GROUND TECHNOLOGIES

Geotechnical Testing Services

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GTE849-Report
9 June 2016

LOGOS PROPERTY
Suite 1202, Level 12
167 Macquarie Street,
Sydney NSW 2000

Attention: Jeff Lord
E-mail: jlord@dblproperty.com

Dear Sir,

RE: Preliminary Geotechnical and Environmental Investigation **at 48B Kurrajong Road, Prestons.**

This letter presents a report on the inspection and testing services associated with the geotechnical investigation at the above mentioned location.

Should you have any questions related to this report please do not hesitate to contact the undersigned.

For and on behalf of
Ground Technologies Pty Ltd

Reviewed By

J. Harendran
Geotechnical Engineer

A. Bennett
Senior Geotechnical Engineer

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EXECUTIVE SUMMARY

Ground Technologies Pty Ltd (Ground Tech) has prepared this report to provide a preliminary geotechnical and environmental model for 48B Kurrajong Road, Prestons NSW (herein referred to as the "site"). It is understood that the site is to be re-developed for industrial use and will require cut to fill operations in order to create level building pads. No further design details were available at the time of preparing this report.

The subject site is located on the northern side of Kurrajong Road, in Prestons NSW. Covering about 2 hectares, the semi-rural allotment is largely vacant with a covering of grass and sparsely located trees. A small excavation about 0.5m deep and 6m in diameter is located at the northern central part of the site. At the south-eastern corner there is a derelict house which has been partially burnt down, and in-ground pool. There are piles of timber and steel adjacent to the house, which appear to be from demolition of a shed or part of the house. A small shed, car body and soil stockpile were located north east of the house. Gradients within the site dip at about 4° to 7°towards the south west.

The site appears to have been historically utilized for semi-rural market gardening. No heavy agriculture was identified within the site during the desktop study. No heavy industrial operations were identified within the site during the desktop study. A search of the NSW EPA Contaminated Land Management record of notices revealed that there were no notices issued to the subject site. No history of dangerous manufacturing utilizing heavy chemicals or metals was documented. No history of heavy chemicals or metals storage was documented.

The geotechnical investigation included drilling five (5) boreholes using 4WD Toyota Landcruiser Drill Rig with flight augers. One (1) bulk sample was recovered for geotechnical testing, five (5) samples were recovered for environmental testing and eleven (11) samples were recovered for salinity testing.

The 1:100,000 scale Geological Series Map of the Sydney region indicates that the subject site is underlain by Bringelly Shale of the Wianamatta Group dating back to the Middle Triassic period and generally comprises *shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, and rare coal / tuff.* The boreholes confirmed this profile across the majority of the site with the subsurface soils comprising a medium to high plasticity clay soil extending to a siltstone or shale bedrock.

Ground slopes within the site were observed as being relatively smooth, one minor stockpile of dumped soil was observed. This indicates a low risk of widespread filling / dumping across the site. Preliminary testing indicates that the fill material within the fill stockpile is within threshold limits for classification as a Restricted Solid Waste. Due to the age of the derelict house, there remains potential for asbestos within the house or associated demolition waste.

The topsoil was observed as being distrurbed by tilling and farming activity. Preliminary laboratory test results show no residual traces of pesticide and heavy metals well within the adopted site criteria thresholds.

Laboratory test results indicate that the soil salinity is predominately slightly saline with some zones of non saline soils. The laboratory test values of sulphates, chlorides and pH indicate that the soil is non aggressive to both steel and concrete.

The results of the desk top study and chemical analyses indicate that the site does not present a significant contamination risk to human health or the environment in a 'Commercial / Industrial' ('D').

1. INTRODUCTION

Ground Technologies Pty Ltd (Ground Tech) has prepared this report to provide a preliminary geotechnical and environmental model for 48B Kurrajong Road, Prestons (herein referred to as the "site"). It is understood that the site is to be re-developed for industrial use and will require cut to fill operations in order to create level building pads. No further design details were available at the time of preparing this report.

The geotechnical investigation included drilling five (5) boreholes using 4WD Toyota Landcruiser Drill Rig with solid flight augers at locations shown on Figure 7. One (1) bulk sample was recovered for geotechnical testing, five (5) samples were recovered for environmental testing and eleven (11) samples were recovered for salinity testing. This report provides a preliminary geotechnical and environmental assessment of the existing soil and rock conditions.

This report is based only on the information provided at the time of this report preparation and may not be valid if changes are made to the site or to the construction method.

1.1 Site Details

The following information, presented in Table 1, describes the site.

Table 1: Summary of Site Details

Site Address	48B Kurrajong Road, Prestons NSW
Council Area	Liverpool City Council
Lot & DP. No.	Lot B, DP416483

Figure 1 – Site Location

1.2 Geology

The 1:100,000 scale Geological Series Map of the Sydney region indicates that the subject site is underlain by Bringelly Shale of the Wianamatta Group dating back to the Middle Triassic period and generally comprises *shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, and rare coal / tuff.*

1.3 Site Description

The subject site is located on the northern side of Kurrajong Road, in Prestons NSW. Covering about 2 hectares, the semi-rural allotment is largely vacant with a covering of grass and sparsely located trees. A small excavation about 0.5m deep and 6m in diameter is located at the northern central part of the site. At the south-eastern corner there is a derelict house which has been partially burnt down, and in-ground pool. There are piles of timber and streel adjacent to the house, which appear to be from demolition of a shed or part of the house. A small shed, car body and soil stockpile were located north east of the house.

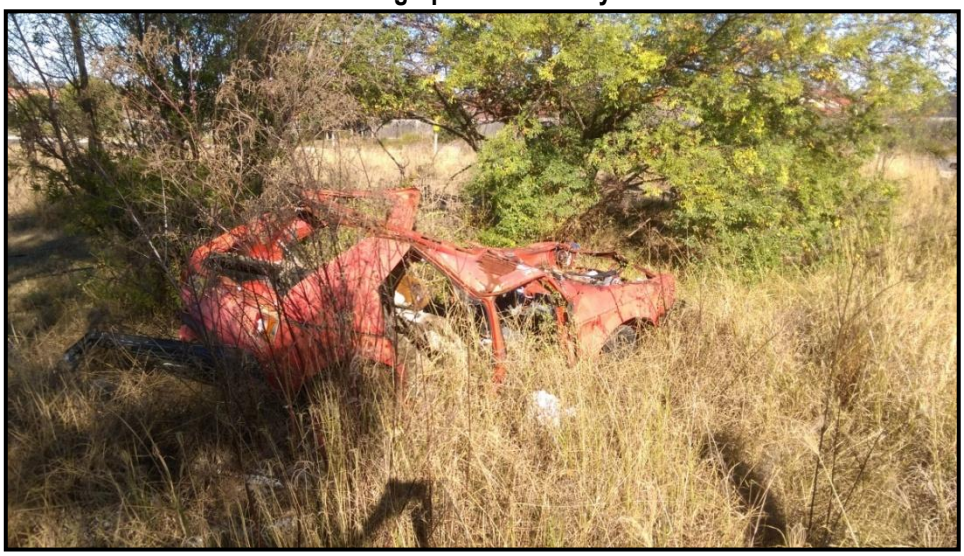
Gradients within the site dip at about 4° to 7°towards the south west.

Photograph 1 – Overview, Southern part of site

Photograph 2 – House and Pool

Photograph 3 – Demolition waste stockpile

Photograph 4 – Car body



Photograph 5 – Demolition waste, west of house.

Photograph 6 – Fill Stockpile (F1), north of house

Photograph 7 – North-west part of site.

Photograph 8 – North-east part of site.

1.4 Site History

A review of Historical Aerial Photographs was undertaken in order to provide a greater insight into the site history.

1947 – In 1947 the site is vacant, largely free of trees except for the southern boundary. Adjoining sites are vacant whilst the region appears to be rural / farming properties. No industrial or manufacturing plants could be identified within the aerial photograph. The subject site is highlighted in figure 2.

Figure 2 – Aerial Photograph from 1947

1970 – In 1970 the northern part of the site remains predominantly vacant. Market gardening appears to be occurring in the central eastern part of the site. A house and two to three small sheds have been constructed in the south-eastern corner. A large warehouse or shed and houses have been constructed in the neighbouring allotment to the west. No industrial or manufacturing plants could be identified within the aerial photograph, however a large industrial warehouse has been constructed about 330m north of the site (not shown in photograph). The subject site is highlighted in figure 3.

Figure 3 – Aerial Photograph from 1970

1982 – In 1982 the subject site remains largely unchanged. Market gardening in the central east appears to have ceased. A pool has been added west of the house. The large shed in the neighbouring site in the west has been removed. No industrial or manufacturing plants could be identified within the aerial photograph. The subject site is highlighted in figure 4.

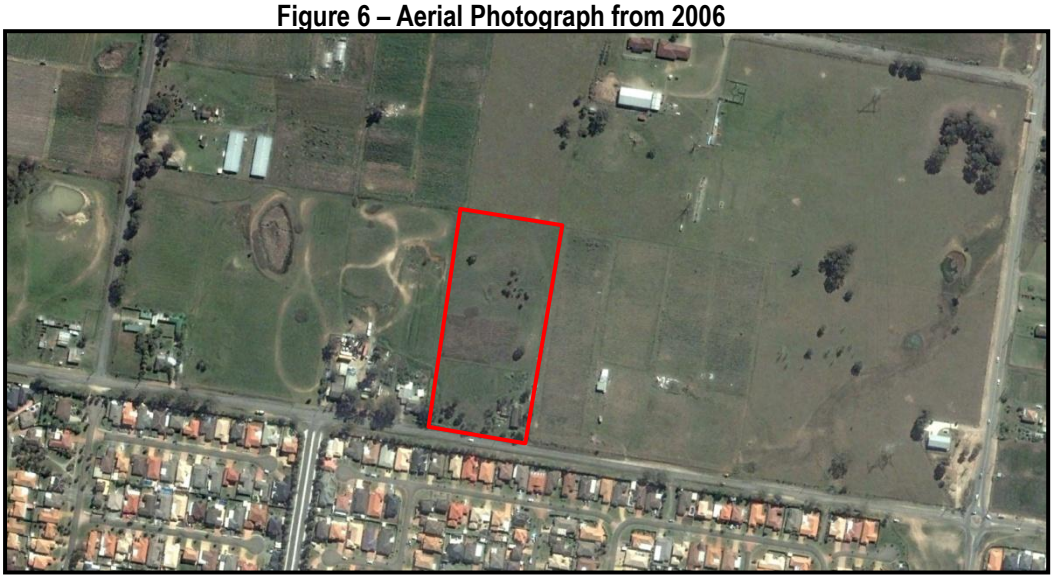
Figure 4 – Aerial Photograph from 1982

1994 – In 1994 no significant changes have been made to the site since 1982. A number of green houses have been constructed in neighbouring sites to the east and north-west. Two neighbouring sites about 300m to the north appear to have ongoing industrial type activity; these sites are used by a crane manufacturer and as a repair depo for tanker trailers at 2016, and are inferred to have similar activity in 1994. A number of green houses have been constructed in neighbouring sites to the east and north-west. The subject site is highlighted in figure 5.

Figure 5 – Aerial Photograph from 1994

2006 – In 2006 the subject site remains moist unchanged. Tilling of the land appears to have occurred in the central part of the site. From the neighbouring sites, most of the green houses have been removed however market gardening is ongoing. Two neighbouring sites about 330m to the north (not shown in photograph) appear to have ongoing industrial type activity; these sites are used by a crane manufacturer and as a repair depo for tanker trailers at 2016, and are inferred to have similar activity in 2006. The neighbouring area to the south has been developed as a residential subdivision. The subject site is highlighted in figure 6.

Figure 6 – Aerial Photograph from 2006



2012 – In 2012 no significant changes to the land usage were observed from 2006. The subject site is highlighted in figure 7.

Figure 7 – Aerial Photograph from 2012

2016 – In 2016 no significant changes to the land usage were observed from 2012. The subject site is highlighted in figure 8.

Figure 8 – Aerial Photograph from 2016

2. GEOTECHNICAL INVESTIGATION

Fieldwork was undertaken on the 20th of May 2016 and included drilling ten boreholes (BH1-BH5) using a 4WD Toyota Landcruiser Ute mounted drill rig with 100 mm solid flight spiral augers at the locations shown on Figure 9. Pocket Penetrometer tests were undertaken within the clay profile recovered from the boreholes. One bulk sample was recovered and sent to the Ground Technologies NATA accredited laboratory in order to determine the California Bearing Ratio (CBR) and Atterberg Limits of the subgrade profile.

Figure 9 – Borehole Locations

2.1 Soil Profiles

A number of distinct geological units were encountered during the field investigation. These units are detailed in Table 2 and the approximate depth of each unit is detailed in Table 3. Full borehole logs and field observations are presented in Appendix A.

Table 2: Summary of Geological Units

UNIT	SOIL TYPE
UNIT A	FILL, Clayey SILT, brown, with roots and organic content, dry.
UNIT B	TOPSOIL: Clayey SILT, brown, with roots and organic content, dry,
UNIT C	NATURAL: Silty CLAY, medium to high plasticity, red-brown, pale-brown, pale grey, slightly moist , stiff to very stiff.
UNIT D	BEDROCK: SHALE, extremely weathered to highly weathered, extremely low to low strength.
UNIT E	BEDROCK: SILTSTONE/SHALE, highly to moderately weathered, low to medium strength.

Table 3: Depth of each Geological Unit

BH	Geological Unit & Depth (m)				
	Unit A	Unit B	Unit C	Unit D	Unit E
	FILL	TOPSOIL	NATURAL Soil Stiff to Very Stiff	BEDROCK SHALE, EL-L Str	BEDROCK SHALE, L-M Str
BH1	-	0.0-0.1	0.1-1.5	1.5-2.8	2.8-3.0*
BH2	-	0.0-0.2	0.2-1.0	1.0-3.0*	-
BH3	-	0.0-0.2	0.2-1.5	1.5-2.8	2.8-3.4*
BH4	-	0.0-0.1	0.1-1.2	1.2-1.6*	-
BH5	-	0.0-0.1	-	0.2-1.5*	-
BH6	0.0-0.5	-	-	-	-

Note* - Borehole terminated due to rig refusal.

2.2 Groundwater

Groundwater was not encountered during the course of the field investigation.

2.3 Laboratory Testing

One (1) representative soil sample of the subgrade material (Unit C) was submitted to Ground Technologies NATA accredited soil laboratory for testing to determine the four day soaked California Bearing Ratio (CBR). The laboratory test results are provided in Appendix B and are summarised in Table 4 below.

Table 4: California Bearing Ratio Test Results

Soil Type	Unit	CBR	Liquid Limit	Plastic Limit	Plasticity Index
NATURAL: Silty CLAY, medium to high plasticity, red-brown, pale-brown, pale grey, slightly moist.	C	4.0	46	20	26

2.4 Site Fill

Ground slopes within the site were observed to be relatively flat over the majority of the site, with the exception of two zones.

1. Stockpile of fill at north of the existing house, identified as location F1 in Figure 8. Drilling into the stockpile indicated the material to be stockpiled topsoil.
2. Undulating ground surface, identified as location F2 in Figure 8. Regular undulations approximately 0.2m high, inferred to be disturbed topsoil from tilling of the ground.

Preliminary contamination testing and classification of the fill has been undertaken within section 5.7 of this report.

Figure 10 – Location of Identified Fill

2.5 Conclusion

The subsurface profile encountered was consistent with the surrounding regional geology. Subject to the filling being validated and controlled, the site is suitable for the proposed development.

3. PRELIMINARY SALINITY ASSESSMENT

Salt is a naturally occurring mineral that forms in a number of ways. It is a product of rock weathering, especially marine sedimentary rocks. It is picked up by wind blowing over the oceans and carried inland as salt laden moisture. Dispersed salt on the soil surface can be concentrated by the action of the wind. These salt deposits are buried over millions of years, but can later be exposed by erosion or the salt can be mobilised by groundwater.

Salt is a natural part of some landscapes, for example, in inland salt pans, brackish streams, coastal salt marshes and naturally saline soils. However, where human activities such as vegetation clearing, cropping, and housing development have disturbed natural ecosystems and changed the hydrology of the landscape, the movement of salt into rivers and on land is accelerated. This is affecting the natural environment, reducing the viability of the agricultural sector and damaging infrastructure.

Salinity is a dynamic process with the potential for the movement and accumulation of salts to change over time and as a result of land use and management practices. The processes of salinity vary at different scales such as individual sites, regions and whole river catchments, so the impacts can be close to or distant from the cause, depending on the landscape and groundwater characteristics.

The impacts of salinity depend on factors such as the susceptibility of the landscape, land use practices, the type of salt, length and frequency of wetting and drying cycles, the salt concentration in the landscape and the amount of water available.

Urban salinity is mainly caused by rising groundwater bringing salts to the land surface. Towns are often located in areas prone to salinity (such as plains, valleys, or at the foot of a ridge). In addition to the regional causes a rise in groundwater levels (see dry land salinity), urban development itself can lead to localized salinity because of:

- Clearing of native vegetation for urban development
- Over-watering of gardens, parks and sporting fields
- Water leaking from pipes, drains, tanks
- Seepage from sullage pits, and
- Blocking or changing natural drainage paths (such as by building roads).

Recognizing the solubility of salt in water is the key to understanding urban salinity processes. When water comes into contact with buildings and other infrastructure, salt can be carried with it. As the water evaporates (or dries) the salt crystals grow and expand, causing physical damage to bricks, mortar and other construction materials. The salt crystals often form a white crust on the surface of bricks. Homeowners often try to wash off the unsightly residue, but this only helps the salt crystals grow even bigger, worsening the problem.

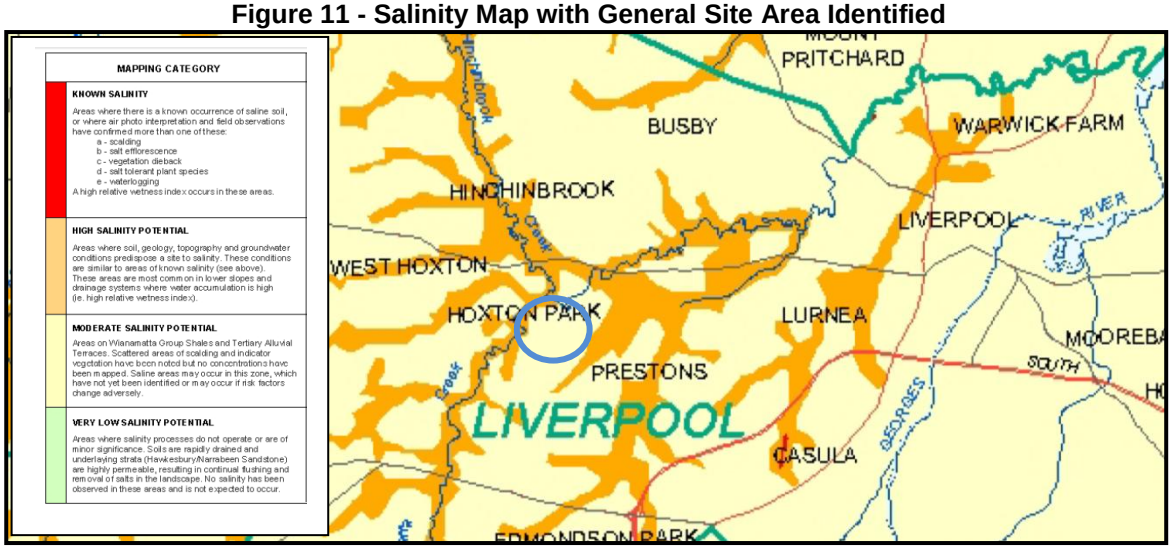
Urban salinity affects built infrastructure, due to the chemical and physical impact of salt on concrete, bricks and metal. The salt moves with water into the pores of bricks and concrete when they are exposed to damp, salt-laden soils. As the water is evaporated from the material, the salt concentrates and over time this can be substantial enough to cause corrosion and damage the material's structure. This is seen as crumbling, eroded or powdering mortar or bricks, the flaking of brick facing and the cracking or corrosion of concrete. The salt within the material can also have a corrosive effect on steel reinforcing. The long-term consequences can be structural damage.

Some building methods may also contribute to the development of salinity. Compacted surfaces can restrict groundwater flow and concentrate salt in one area. By cutting into slopes to build, groundwater or saline soil may be intercepted and exposed. In addition, fill used to build up an area may be a source of salt, or it may be less permeable, preventing good drainage.

3.1 Salinity Potential

The Department of Infrastructure and Planning (2002) Salinity Potential in Western Sydney map "Salinity Potential in Western Sydney 2002" indicates that the subject site is situated in a region with a moderate to high risk of saline soils.

Figure 11 - Salinity Map with General Site Area Identified



The moderate classification is attributed to scattered areas of scalding and vegetation indicators in areas where the concentrations have not been mapped. There is the possibility of encountering saline areas which were not identified due to localised factors. Saline soils could occur within areas of lower slopes and drainage systems where water accumulation is high or where movement of water through the soil profile is low.

Eleven (11) preliminary screening tests were collected as a part of this assessment in order to gain a view on the risk of saline soils. This assessments is based on the booklet "Site Investigations for Urban Salinity" published by Department of Land and Water Conservation 2002. Laboratory analysis was completed by Australian Laboratory Services (ALS) Pty Ltd, a NATA accredited laboratory, Certificate Reference number ES1611024.

3.2 Electrical Conductivity

Salinity refers to the presence of excessive salt, which is toxic to most plants. Because salt separates into positively and negatively charged ions when dissolved in water, the electrical conductivity of the water increases as the amount of salt increases. To test the electrical conductivity of soil one part of soil is mixed with 5 parts of water. The result is then multiplied by the soil texture conversion factor to give the final figure. This result is known as extract electrical conductivity (EC_e). The EC_e values of soil salinity class is given below which has been adopted from the booklet "Site Investigations for Urban Salinity" published by Department of Land and Water Conservation 2002. The salinity exposure classification for various concrete strengths (F'_c) is detailed in Section 5.1 of AS 2870-2011 "Residential Slabs and Footings" code.

Table 5: EC_e values of Soil Salinity Class and Exposure Classification for Concrete

Class	EC_e	Exposure Classification for Concrete (AS 2870 – 2011 from Tables 5.1 & 5.3)
Non Saline	<2	A1 (min. F'_c = 20 MPa)
Slightly Saline	2-4	A1 (min. F'_c =20 MPa)
Moderately Saline	4-8	A2 (min. F'_c =25 MPa)
Very Saline	8-16	B1 (min. F'_c =32 MPa)
Highly Saline	>16	B2 (min. F'_c =40MPa)

3.3 Chlorides

Chlorides are negatively charged ions (anions) which are corrosive to building material, particularly steels. In concrete, chlorides react with the steel reinforcement causing it to corrode and expand putting physical stress on the concrete.

3.4 Sulphates

Sulphates are negatively charged particles (anions) which are corrosive to building materials, particularly concrete. Sulphates react with the hydrated calcium aluminate in concrete. The products of the reaction have a greater volume than the original material, producing physical stress in the concrete.

Table 6: Sulphate and Chloride Values and Aggressivity

Concrete Structure		Steel Structure	
Sulphate (SO4) Units(mg/kg)	Classification	Chloride Units(mg/kg)	Classification
<5,000	Non-aggressive	<20,000	Non-aggressive
5,000-10,000	Mild	20,000-50,000	Mild
10,000-20,000	Moderate	>50,000	Moderate
>20,000	Severe		

Source: *Australian Standard 2159:2009 Piling – Design and Installation Guidelines*

3.5 pH

pH Measures acidity or alkalinity of soil and is important in determining the aggressiveness of the soil to building materials. Acids combine with the calcium hydroxide component of cement to form soluble calcium compounds which can leach from the concrete increasing its porosity and decreasing its strength.

Table 7: pH Values and Aggressivity

Concrete Structure		Steel Structures	
pH	Classification	pH	Classification
>5	Non-aggressive	>4	Non-aggressive
4.5-5	Mild	3-4	Mild
4.0-4.5	Moderate	<3	Moderate
<4.0	Severe		

Source: *Australian Standard 2159:2009 Piling – Design and Installation Guidelines*

3.6 Laboratory Test Results

Test results are tabulated and presented in table 8 & 9 below. The laboratory test certificate is located in Appendix C. A discussion of the test data is presented in Section 3.7.

Table 8: Analysis of the Soil Samples (Salinity)

Sample	Borehole	Depth (m)	EC µS/cm	Texture Factor	ECe	Salinity Class
A2	BH1	0.5	0.329	7	2.3	Slightly Saline
A3	BH1	1.5	0.295	9	2.7	Slightly Saline
A4	BH1	2.5	0.337	9	3.0	Slightly Saline
A7	BH2	0.5	0.166	7	1.2	Non Saline
A8	BH2	1.5	0.166	9	1.5	Slightly Saline
A9	BH2	2.5	0.242	9	2.2	Slightly Saline
A11	BH3	0.5	0.432	7	3.0	Slightly Saline
A12	BH3	1.5	0.311	9	2.8	Slightly Saline
A13	BH3	2.5	0.234	9	2.1	Slightly Saline
A15	BH4	0.5	0.090	7	0.6	Non Saline
A17	BH4	0.5	0.030	7	0.2	Non Saline

Table 9: Analysis of the Soil Samples (Aggressiveness)

Sample	Borehole	Depth (m)	pH	Chloride	Sulphate	Resistivity	Aggressivity to Concrete	Aggressivity to Steel
			pH Units	mg/kg	mg/kg	Ohm.cm		
A2	BH1	0.5	5.7	360	320	3040	Not Agg	Not Agg
A3	BH1	1.5	6.0	310	220	3390	Not Agg	Not Agg
A4	BH1	2.5	9.3	190	100	2970	Not Agg	Not Agg
A7	BH2	0.5	6.2	110	230	6020	Not Agg	Not Agg
A8	BH2	1.5	6.9	150	70	8620	Not Agg	Not Agg
A9	BH2	2.5	7.2	240	130	4030	Not Agg	Not Agg
A11	BH3	0.5	5.4	420	220	2310	Not Agg	Not Agg
A12	BH3	1.5	5.8	330	240	3220	Not Agg	Not Agg
A13	BH3	2.5	7.2	250	140	4270	Not Agg	Not Agg
A15	BH4	0.5	6.2	40	110	11100	Not Agg	Not Agg
A17	BH4	0.5	6.0	<10	40	33000	Not Agg	Not Agg
Abbreviations:								
Not Agg	*Non-Aggressive*							
Mild	*Mildly Aggressive*							

3.7 Results Discussion

From the results presented in Table 8, the electrical conductivity results indicate that the soil salinity is predominately slightly saline with some non saline soils present. No highly saline results were recorded. The laboratory test values of sulphates, chlorides and pH (table 9) indicate that the soil samples are non aggressive to both steel and concrete. Structural designs should take into account the following minimum design recommendations for concrete reinforced structures

Table 10: Structural Design Recommendations

Ground Slabs[1]		Concrete Bored Piers [2]		
F'c	Cover	F'c	Cover (50 year design life)	Cover (100 year design life)
20MPa	45mm	32MPa	45mm	65mm

Note 1 – Reference AS2870 Residential Slabs and Footings
Note 2 – Reference AS2159:2009 Piling – Design and Installation Guidelines

4. PRELIMINARY ACID SULPHATE SOILS ASSESSMENT

Acid Sulfate Soils (ASS) are naturally occurring and usually form in low lying coastal areas, creeks, rivers and flood plains. The sulfates present in the soil are stable when in the saturated/waterlogged state, but react to form sulphuric acid when disturbed and exposed to oxygen. The Department of Land and Water Conservation has no record of Acid Sulphate soils within the Prestons region.

5. PRELIMINARY CONTAMINATION ASSESSMENT

5.1 Search of the Contaminated Land Management Register (NSW EPA)

A summary of the search of the NSW EPA Contaminated Land Management record of notices for the Liverpool City Council Area can be found in Appendix D. No notices have been issued to the subject site. Two (2) sites are listed on this register however they are situated at such a distance (greater than 500m) so as not to pose a potential contamination risk to the subject property.

5.2 Search of the Protection of the Environment operations Public Register (POEO) of Licensed and Delicensed Premises:

A search of the POEO public register of licensed and delicensed premises (DECC) provided the details of 22 notices for premises in the Prestons NSW area. No licensed or delicensed premises were located within the immediate surrounding area of the site (within 500m). Full results of the search can be found in Appendix D.

5.3 Summary of Potential Sources of Contamination:

Minor market gardening was identified within the site during the desktop study between 1970 and 1982. No heavy agriculture was identified within the site during the desktop study. No heavy industrial operations were identified within the site during the desktop study.

A search of the NSW EPA Contaminated Land Management record of notices revealed that there were no notices issued to the subject site. No history of dangerous manufacturing utilizing heavy chemicals or metals was documented. No history of heavy chemicals or metals storage was documented.

The neighbouring properties to the east and west show evidence only for market gardening. The neighbouring properties about 330m to the north show evidence of industrial use.

According to the interpretation of the sub-surface soil profile for this site, clay soils are present beneath the site. This material would provide a relatively impermeable layer and prevent the migration of any contamination into deeper soils or groundwater.

Whilst the potential for site contamination was low, minor laboratory screening testing was undertaken as a part of this investigation. Routine testing for metals such as Arsenic, Chromium Copper, Lead, Mercury Nickel and Zinc was undertaken whilst Organochlorine Pesticides (OCP), Organophosphorous Pesticides (OPP) was also undertaken within the soil profile.

One stockpile of fill was identified during the site walk over. Limited screening testing of the fill was undertaken as a part of this preliminary investigation

5.4 Sampling Methodology:

Each sample location was excavated utilizing a truck mounted solid flight auger drill rig. The sample was collected from the auger using a stainless steel trowel, which had been decontaminated prior to use to prevent cross contamination occurring.

The samples were placed in 250g laboratory prepared glass jars which were capped using Teflon-sealed screw caps and then placed in a chilled container. The sample jars were transported to our West Hoxton office and placed in a refrigerator.

The samples were then forwarded to Australian Laboratory Services Pty Ltd (ALS) for analysis along with a Chain of Custody which was subsequently returned to confirm the receipt of all samples. ALS are accredited by the National Association of Testing Authorities (NATA) for the analyses carried out and are also accredited for

compliance with ISO/IEC 17025.

5.5 Soil Assessment Criteria:

The Assessment criteria used in this investigation have been obtained from the "Guidelines for Assessing Former Orchards and Market Gardens" (FOMG) prepared by Department of Environment and Conservation (NSW) and the National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013). This document presents risk-based Health Investigation Levels based on a variety of exposure settings for a number of organic and inorganic contaminants. To assess the risk to human health the results of the laboratory analysis are compared against the Health Investigation Levels (HIL) for the exposure setting; 'Commercial / Industrial' ('D').

The selected assessment criteria used in this assessment are summarized on table 11 below:

Table 11: Site Assessment Criteria

Contaminant	Health Based Investigation Level (HIL'D')	FOMG
Arsenic (total)	3,000	500
Cadmium	900	100
Chromium	3,600	-
Copper	240,000	250
Lead	1,500	1500
Mercury	730	75
Nickel	6,000	-
Zinc	400,000	35,000
Aldrin + Dieldrin	45	50
Chlordane	530	100
Endosulfan	2,000	-
Endrin	100	-
Heptachlor	50	1000
Mothoxychlor	2,500	-
DDD+DDE+DDT	3,600	5,000
C6-C10	800	-
C10-C16	1,000	-
C16-C34	5,000	-
C34-C40	10,000	-
Benzene	65	-
Toulene	105	-
Ethylbenzene	125	-
Xylenes	45	-
Total PAH	4000	-
Benzo(a)pyrene	0.7	-
Carcinogenic PAH	4	-

5.6 Laboratory Test Results – Agricultural Land:

Routine testing for metals such as Arsenic, Chromium Copper, Lead, Mercury Nickel and Zinc was undertaken whilst Organochlorine Pesticides (OCP), Organophosphorous Pesticides (OPP) was also undertaken within the soil profile. Test results are tabulated and presented below (Tables 12 & 13) along with the relevant assessment criteria. Laboratory test certificates (ES1611024) are located in Appendix C.

Table 12: Heavy Metals in Natural Soils

Location	Sample No.	Depth (m)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
BH1	A1	0.2	<5	<1	26	28	39	<0.1	14	71
BH2	A6	0.2	16	<1	19	26	18	<0.1	9	53
BH3	A10	0.2	6	<1	18	36	16	<0.1	9	54
BH4	A14	0.2	10	<1	17	22	11	<0.1	6	37
BH5	A16	0.2	22	<1	10	27	17	<0.1	12	68
NEPM Health Investigation			**3000**	**900**	**3600**	**240000**	**1500**	**730**	**6000**	**400000**
FOMG			**500**	**100**	**-**	**250**	**1500**	**75**	**-**	**35000**

Table 13: Pesticides in Natural Soils

Location	Sample No.	Depth (m)	Aldrin + Dieldrin	Chlordane	Endosulfan	Endrin	Heptachlor	Methoxychlor	DDD+DDE+DDT
BH1	A1	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
BH2	A6	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
BH3	A10	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
BH4	A14	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
BH5	A16	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
NEPM Health Investigation			**45**	**530**	**2000**	**100**	**50**	**2500**	**3600**
FOMG			**50**	**100**	**-**	**-**	**1000**	**-**	**5000**

5.7 Laboratory Test Results – Fill Material:

One stockpile of soil fill was identified during the field investigation. Limited screening testing of the fill was undertaken as a part of this preliminary investigation. Test results are tabulated and presented below (Tables 14, 15 & 16) along with the relevant assessment criteria. Laboratory test certificates (ES1611024) are located in Appendix C.

Table 14: Heavy Metal Test Results in Fill Material

Location	Sample No.	Depth (m)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Fill Stockpile F1	A5	0.3	<5	<1	20	32	**107**	<1	11	155
NEPM Health Investigation Level			**3000**	**900**	**3600**	**240000**	**1500**	**730**	**6000**	**400000**
FOMG			**500**	**100**	**-**	**250**	**1500**	**75**	**-**	**35000**

Table 15: Hydrocarbons in Fill Material

Location	Sample No.	Depth (m)	C6-C10	C10-C16	C16-C34	C34-C40	Benzene	Toulene	Ethylbenzene	Xyleses	Total PAH	Carcinogenic PAH	Benzo(a)pyrene
Fill Stockpile F1	A5	0.3	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
NEPM Health Investigation			**800**	**1,000**	**5,000**	**10,000**	**65**	**105**	**125**	**45**	**4000**	**4**	**0.7**

No fibre cement or asbestos like materials were observed within the soils during the field investigation. However it should be noted there is potential for asbestos materials within the dilapidated house and associated stockpiles of demolition waste.

5.8 Conclusions from Preliminary Contamination Assessment:

The laboratory screening tests show the levels of heavy metals below both the "Guidelines for Assessing Former Orchards and Market Gardens" (FOMG) and the Health Investigation Levels (HIL) for the exposure setting; 'Commercial / Industrial' ('D'). The laboratory test results show that the levels of pesticides were below the detection limits.

The results of the desk top study and preliminary screening chemical analyses indicate that the site would present a low risk to human health or the environment in a 'Commercial / Industrial' ('D'), however a conclusive statement can not be made without a Stage 2 Contamination Assessment with testing in accordance with EPA sampling guidelines. It should be noted that any residual contamination caused by pesticides would be limited to the upper 0.2m to 0.5m of soils profile

One stockpile of soil fill was identified within the site. Preliminary testing indicates that the material is not within threshold limits for classification as a General Solid Waste due to exceedance of the value for Lead. Without TCLP testing for leachability, the test results for the one sample tested indicated the material is within limits for classification as a Restricted Solid Waste (RSW).

No fibre cement or asbestos like materials were observed within the soils during the field investigation. However it should be noted there is potential for asbestos materials within the dilapidated house and associated stockpiles of demolition waste.

6. PRELIMINARY GEOTECHNICAL DESIGN PARAMETERS AND RECOMMENDATIONS

6.1 Site Classification

As defined in AS 2870-2011, Table 2.1 and section 2.2.3, the proposed filled portion of the site, where filling is placed as controlled fill in accordance with AS3798, could be classified as a **Class "H1"** site. Based on the geology, and the natural / fill soil profiles encountered on this limited scope investigation, the site is estimated to have a Characteristic Surface Movement (ys) in the range between **40mm** and **60m** which is typical for clay soils derived from shale, which has been extensively weathered. The general definition of a Class "H1" site as presented in Table 2.1 of AS 2870–2011 is described as a highly reactive site which can experience high ground movement from moisture changes.

Within Cut Portions of the site, where bedrock is encountered at depths of less than 1.4m the site classification may be downgraded to a Class M or lower. This is subject to re-classification at the end of bulk earthworks.

6.2 Footings – Allowable End Bearing Capacity

It is envisaged that footings for the superstructures will comprise high level strip or pad type footings. Such strip or pad footings shall be proportioned using a maximum allowable bearing pressure not exceeding 150kPa within the natural stiff clays (Unit C) and controlled fill platform. Adopt minimum founding depths of not less than 0.4m (below surrounding finished surface level) for all strip / pad footings.

Strip or pad footings constructed within the shale / siltstone bedrock (Unit D and Unit E) may be proportioned using a maximum allowable bearing pressure not exceeding 700kPa.

Bored Pier footings constructed within the shale / siltstone bedrock (Unit D and Unit E) may be proportioned using a maximum allowable bearing pressure not exceeding 700kPa and an allowable skin friction of 70kPa. Higher end bearing capacities may be available within the medium strength bedrock (below rig refusal depth) subject to further geotechnical investigation utilizing NMLC drilling techniques.

6.3 Floor Slab / Pavements

Preliminary design for floor slabs and pavements can be designed upon a Sub-grade Reaction Modulus (k) of 30kPa or a CBR of 4.0%. This adopted value is based on the assumption that drainage is suitably detailed to prevent any saturation of sub-grade or pavement materials. Higher values may be achieved within cut portions of the site where shale bedrock is exposed. All pavement design parameters should be confirmed at the completion of bulk earthworks.

Rigid pavements should incorporate a regular spacing of construction joints in order that minor post construction vertical differential movement of the sub-grade does not detrimentally affect pavement performance.

Differential vertical movement within the sub-grade profile present across the site is inevitable beneath pavement areas. Such movement may induce pavement distortion, longitudinal cracking at pavement edges & 'rolling-out' of kerbs. Minimisation of such movements can be achieved by adopting the following measures:

- continue sub-base crushed rock at least 500mm past kerbs
- Avoid garden beds which can act as a conduit for rainfall (or watering) causing wetting of subgrade clays to adjacent paving.
- Install perimeter cut-off drains at the edge of pavements. Soils drains should penetrate to approx. 200mm below the clay interface & be connected to drainage points.
- Ensure that tree planting does not promote drying of subgrade clays to adjacent pavements.

6.4 Batter Slopes

We understand that excavation operations will form part of the development. Resultant embankments should either be retained or battered back to the following recommended slopes:

- Short term Unretained batters in controlled fill and natural clay (Units A to C) should be cut no steeper than 1 Vertical to 1 Horizontal.
- Short term unretained batters in extremely weathered bedrock (Unit D) should be cut no steeper than 1 Vertical to 0.5 Horizontal.
- Short term unretained batters in highly moderately weathered bedrock (Unit E) could be cut vertically, subject to inspection and approval by a geotechnical engineer after every meter depth of cut within this material.
- Long term Unretained batters in controlled fill and natural clay (Units A to C) should be cut no steeper than 1 Vertical to 2 Horizontal.
- Long term unretained batters in extremely to highly weathered bedrock (Units D and Unit E) should be cut no steeper than 1 Vertical to 1 Horizontal.

Unretained excavations should not extend below the "zone of influence" of adjacent structures. That is, a line drawn 45^{o} down from the foundation level of adjacent structures or features. If excavations are to extend below this line, proposed excavations are to be retained prior to excavation.

6.5 Site Excavations

Excavations within Units A to D should be achieved with bucket attachment to a midsized excavator. Excavations within (Unit E) or medium strength bedrock, possibly encountered at a depth below drill rig refusal, may require pre-loosening using rock breaking or ripping attachments.

6.6 Retaining Wall Design Parameters

The material being retained will comprise controlled fill and natural clay. These materials may be apportioned an effective friction angle of 25 degrees.

Where retaining walls are designed to allow for a small amount of lateral strain (nominally 1/1000th of wall height) the lateral pressure acting on the wall can be calculated assuming distribution of 7.5H (kPa) where H equals the height of retained material in metres. The resultant lateral thrust will be 3.75H^2 (KN) and will act at a height of H/3 above the base.

The design of rigid retaining walls should allow for a lateral earth pressure acting on the wall of 10.0H (kPa). The resultant lateral thrust will be 5.0H^2 (KN) and will act at a height of H/3 above the base.

Surcharge loads (if applicable) will ADD to the earth pressure acting on retaining walls. In the case of non rigid walls, assume K_a x surcharge load will be converted to lateral thrust. For rigid walls assume K_o x surcharge load will be converted to loaded thrust. Allowance should be made for sloping backfill (if applicable).

Walls should be constructed as soon as possible after cutting operations. Subsurface drains should be provided in any backfill material, discharge from subsurface drains should be to an approved discharge point. It is recommended that a minimum of 300mm width of free draining aggregate is provided as a drainage medium behind the retaining walls.

7. CONDITIONS OF THE RECOMMENDATIONS

This report is a geotechnical report only and the classification stated shall not be regarded as an engineering design nor shall it replace a design by engineering principles although it may contribute information for such designs. When this report is to be used as a reference by the engineer or builder or other relevant party, this report must be reproduced in total.

The advice given in this report is based on the assumption that the test results are representative of the overall subsurface conditions. However, it should be noted that actual conditions in some parts of the building site may differ from those found in the test holes. If excavations reveal soil conditions significantly different from those shown in our attached Soil Log(s), Ground Tech must be consulted and excavations stopped immediately.

The foundation depths quoted in this report are measured from the surface during our testing and may vary accordingly if any filling or excavation works are carried out. The description of the foundation material for has been provided for its easy recognition over the whole building site.

Any sketches in this report should be considered as only an approximate pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions or slope information should not be used for any building cost calculations and/or positioning of the building. Dimensions on logs are correct.

8. LIMITATIONS

This type of investigation (as per our commission) is not designed or capable of locating all ground conditions, (which can vary even over short distances). The advice given in this report is based on the assumption that the test results are representative of the overall ground conditions. However, it should be noted that actual conditions in some parts of the site might differ from those found. If excavations reveal ground conditions significantly different from those shown in our findings, Ground Tech must be consulted.

The scope and the period of Ground Tech services are described in the report and are subject to restrictions and limitations. Ground Tech did not perform a complete assessment of all possible conditions or circumstances that may exist at the Site. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Ground Tech in regards to it.

Where data has been supplied by the client or a third party, it is assumed that the information is correct unless otherwise stated. No responsibility is accepted by Ground Tech for incomplete or inaccurate data supplied by others.

Any drawings or figures presented in this report should be considered only as pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions should not be used for accurate calculations or dimensioning.

The advice given in this report is based on the assumption that the test results are representative of the overall subsurface conditions. However, it should be noted that actual conditions in some parts of the building site may differ from those found in the test holes. If excavations reveal subsurface conditions significantly different from those shown in our attached Soil/Rock Log(s), Ground Tech must be consulted and excavations stopped immediately.

The foundation depths quoted in this report are measured from the surface during our testing and may vary accordingly if any filling or excavation works are carried out. The description of the foundation material for has been provided for its easy recognition over the whole building site.

Any sketches in this report should be considered as only an approximate pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions or slope information should not be used for any building cost calculations and/or positioning of the building. Dimensions on logs are correct.

APPENDIX A

Borehole Logs

GROUND TECHNOLOGIES

Geotechnical Testing Services

Ground Technologies Pty Ltd
ABN 25 089 213 294
PO Box 1121 Green Valley NSW 2168
Ph: (02) 8783 8200
Fax: (02) 8783 8210
Email: lab@groundtech.com.au

SITE LOCATION: 42B Kurrajong Road, Prestons

BOREHOLE NO. 1

WATER	DEPTH (m)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION (SOIL TYPE, COLOUR, MOISTURE, CONSISTENCY)	GRAPHIC LOG	SAMPLES	REMARKS
N I L		-	Clayey SILT, brown, with roots and organic content.			TOPSOIL
		CH	Silty CLAY, medium to high plasticity, red-brown with pale grey, slightly moist. Stiff to Very Stiff.		A1	RESIDUAL PP. 200 kPa
	0.5				A2	
	1		Silty CLAY / Completely weathered Shale, medium to high plasticity, pale grey with red, slightly moist, Very Stiff.			
	1.5	ROCK	SHALE, extremely to highly weathered, pale brown, extremely low to low strength. As above, highly weathered, low strength.		A3	BEDROCK
	2					
	2.5				A4	
			SHALE, moderately to slightly weathered, brown-grey, medium strength.			
	3		Borehole terminated at 3.0m			TC bit refusal
	3.5					
	4					
	4.5					

Method: 4WD Mounted Rig/Solid FlightSpiral Augers
Date of Drilling: 20/5/2016
Logged and Drilled by: JH/SM

GROUND TECHNOLOGIES

Geotechnical Testing Services

Ground Technologies Pty Ltd
ABN 25 089 213 294
PO Box 1121 Green Valley NSW 2168
Ph: (02) 8783 8200
Fax: (02) 8783 8210
Email: lab@groundtech.com.au

SITE LOCATION: 42B Kurrajong Road, Prestons

BOREHOLE NO. 2

WATER	DEPTH (m)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION (SOIL TYPE, COLOUR, MOISTURE, CONSISTENCY)	GRAPHIC LOG	SAMPLES	REMARKS
NIL			Clayey SILT, brown, with roots and organic content.			TOPSOIL
		CH	Silty CLAY, medium to high plasticity, red-brown with pale grey, slightly moist. Stiff to Very Stiff.		A6	RESIDUAL
	0.5				A7	
	1		SHALE, extremely to hightly weathered, grey, pale brown, extremely low to very low strength.			BEDROCK
	1.5				A8	
	2		As above, highly to moderately weathered, very low to low strength.			
	2.5				A9	
	3					
	3.5		Borehole terminated at 3.5m			TC bit refusal
	4					
	4.5					

Method: 4WD Mounted Rig/Solid FlightSpiral Augers
Date of Drilling: 20/5/2016
Logged and Drilled by: JH/SM

GROUND TECHNOLOGIES

Geotechnical Testing Services

Ground Technologies Pty Ltd
ABN 25 089 213 294
PO Box 1121 Green Valley NSW 2168
Ph: (02) 8783 8200
Fax: (02) 8783 8210
Email: lab@groundtech.com.au

SITE LOCATION: 42B Kurrajong Road, Prestons

BOREHOLE NO. 3

WATER	DEPTH (m)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION (SOIL TYPE, COLOUR, MOISTURE, CONSISTENCY)	GRAPHIC LOG	SAMPLES	REMARKS
NIL		-	Clayey SILT, brown, with roots and organic content.			TOPSOIL
		CH	Silty CLAY, medium to high plasticity, red-brown with pale grey, slightly moist. Stiff to Very Stiff.		A10	RESIDUAL
	0.5				A11	
			Silty CLAY / Completely weathered Shale, medium to high plasticity, pale grey with red, slightly moist, Very Stiff.			
	1					
	1.5	ROCK	SHALE, extremely to hightly weathered, grey, pale brown, extremely low to very low strength.		A12	BEDROCK
	2		As above, highly weathered, low strength.			
	2.5				A13	
			SHALE, moderately to slightly weathered, brown-grey, medium strength.			
	3					
	3.5		Borehole terminated at 3.4m			TC bit refusal at 3.4m
	4					
	4.5					

Method: 4WD Mounted Rig/Solid FlightSpiral Augers
Date of Drilling: 20/5/2016
Logged and Drilled by: JH/SM

GROUND TECHNOLOGIES

Geotechnical Testing Services

Ground Technologies Pty Ltd
ABN 25 089 213 294
PO Box 1121 Green Valley NSW 2168
Ph: (02) 8783 8200
Fax: (02) 8783 8210
Email: lab@groundtech.com.au

SITE LOCATION: 42B Kurrajong Road, Prestons

BOREHOLE NO. 4

WATER	DEPTH (m)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION (SOIL TYPE, COLOUR, MOISTURE, CONSISTENCY)	GRAPHIC LOG	SAMPLES	REMARKS
N I L		-	Clayey SILT, brown, with roots and organic content.			TOPSOIL
		CH	Silty CLAY, medium to high plasticity, red-brown with pale grey, slightly moist. Stiff to Very Stiff.		A14	RESIDUAL
	0.5				A15	
	1					
			SILTSTONE, highly weathered, brown, pale brown, low strength.			BEDROCK
	1.5		SILTSTONE, highly to moderately weathered, low to medium strength.			
			Borehole terminated at 1.6m			TC bit refusal.
	2					
	2.5					
	3					
	3.5					
	4					
	4.5					

Method: 4WD Mounted Rig/Solid FlightSpiral Augers
Date of Drilling: 20/5/2016
Logged and Drilled by: JH/SM

GROUND TECHNOLOGIES

Geotechnical Testing Services

Ground Technologies Pty Ltd
ABN 25 089 213 294
PO Box 1121 Green Valley NSW 2168
Ph: (02) 8783 8200
Fax: (02) 8783 8210
Email: lab@groundtech.com.au

SITE LOCATION: 42B Kurrajong Road, Prestons

BOREHOLE NO. 5

WATER	DEPTH (m)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION (SOIL TYPE, COLOUR, MOISTURE, CONSISTENCY)	GRAPHIC LOG	SAMPLES	REMARKS
N I L		-	Clayey SILT, brown, with roots and organic content.			TOPSOIL
		ROCK	SHALE, extremely to hightly weathered, grey, pale brown, extremely low to very low strength.		A16	BEDROCK
	0.5				A17	
	1		SHALE, highly weathered, brown, pale brown, low strength.			
	1.5		Borehole terminated at 1.5m			TC bit refusal.
	2					
	2.5					
	3					
	3.5					
	4					
	4.5					

Method: 4WD Mounted Rig/Solid FlightSpiral Augers
Date of Drilling: 20/5/2016
Logged and Drilled by: JH/SM

APPENDIX B

Ground Technologies Laboratory Test Results

GROUND TECHNOLOGIES
Geotechnical Testing Services

Ground Technologies Pty Ltd
ABN 25 089 213 294
55 Fifteenth Avenue, West Hoxton NSW 2171
PO Box 1121 Green Valley NSW 2168
Ph: (02) 8783 8200 Fax: (02) 8783 8210
Email: lab@groundtech.com.au

CALIFORNIAN BEARING RATIO

Client	Logo's Properties	Job No :	**GTE849**
Project	42 Kurragong Road	Test Date :	**30-May-16**
Location	Prestons	Report No.	**GTER849-L1**

Sample Number		L1			
Date Sampled		20-May-16			
Depth		0.2-0.8m			
Location		BH1			
Laboratory Compaction AS1289 5.1.1 standard					
Oversize Material 19mm Sieve	%	0.0			
Maximum Dry Density	t/m^3	1.69			
Optimum Moisture Content	%	19.2			
Field Moisture Content	%	14.7			
Test Results AS 1289 6.1.1					
Before Soaking	Dry Density t/m^3	1.69			
	Moisture Ratio %	100.0			
	Density Ratio %	100.0			
After Soaking	Dry Density t/m^3	1.69			
	Moisture Content %	22.7			
Moisture Content after test - remainder	%	20.3			
Moisture Content after test - top 30mm	%	22.5			
Number of days soaking	days	4			
Mass of Surcharge	Kg	4.5			
Swell after soaking	%	0.5			
CBR penetration	mm	5.0			
CBR VALUE	**%**	**4**			

Material Description : L1: Red Brown Silty Clay

Test Methods: AS1289 6.1.1, 5.1.1, 2.1.1 Sampling : AS1289 1.2.1 (6.5.3)

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory No. 14343
Accredited for compliance with ISO/IEC 17025

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+10'00'

Approved Signatory
Date 03-Jun-16

GROUND TECHNOLOGIES

Geotechnical Testing Services

Ground Technologies Pty Ltd
ABN 25 089 213 294
55 Fifteenth Avenue, West
Hoxton NSW 2171
PO Box 1121 Green Valley NSW 2168

Test Results - Atterberg Limits

Client:	Logos Property	Job No.	GTE849
Project:	42 Kurrajong Road	Report No.	GTER849-L2
Location:	Prestons	Test Date:	2/02/2016

Sample Location		**TS1- 0.2-0.8m**
Sample Number		**L1**
Test procedure		AS1289 3.1.1,3.2.1,3.3.1,3.4.1, 2.1.1
ATTERBERG LIMITS		
Liquid Limit	%	**46**
Plastic limit	%	**20**
Plasticity Index	%	**26**
Linear Shrinkage	%	**ND**
Curling/ Crumbling/ Cracking		**NA**
sample history		Oven dried, dry sieved
Sample description		**Brown Silty Clay**

Comments: Sampling Method: AS1289.1.2.1 (6.5.4)

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory No. 14343
Accredited for compliance with ISO/IEC 17025
The results of the tests, calibrations and/or measurements in this document are traceable to Australian/National Standards

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Approved Signatory

Date of issue 3/06/2016

APPENDIX C

ALS Laboratory Test Results

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1611024**	Page	: 1 of 19
Client	: **GROUND TECHNOLOGIES**	Laboratory	: Environmental Division Sydney
Contact	: JOSHUA HARENDRAN	Contact	:
Address	: PO BOX 1121 GREEN VALLEY NSW,AUSTRALIA 2168	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8783 8200	Telephone	: +61-2-8784 8555
Project	: GTE849	Date Samples Received	: 23-May-2016 08:00
Order number	: ----	Date Analysis Commenced	: 23-May-2016
C-O-C number	: ----	Issue Date	: 27-May-2016 11:16
Sampler	: JOSHUA HARENDRAN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 18		
No. of samples analysed	: 17		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED
ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A1	A2	A3	A4	A5
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-001	ES1611024-002	ES1611024-003	ES1611024-004	ES1611024-005
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		----	5.7	6.0	9.3	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		----	329	295	337	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		12.7	14.4	8.9	7.0	10.7
EA080: Resistivity									
Resistivity at 25°C	----	1	ohm cm		----	3040	3390	2970	----
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		----	320	220	100	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		----	360	310	190	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	----	----	----	<5
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	<1
Chromium	7440-47-3	2	mg/kg		26	----	----	----	20
Copper	7440-50-8	5	mg/kg		28	----	----	----	32
Lead	7439-92-1	5	mg/kg		39	----	----	----	107
Nickel	7440-02-0	2	mg/kg		14	----	----	----	11
Zinc	7440-66-6	5	mg/kg		71	----	----	----	155
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	<0.1
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A1	A2	A3	A4	A5
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-001	ES1611024-002	ES1611024-003	ES1611024-004	ES1611024-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	----	----	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		----	----	----	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		----	----	----	----	<0.5
Fluorene	86-73-7	0.5	mg/kg		----	----	----	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		----	----	----	----	<0.5
Anthracene	120-12-7	0.5	mg/kg		----	----	----	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		----	----	----	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		----	----	----	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	----	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		----	----	----	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	----	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	----	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	----	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	----	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	----	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	----	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	----	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A1	A2	A3	A4	A5
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-001	ES1611024-002	ES1611024-003	ES1611024-004	ES1611024-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	----	----	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	----	----	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	----	----	<10
C10 - C14 Fraction	----	50	mg/kg		----	----	----	----	<50
C15 - C28 Fraction	----	100	mg/kg		----	----	----	----	<100
C29 - C36 Fraction	----	100	mg/kg		----	----	----	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	----	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	----	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	----	----	<10
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	----	<50
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	----	<100
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	----	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	----	----	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	----	----	<0.2
Toluene	108-88-3	0.5	mg/kg		----	----	----	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	----	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	----	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	----	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg		----	----	----	----	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	----	----	<0.5
Naphthalene	91-20-3	1	mg/kg		----	----	----	----	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		102	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		103	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		76.1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A1	A2	A3	A4	A5
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-001	ES1611024-002	ES1611024-003	ES1611024-004	ES1611024-005
					Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
Phenol-d6	13127-88-3	0.5	%		----	----	----	----	94.4
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	----	81.5
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	----	97.0
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	----	92.7
Anthracene-d10	1719-06-8	0.5	%		----	----	----	----	89.9
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	----	86.1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	----	----	95.0
Toluene-D8	2037-26-5	0.2	%		----	----	----	----	102
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	----	----	85.6

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A6	A7	A8	A9	A10
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-006	ES1611024-007	ES1611024-008	ES1611024-009	ES1611024-010
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		----	6.2	6.9	7.2	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		----	166	116	242	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		14.1	10.6	8.4	8.8	15.4
EA080: Resistivity									
Resistivity at 25°C	----	1	ohm cm		----	6020	8620	4130	----
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		----	230	70	130	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		----	110	150	240	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		16	----	----	----	6
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	<1
Chromium	7440-47-3	2	mg/kg		19	----	----	----	18
Copper	7440-50-8	5	mg/kg		26	----	----	----	36
Lead	7439-92-1	5	mg/kg		18	----	----	----	16
Nickel	7440-02-0	2	mg/kg		9	----	----	----	9
Zinc	7440-66-6	5	mg/kg		53	----	----	----	54
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	<0.1
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	----	----	----	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	----	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	----	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	----	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	----	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	----	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	----	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	----	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	----	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	----	----	----	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	----	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A6	A7	A8	A9	A10
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-006	ES1611024-007	ES1611024-008	ES1611024-009	ES1611024-010
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	<0.05
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		----	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A6	A7	A8	A9	A10
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-006	ES1611024-007	ES1611024-008	ES1611024-009	ES1611024-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		----	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		----	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**130**	----	----	----	**101**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**112**	----	----	----	**87.8**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**100**	----	----	----	**69.1**
EP075(SIM)S: Phenolic Compound Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A6	A7	A8	A9	A10
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-006	ES1611024-007	ES1611024-008	ES1611024-009	ES1611024-010
					Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
Phenol-d6	13127-88-3	0.5	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A11	A12	A13	A14	A15
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-011	ES1611024-012	ES1611024-013	ES1611024-014	ES1611024-015
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		5.4	5.8	7.2	----	6.2
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		432	311	234	----	90
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		18.1	11.1	9.4	16.7	12.6
EA080: Resistivity									
Resistivity at 25°C	----	1	ohm cm		2310	3220	4270	----	11100
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		220	240	140	----	110
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		420	330	250	----	40
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		----	----	----	10	----
Cadmium	7440-43-9	1	mg/kg		----	----	----	<1	----
Chromium	7440-47-3	2	mg/kg		----	----	----	17	----
Copper	7440-50-8	5	mg/kg		----	----	----	22	----
Lead	7439-92-1	5	mg/kg		----	----	----	11	----
Nickel	7440-02-0	2	mg/kg		----	----	----	6	----
Zinc	7440-66-6	5	mg/kg		----	----	----	37	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	----	----	<0.1	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		----	----	----	<0.1	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		----	----	----	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		----	----	----	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg		----	----	----	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg		----	----	----	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg		----	----	----	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg		----	----	----	<0.05	----
Aldrin	309-00-2	0.05	mg/kg		----	----	----	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		----	----	----	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg		----	----	----	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg		----	----	----	<0.05	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A11	A12	A13	A14	A15
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-011	ES1611024-012	ES1611024-013	ES1611024-014	ES1611024-015
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-Endosulfan	959-98-8	0.05	mg/kg		----	----	----	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg		----	----	----	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg		----	----	----	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg		----	----	----	<0.05	----
Endrin	72-20-8	0.05	mg/kg		----	----	----	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		----	----	----	<0.05	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		----	----	----	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg		----	----	----	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		----	----	----	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		----	----	----	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg		----	----	----	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg		----	----	----	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg		----	----	----	<0.2	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		----	----	----	<0.05	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		----	----	----	<0.05	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		----	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A11	A12	A13	A14	A15
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-011	ES1611024-012	ES1611024-013	ES1611024-014	ES1611024-015
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		----	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		----	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	----	103	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	----	----	120	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	----	----	102	----
EP075(SIM)S: Phenolic Compound Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A11	A12	A13	A14	A15
				Client sampling date / time	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]	[23-May-2016]
Compound	CAS Number	LOR	Unit		ES1611024-011	ES1611024-012	ES1611024-013	ES1611024-014	ES1611024-015
					Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
Phenol-d6	13127-88-3	0.5	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A16	A17	----	----	----
				Client sampling date / time	[23-May-2016]	[23-May-2016]	----	----	----
Compound	CAS Number	LOR	Unit		ES1611024-016	ES1611024-017	--------	--------	--------
					Result	Result	----	----	----
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		----	**6.0**	----	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		----	**30**	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		**11.0**	**9.3**	----	----	----
EA080: Resistivity									
Resistivity at 25°C	----	1	ohm cm		----	**33300**	----	----	----
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		----	**40**	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		----	<10	----	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		**22**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		**10**	----	----	----	----
Copper	7440-50-8	5	mg/kg		**27**	----	----	----	----
Lead	7439-92-1	5	mg/kg		**17**	----	----	----	----
Nickel	7440-02-0	2	mg/kg		**12**	----	----	----	----
Zinc	7440-66-6	5	mg/kg		**68**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A16	A17	----	----	----
				Client sampling date / time	[23-May-2016]	[23-May-2016]	----	----	----
Compound	CAS Number	LOR	Unit		ES1611024-016	ES1611024-017	--------	--------	--------
					Result	Result	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		----	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A16	A17	----	----	----
				Client sampling date / time	[23-May-2016]	[23-May-2016]	----	----	----
Compound	CAS Number	LOR	Unit		ES1611024-016	ES1611024-017	--------	--------	--------
					Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		----	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		----	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**117**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**90.2**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**65.6**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	A16	A17	----	----	----
				Client sampling date / time	[23-May-2016]	[23-May-2016]	----	----	----
Compound	CAS Number	LOR	Unit		ES1611024-016	ES1611024-017	--------	--------	--------
					Result	Result	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
Phenol-d6	13127-88-3	0.5	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	----	----	----

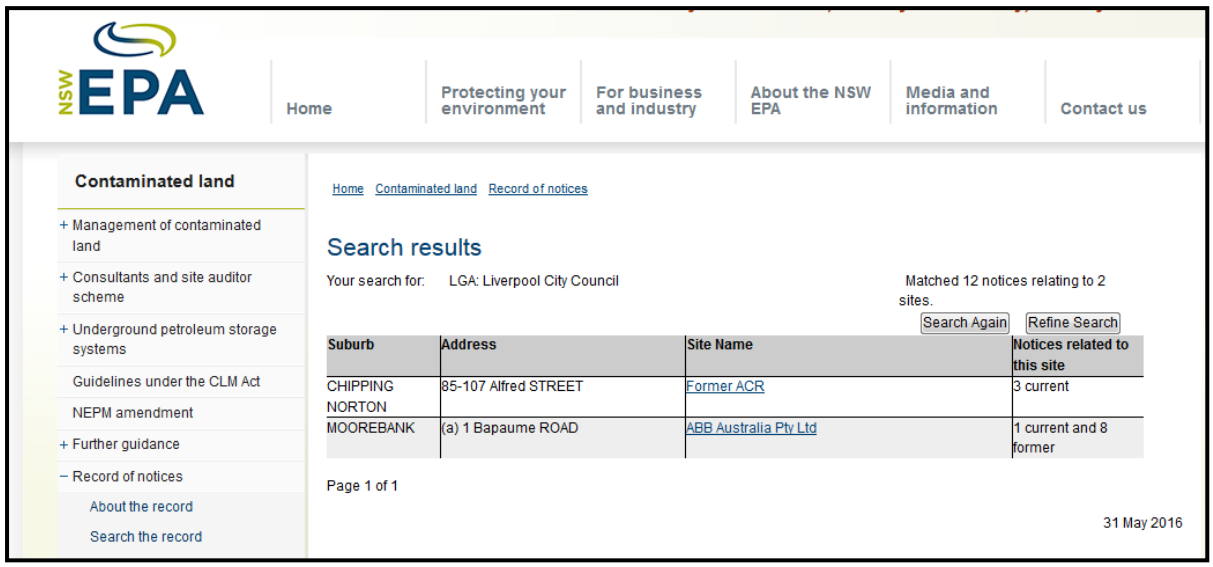
Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

APPENDIX D

Search of the NSW EPA Contaminated Land Management Record



Search of the Protection of the Environment operations Public Register (POEO) of Licensed and Delicensed Premises:

Number	Name	Location	Type	Status	Issued date
948	ARROWCREST GROUP PTY. LTD.	63-73 JEDDA ROAD, PRESTONS, NSW 2170	POEO licence	Surrendered	19 Apr 2000
1017597	ARROWCREST GROUP PTY. LTD.	63-73 JEDDA ROAD, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	21 Jun 2002
1057359	ARROWCREST GROUP PTY. LTD.	63-73 JEDDA ROAD, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	01 May 2006
1072211	ARROWCREST GROUP PTY. LTD.	63-73 JEDDA ROAD, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	17 Sep 2007
12143	BORAL RESOURCES (NSW) PTY LTD	10-12 Bernera Rd, PRESTONS, NSW 2170	POEO licence	No longer in force	20 Jul 2004
5641	HANSON CONSTRUCTION MATERIALS PTY LTD	54 JEDDA ROAD, PRESTONS, NSW 2170	POEO licence	No longer in force	28 Feb 2000
1008687	HANSON CONSTRUCTION MATERIALS PTY LTD	54 JEDDA ROAD, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	06 Aug 2001
11112	HY-TEC INDUSTRIES PTY LTD	100 JEDDA ROAD, PRESTONS, NSW 2170	POEO licence	No longer in force	17 Aug 2000
20680	JALCO AUSTRALIA PTY. LIMITED	6 ASH ROAD, PRESTONS, NSW 2170	POEO licence	Issued	29 Feb 2016
4386	PRESTONS INDUSTRIES PTY LTD	119 JEDDA ROAD, PRESTONS, NSW 2170	POEO licence	Surrendered	30 May 2000
11235	STATE ASPHALTS NSW PTY LTD	90 Jedda Road, PRESTONS, NSW 2170	POEO licence	No longer in force	31 Oct 2000
1058485	STATE ASPHALTS NSW PTY LTD	90 Jedda Road, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	11 Apr 2006
13262	STATE ASPHALTS NSW PTY LTD	65-75 Yarrawa Street, PRESTONS, NSW 2170	POEO licence	Issued	02 Sep 2011
3085767850	STATE ASPHALTS NSW PTY LTD	65-75 Yarrawa Street, PRESTONS, NSW 2170	Penalty Notice	Issued	29 Jan 2013
1532821	STATE ASPHALTS NSW PTY LTD	65-75 Yarrawa Street, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	25 Aug 2015
1534834	STATE ASPHALTS NSW PTY LTD	65-75 Yarrawa Street, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	29 Oct 2015
1535153	STATE ASPHALTS NSW PTY LTD	65-75 Yarrawa Street, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	24 Nov 2015
11945	SYDNEY GALVANIZING PTY LIMITED	12 ASH ROAD, PRESTONS, NSW 2170	POEO licence	Issued	14 Jul 2003
1058459	SYDNEY GALVANIZING PTY LIMITED	12 ASH ROAD, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	18 Apr 2006
1072329	SYDNEY GALVANIZING PTY LIMITED	12 ASH ROAD, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	08 May 2007

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Number	Name	Location	Type	Status	Issued date
1096336	SYDNEY GALVANIZING PTY LIMITED	12 ASH ROAD, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	22 Jun 2009
1526968	SYDNEY GALVANIZING PTY LIMITED	12 ASH ROAD, PRESTONS, NSW 2170	s.58 Licence Variation	Issued	13 May 2015

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31 May 2016