Charley Brothers Pty Ltd

Stage 1 Site Contamination Assessment

Proposed Residential Development

Northern Portion of Lot 499 DP1258597, Lake Innes

Report No. RGS21064.1-AC

8 February 2021

REGIONAL GEOTECHNICAL SOLUTIONS

REGIONAL GEOTECHNICAL SOLUTIONS

Manning-Great Lakes
Port Macquarie
Coffs Harbour

RGS21064.1-AC

8 February 2021

Charley Brothers Pty Ltd
c-/ Love Project Management
152 Bago Road
WAUCHOPE NSW 2446

Attention: Michelle Love

Dear Michelle,

RE: Proposed Residential Development – Northern Portion of Lot 499 DP1258597, Lake Innes

Stage 1 Site Contamination Assessment

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a Stage 1 Site Contamination Assessment for the proposed residential development in the Northern Portion of Lot 499 DP1258597, Lake Innes.

The assessment found the site is likely to be appropriate for the proposed residential development from a site contamination perspective provided the recommendations and advice of this report are adopted.

The work presented herein was reviewed by Dr David Tully CEnvP SC. A copy of Dr Tully's letter pertaining to the review is appended to the report.

If you have any questions regarding this project, please contact the undersigned.

For and on behalf of **Regional Geotechnical Solutions Pty Ltd**

Prepared by

Tim Morris

Associate Engineering Geologist

Regional Geotechnical Solutions Pty Ltd
ABN 51141848820

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Appendices

1 INTRODUCTION

Regional Geotechnical Solutions Pty Ltd (RGS) have undertaken a Stage 1 Site Contamination Assessment for the proposed residential development in the Northern Portion of Lot 499 DP1258597, Lake Innes.

It is understood that the northern portion of Lot 499 DP1258597, Lake Innes, is currently zoned for rural land use and is now proposed for residential rezoning.

The purpose of the work described herein was to assess the suitability of the site for residential land use with respect to the presence of site contamination resulting from past land use and activities, as well as providing discussions and recommendations regarding:

- Identification of Areas of Environmental Concern (AEC) and Chemicals of Concern (COC);
- The undertaking of limited targeted sampling and analysis at the selected AEC to allow some preliminary analysis of the presence of contamination;
- Evaluation of test results against industry accepted criteria for the intended landuse;
- Conclusions regarding the presence of contamination at the site and its potential impacts on the proposed residential landuse; and
- The requirement for remediation, further investigation, or ongoing management of site contamination.

The work was commissioned by Mr R Charley on behalf of Charely Brothers Pty Ltd and was undertaken in accordance with proposal number RGS21064.1-AA dated 23 December 2020.

2 GUIDELINES AND ASSESSMENT CRITERIA

The assessment was aimed at fulfilling the requirements of a Stage 1 Contaminated Site Assessment in accordance with NSW EPA *Guidelines for Consultants Reporting on Contaminated Land (2020)*

To evaluate results and for guidance on assessment requirements, the assessment adopted the guidelines provided in the *National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013)*. The NEPM document provides a range of guidelines for assessment of contaminants for various land use scenarios. The proposed landuse is residential and as such comparison with the NEPM guideline values for Residential A landuse was considered appropriate. In accordance with the NEPM guideline the following criteria were adopted for this assessment:

- Health Investigation Levels (HILs) for Residential land use were used to assess the potential human health impact of heavy metals and polycyclic aromatic hydrocarbons (PAH);
- Health Screening Levels (HSLs) for coarse textured (sand) or fine textured (silt and clay) soils on a Residential site were adopted as appropriate for the soils encountered to assess the potential human health impact of petroleum hydrocarbons and benzene, toluene, ethyl-benzene, xylenes (BTEX) compounds;
- Ecological Investigation Levels (EILs) for Residential land use were used for evaluation of the potential ecological / environmental impact of heavy metals and PAH;
- Ecological Screening Levels (ESLs) for coarse textured (sand) soils or fine textured (silt and clay) soils on a Residential land use site were adopted as appropriate for the soils encountered, to assess the potential ecological / environmental impact of petroleum hydrocarbons and BTEX compounds.

In accordance with NEPM 2013, exceedance of the criteria does not necessarily deem that remediation is required, but is a trigger for further assessment of the extent of contamination and associated risks. The adopted criteria are presented in the results summary table in Appendix C.

3 METHODOLOGY

In accordance with the relevant sections of the *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (Amended 2013*), the assessment involved the following process:

- A brief study of site history, with the aim of identifying past activities on or near the site that might have the potential to cause contamination;
- Review of selected available recent and historical aerial photography for the last 50 years;
- A search of NSW EPA records, or contaminated land notifications on the site;
- Government records of groundwater bores in the area;
- Land title search of the respective lots available from the Land Titles Office;
- Using the above information, characterise the site into Areas of Environmental Concern, in which the potential for contamination has been identified, and nominate Chemicals of Concern that might be associated with those activities;
- Undertake targeted sampling and analysis at the selected Areas of Concern to allow some preliminary analysis of the presence of contamination;
- Analyse samples for a suite of potential contaminants associated with the past activities; and
- Evaluate the results against industry accepted criteria for the proposed land use.

4 SITE SETTING AND HISTORY

4.1 Site Description

The subject portion of Lot 499 is approximately 4.4ha in area and is mostly cleared and is located in an area of gently undulating topography.

A satellite image that shows the location of the site and the site setting is reproduced below.

***Plate 1**: Satellite image dated 2012 obtained from the NSW Government 'Six Maps' website that illustrates the site location and setting. The approximate area of assessment in the northern portion of Lot 499 DP1258597 is outlined in red.*

4.2 Historical Aerial Photography

Aerial photographs of the site were purchased from the NSW Spatial Services and reviewed to assist in identifying past land uses that may contribute to site contamination. The results of the review are summarised in Table 1.

Table 1- Aerial Photograph Summary

Year	Site (Lot 6 DP861376)	Surrounding Land
1956	Site does not appear to be disturbed and is thickly vegetated by what appears to be large trees.	Area to the north has been mostly cleared and appears to be being used for grazing purposes. Surrounding areas to the east, south and west are thickly vegetated.
1983	No significant change	North of site boundary has been cleared and disturbed by earthworks that are likely to be associated with construction of power line easement. Several farm houses are present to the north. An abattoir facility is present about 500m to the north east.

Year	Site (Lot 6 DP861376)	Surrounding Land
1997	Several swathes of vegetation have been cleared through the centre of the subject area.	A crematorium with associated garden areas has been constructed on the north west boundary. The actual crematorium facility is located more than 250m from the site boundary.
2010 Google Earth (Figure 2)	Site has been mostly cleared, leaving a thin strip of vegetation running south west through the site. Two small rectangular features are present in the north of the site, possibly temporary stockpiles.	Residential subdivision has been constructed to the north and north east of the site.
2020 Google Earth	No significant change. A windrow of vegetation has been pushed up in the west of the site and an unformed track passes east west across the centre of the site.	No significant change

4.3 NSW EPA Records

A check with the NSW EPA website (www.epa.nsw.gov.au) revealed that no notices have been issued on the site under the Contaminated Land Management Act (1997).

4.4 Land Title Search

A list of past registered proprietors and lessors of the site was obtained from the Land Titles Office. A summary of the title details is included in Appendix A.

The title history search revealed the following:

- 1906 – 1938: Philip Charley, gentleman
- 1938 – 1964: Permanent Trustee Company of NSW, Philip Charley estate
- 1964: Noel Charley, company director;
- 1964 to date: Vilro Pty Ltd as part of a series of other lots.

4.5 Geology

The site is situated in an area of clay soils overlying deeply weathered geological units of the Touchwood Formation which includes siltstone, sandstone and intrusive units of the Karikeree Meta-dolerite.

The Port Macquarie 1:25,000 Coastal Quaternary Geology Sheet indicates undifferentiated Pleistocene alluvial soils are present in the south of the site.

4.6 Groundwater

A groundwater bore search on the Water NSW website indicates that there are no licensed groundwater bores within 400m of the site boundary.

Regional groundwater flow direction typically follows topographic slopes, which for this site would be towards the south.

4.7 Council Records

Reference to the Port Macquarie Hastings Council Local Environment Plan (LEP) shows the site is currently zoned RU3 – Rural.

It is proposed for rezoning as R1, General Residential, with some areas of E2 and E3 environmental zoning.

4.8 Historical Information

From discussions with Love Project Management, it is understood that the initial clearing of wide swathes of vegetation was for the establishment of a golf course, however, the golf course was never developed.

4.9 Site Observations

Fieldwork was undertaken on 15 January 2021. Observations made during the site visit are summarised below:

- Site was mostly vegetated with grass that was maintained by slashing, with several stands of trees present;
- A large windrow of pushed up vegetation is present in the west of the site;
- Two small areas of disturbed ground were observed in the north east of the site as shown on Figure 2, which correlated with areas of historical minor earthworks visible in the 2010 satellite image. One site comprised a backfilled excavation (TP2) and the second was a low stockpile of clay fill, approximately 20m wide (TP4);
- Surface soils near the northern boundary had been disturbed by earthworks associated with the power line easement access track construction.

Typical site photographs are presented below.

 *Looking south across open grassed area in centre of site*	 *Looking west along northern boundary where powerline easement access track located.*

4.10 Site History Summary

Based on available data the chronological development of the site was undertaken as summarised below:

- The site was vegetated with natural forest until about 1997 when there were several areas cleared within the subject area of assessment;
- Further clearing works had occurred by 2010 and satellite imagery indicates two small areas in the north of the site were disturbed by possible filling works, with a small dam and a possible stockpile visible in the satellite imagery;
- Minor earthworks have occurred along the northern boundary where an access track in the powerline easement was constructed;
- A windrow of vegetation in the west of the site was pushed up between 2013 and 2014;
- There has been no significant change to the site since about 2014.

5 SITE CONTAMINATION ASSESSMENT

5.1 Conceptual Site Model

Based on the site observations and knowledge obtained about site activities as outlined above, potential Areas of Concern and Chemicals of Concern were identified for the assessment as outlined in Table 2.

Table 2: Conceptual Site Model

Area of Concern	Mode of Potential Contamination	Key Chemicals of Concern	Targeted Sampling Location
AEC1: Soils in stockpiles	Imported fill of unknown origin	Heavy Metals, TPH, BTEX, PAH, OC/OPP, asbestos	TP2, TP4, TP7
AEC2: Disturbed soils on northern boundary	Imported fill of unknown origin	Heavy Metals, TPH, BTEX, PAH, OC/OPP, asbestos	TP10, TP12, TP14

Heavy Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc
BTEX - Benzene, Toluene, Ethylbenzene and Xylene
TPH - Total Petroleum Hydrocarbons
PAH – Polycyclic Aromatic Hydrocarbons
OC/OPP – Organochlorine and Organophosphorus Pesticides

The risk of groundwater contamination at the site was considered low as the potential sources of contamination were typically of surface origin. An assessment of groundwater assessment was therefore not undertaken as part of this preliminary contamination assessment. Assessment of soil vapours were not undertaken as it is also beyond the scope of this preliminary contamination assessment.

The presence of measurable concentrations of chemical substances does not automatically imply that the site will cause harm. In order for this to be the case, an exposure route must be present allowing a source to adversely affect a receptor.

Based on the site observations and knowledge obtained about site activities as outlined above, potential exposure routes linking chemicals of concern with identified receptors to form plausible exposure routes are summarised in Table 3.

Table 3: Plausible Exposure Pathways

Area of Concern	Chemicals of Concern	Exposure Route	Receptors	Comment
AEC1: Imported Fill	Heavy Metals, TPH, BTEX, PAH, OC/OPP	Inhalation, dermal contact, ingestion	Site users, construction workers, services maintenance workers	Possible risk from historical dumping
AEC2: Imported Fill	Heavy Metals, TPH, BTEX, PAH, OC/OPP	Inhalation, dermal contact, ingestion	Site users, construction workers, services maintenance workers	Possible risk from historical dumping

5.2 Field Work

Field work for the assessment was undertaken on 15 January 2021 and included:

- Site walkover to assess visible surface conditions and identify evidence of contamination, or past activities that may cause contamination;
- 14 shallow test pits undertaken by 3.5T mini-excavator, logged and sampled by an Engineering Geologist;
- Test pit locations were based on professional judgement with consideration of the site history and visible site features.

Engineering logs of the test pits are presented in Appendix B. The locations of the test pits are shown on Figure 1. They were obtained on site by measurement relative to existing site features.

Soil samples were taken from selected intervals in the excavated test pits using disposable gloves and hand tools which were decontaminated between sampling points using Decon90 detergent and deionised water. The samples were collected in acid-rinsed 250mL glass jars and placed in an ice-chilled cooler box.

5.3 Ground Conditions Encountered

A summary of the observed profiles is presented in Table 4.

Table 4: Subsurface Profile Summary

Investigation	Depth to Base of Material Layer (m)				
	Topsoil/ Fill: Sandy CLAY with grass roots	**FILL:** Sandy CLAY, red or yellow with pale mottling	**Topsoil:** Sandy CLAY with grass roots	**Colluvial:** Sandy Gravel, with some clay	**Residual:** CLAY, medium plasticity, yellow or red
TP1	--	--	0.25	--	≥0.7
TP2	0.4	1.4		--	≥1.5
TP3	--	--	0.2	--	≥0.5
TP4	0.1	0.8	0.9	≥1.0	--
TP5	--	0.15	--	0.25	≥0.3
TP6	--	--	0.15	0.3	≥0.5
TP7	0.5	--	--	--	--
TP8	--	--	0.2	0.4	≥0.5
TP9	--	--	0.2	0.35	≥0.5
TP10	--	--	0.2	0.35	≥0.5
TP11	--	--	0.2	0.35	≥0.5
TP12	--	--	0.2	0.35	≥0.5

Investigation	Depth to Base of Material Layer (m)				
	Topsoil/ Fill: Sandy CLAY with grass roots	**FILL:** Sandy CLAY, red or yellow with pale mottling	**Topsoil:** Sandy CLAY with grass roots	**Colluvial:** Sandy Gravel, with some clay	**Residual:** CLAY, medium plasticity, yellow or red
TP13	--	--	0.2	0.35	≥0.5
TP14	0.1	0.4	≥0.5	--	--
TP15	--	0.2	--	0.3	≥0.5

The test pits typically encountered topsoil overlying colluvial clay and residual clays which is consistent with the published geological mapping for the site and previous experience in the area.

No visible evidence of liquid hydrocarbon contamination or odours were noted on the surface or in the excavated soil profiles.

TP2 targeted the backfilled dam (AEC1) and encountered up to 1.4m of mixed clay fill. 0.8m of clay fill was encountered at a small stockpile (AEC1) at TP4. Shallow clay fill to 0.4m was also encountered on the northern boundary where minor earth works had been undertaken adjacent to the powerline easement track (AEC2).

5.4 Laboratory Testing

Samples were transported under chain-of-custody conditions to a NATA accredited specialist chemical testing laboratory, to be tested for the following suite of common contaminants often present in fill material:

- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Benzene, Toluene, Ethyl-benzene, Xylenes (BTEX)
- Organochlorine and organophosphorus pesticides (OC/OPs)
- Heavy metals (arsenic, cadmium, chromium, cobalt, copper, lead, mercury, and zinc)
- Asbestos identification in accordance with AS4964; and
- Soil pH, total organic carbon content (TOC), cation exchange capacity (CEC) and electrical conductivity (EC) for the purposes of determination of ecological investigation levels (see Section 5.6).

The results are presented in Appendix C. A summary table of the results comparing them to the adopted guidelines is also presented in Appendix C.

5.5 Quality Control

Samples were obtained using industry accepted protocols for sample treatment, preservation, and equipment decontamination. A duplicate of TP3 (0.3 - 0.4m) was submitted to the laboratory for analysis as D1. Results of the duplicate analysis indicated heavy metal concentrations correlated well between the samples.

The Relative Percent Differences (RPDs) were calculated for the duplicate sample and presented in the results summary table in Appendix B. RPD were less than 30%.

In addition to the field QC procedures, the laboratory conducted internal quality control testing including surrogates, blanks, and laboratory duplicate samples. The results are presented with the laboratory test results in Appendix B.

On the basis of the results of the field and laboratory quality control procedures and testing the data is considered to reasonably represent the concentrations of contaminants in the soils at the sample locations at the time of sampling and the results can be adopted for this assessment.

5.6 Analysis Results

An appraisal of the laboratory test results presented in Appendix C is provided below with reference to the adopted soil investigation and screening levels discussed in Section 2.

- EILs are site specific and are determined by calculating an Ambient Background Concentration (ABC) and an Added Contaminant Limit (ACL) for the site. ABC values were adopted using results from TP8 (0- 0.1m) in an undisturbed area of the site. EILs are presented in the Summary Table in Appendix C and summarised in Table 5:

Table 5: EILs Summary (With Reference to NEPM, Schedule B1)

Analyte	ABC – TP8 (mg/kg)	EIL – Aged Residential Landuse (mg/kg)
Copper	60	200
Arsenic	<5	100
Lead	9	1100
Nickel	<5	240
Chromium (III)	325	460
Zinc	17	430

- Concentrations of heavy metals did not exceed the calculated EILs;
- Concentrations of heavy metals were above the laboratory limit of reporting (LOR), but were below adopted health investigation criteria for a residential site;
- Concentrations of Total Recoverable Hydrocarbons (TRH), PAH hydrocarbons BTEX and PCB contaminants were below LOR in all samples analysed; and
- Concentrations of pesticide contaminants were below LOR in all samples analysed

6 ASSESSMENT AND CONCLUSIONS REGARIDNG SITE CONTAMINATION

A Stage 1 Site Contamination Assessment was undertaken to assess past and present potentially contaminating activities and contamination types and evaluate the site's suitability for residential use from a contamination perspective.

6.1 Summary

Based on the results outlined in this report the following points and recommendations are made:

- Should any existing fill require removal off-site, it will require assessment for a Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 in accordance with the Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – the Excavated Natural Material (ENM) Order 2014; and
- Should potential evidence of site contamination be identified during development activities, such as soil staining, odours or possible asbestos cement sheeting, then a site contamination specialist should be contacted for advice without delay.

6.2 Conclusion

Based on the results obtained in this investigation the site is considered likely to be suitable for the proposed residential land use with regard to the presence of soil contamination provided the recommendations and advice of this report are adopted, and site preparation works are conducted in accordance with appropriate site management protocols and legislative requirements.

7 LIMITATIONS

This report comprises the results of an investigation carried out for a specific purpose and client as defined in the document. The report should not be used by other parties or for purposes or projects other than those assumed and stated within the report, as it may not contain adequate or appropriate information for applications other than those assumed or advised at the time of its preparation. The contents of the report are for the sole use of the client and no responsibility or liability will be accepted to any third party. The report should not be reproduced either in part or in full, without the express permission of Regional Geotechnical Solutions Pty Ltd.

Contaminated site investigations are based on data collection, judgment, experience, and opinion. By nature, these investigations are less exact than other engineering disciplines. The findings presented in this report and used as the basis for the recommendations presented herein were obtained using normal, industry accepted practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

Recommendations regarding ground conditions referred to in this report are estimates based on the information available at the time of its writing. Estimates are influenced and limited by the fieldwork method and testing carried out in the site investigation, and other relevant information as has been made available. In cases where information has been provided to Regional Geotechnical Solutions for the purposes of preparing this report it has been assumed that the information is accurate and appropriate for such use. No responsibility is accepted by Regional Geotechnical Solutions for inaccuracies within any data supplied by others.

If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

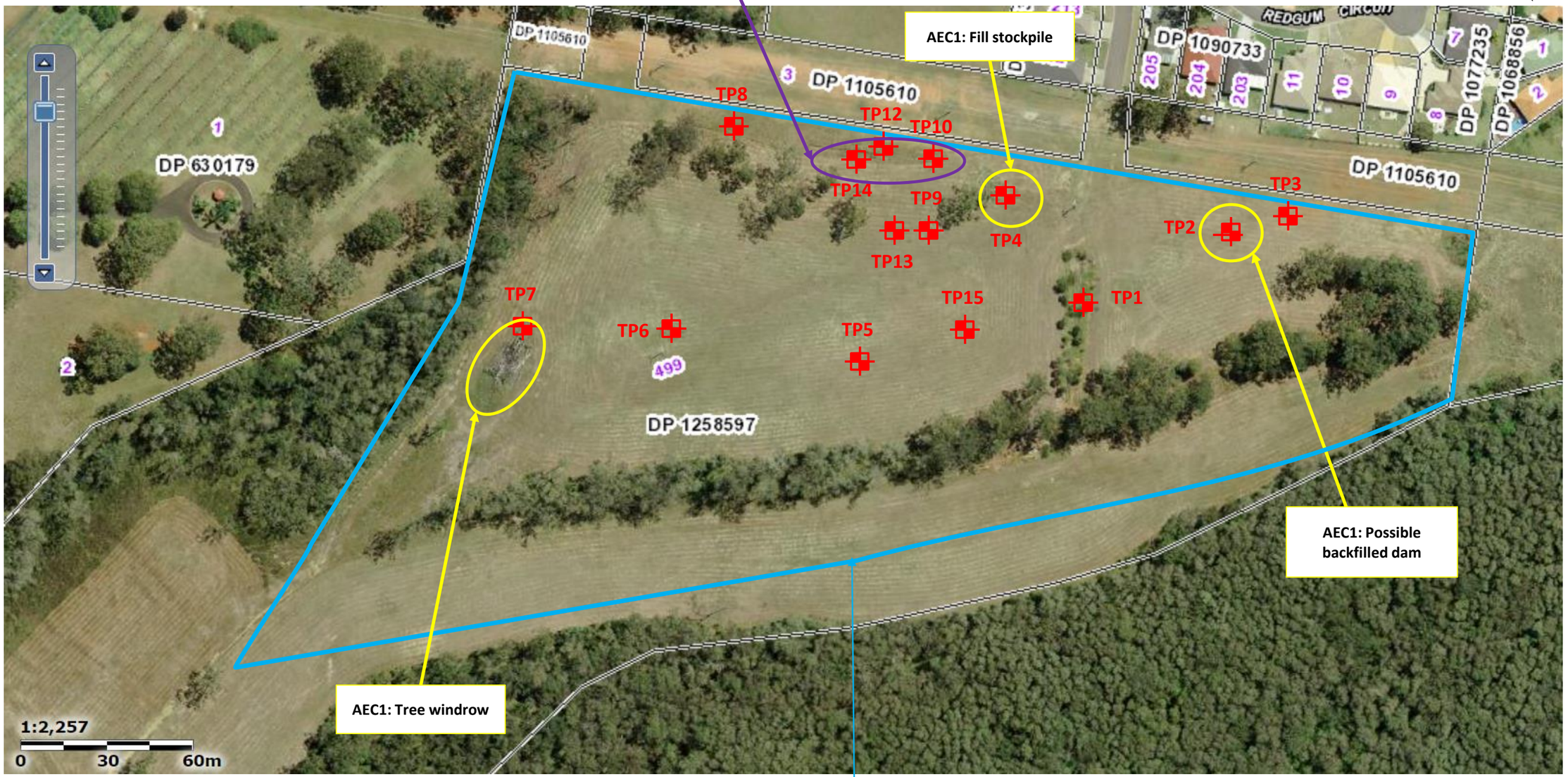
Tim Morris

Associate Engineering Geologist

Figures

AEC2 - Disturbed soils near powerline easement

AEC1: Fill stockpile



AEC1: Possible backfilled dam

AEC1: Tree windrow

Area of Assessment in Lot 499

Legend

Test Pit Location

Based on SixViewer image dated 2012

REGIONAL GEOTECHNICAL SOLUTIONS	**Client:**	CHARLEY BROTHERS	Job No. RGS21064.1
	Project:	PROPOSED REZONING NORTHERN PORTION, LOT 499 DP1258597	Drawn By: TM Scale: NTS Date: 5-Feb-21
	Title:	INVESTIGAITON LOCATION PLAN	Figure No. **1**

Legend

Test Pit Location

Based on Google image dated 2010

REGIONAL GEOTECHNICAL SOLUTIONS	**Client:**	CHARLEY BROTHERS	Job No.	RGS21064.1
	Project:	PROPOSED REZONING NORTHERN PORTION, LOT 499 DP1258597	Drawn By:	TM
			Scale:	NTS
			Date:	5-Feb-21
	Title:	HISTORICAL SATELLITE IMAGE - 2010	Figure No.	**2**

Appendix A

Site History Documentation

ADVANCE LEGAL SEARCHERS PTY LTD

(ACN 147 943 842)
ABN 82 147 943 842

18/36 Osborne Road,
Manly NSW 2095

Telephone: +612 9977 6713
Mobile: 0412 169 809
Email: search@alsearchers.com.au

22nd January, 2021

REGIONAL GEOTECHNICAL SOLUTIONS PTY LTD
1/12 Jinalee Road,
PORT MACQUARIE, NSW, 2444

Attention: Tim Morris

RE: **Philip Charlie Drive,**
Port Macquarie
(Lake Innes)
RGS21064.1

Current Search

Folio Identifier 499/1258597 (title attached)
DP 1258597 (plan attached)
Dated 20th January, 2021
Registered Proprietor:
VILRO PTY LIMITED

Title Tree
Lot 499 DP 1258597

Folio Identifier 499/1258597

Folio Identifier 399/1241278

Folio Identifier 299/1234443

Folio Identifier 171/1218524

Folio Identifier 168/1201505

Folio Identifier 2/1190501

Folio Identifier 32/809231

Folio Identifier 2/801087

Folio Identifier 3/630179

Certificate of Title Volume 14997 Folio 86

Certificate of Title Volume 13640 Folio 24

Certificate of Title Volume 9647 Folio 213

PA 41555

Conveyance Book 1951 No 802

Conveyance Book 809 No 505

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Summary of proprietor(s)
Lot 499 DP 1258597

Year	Proprietor(s)
	(Lot 499 DP 1258597)
2020 – todate	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 399 DP 1241278)
2018 – 2020	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 299 DP 1234443)
2017 – 2018	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 171 DP 1218524)
2016 – 2017	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 168 DP 1201505)
2014 – 2016	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 2 DP 1190501)
2013 – 2014	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 6 DP 1105610)
2010 – 2013	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 32 DP 809231)
1991 – 2010	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 2 DP 801087)
1990 – 1991	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 3 DP 630179)
1988 – 1990	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 3 DP 630179 – CTVol 14997 Fol 86)
1983 – 1988	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 11 DP 255991 – CTVol 13640 Fol 24)
1978 – 1983	Vilro Pty Limited *(ACN 000 560 387)*
	(Lot 1 DP 220842 – CTVol 9647 Fol 213)
1964 – 1978	Vilro Pty Limited *(ACN 000 560 387)*
	(Part Portion 379 Parish Macquarie and other lands – Conv Bk 1951 No 802)
1964 – 1964	Noel George Charley, company director
1938 – 1964	Permanent Trustee Company of New South Wales Philip Charley, estate
	(Part Portion 379 Parish Macquarie and other lands – Conv Bk 809 No 505)
1906 – 1938	Philip Charley, gentleman

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Appendix B

Results of Field Investigations

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP1

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487119 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519107 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered	E 0.10m				CL	**TOPSOIL:** Sandy CLAY, low plasticity, traces of grass roots to 5mm	M < w_P	Fb			TOPSOIL
							0.25m					
		0.30m E 0.40m		0.5		CH	**CLAY:** Medium to high plasticity, yellow	M > w_P	Fb / St			RESIDUAL
							0.70m					
				1.0			Hole Terminated at 0.70 m					
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP2

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487163 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519141 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered	E 0.10m				CL	**FILL:** Sandy CLAY, low plasticity, dark grey/grey/red, traces of grass roots to 5mm	M < w_P	Fb			FILL/TOPSOIL
		0.40m					0.40m					
		E 0.50m		0.5		CH	**FILL:** Sandy CLAY, medium plasticity, red with white/yellow/grey mottling, traces of gravel, fine to medium grained, subangular					FILL
				1.0								
							1.40m					
				1.5		CH	**Sandy CLAY:** Medium to high plasticity, red					RESIDUAL
							1.50m					
							Hole Terminated at 1.50 m					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP3

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487181 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519150 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered	E 0.20m				CL	**TOPSOIL:** Sandy CLAY, low plasticity, dark grey, traces of grass roots to 5mm	M < w_P	Fb			TOPSOIL
		0.30m				CH	**Sandy CLAY:** Medium to high plasticity, red					RESIDUAL
		D E 0.40m		0.5			Hole Terminated at 0.50 m					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP4

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487110 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519159 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket		E 0.10m				CL	**TOPSOIL:** Sandy CLAY, low plasticity, dark grey 0.10m	M > w_P	Fb			FILL/TOPSOIL
						CH	**CLAY:** Medium to high plasticity, yellow, traces of brown/grey					FILL
		0.50m		0.5								
		E 0.60m										
							0.80m					
						CL	**TOPSOIL:** Sandy CLAY, low plasticity, dark grey 0.90m					TOPSOIL
	▶					GP	**Sandy GRAVEL:** Fine grained, grey 1.00m	W				COLLUVIAL
				1.0			Hole Terminated at 1.00 m					
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP5

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487040 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519122 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket		E 0.10m				MH	**TOPSOIL:** Sandy Clayey SILT, dark grey, traces of grass roots to 5mm	M				TOPSOIL
						GP	**Sandy GRAVEL:** Fine grained, subrounded, grey	W				COLLUVIAL
	▶					CH	**CLAY:** Medium to high plasticity, yellow	M > w_P	Fb			RESIDUAL
				0.5			Hole Terminated at 0.50 m					
				1.0								
				1.5								

RG LIB 1.04.4.GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS21064.1 LOGS.GPJ <<DrawingFile>> 09/02/2021 10:35 8.30.004 Datgel Lab and In Situ Tool

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP6

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 486995 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519127 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered	E 0.10m				SM	**TOPSOIL:** Sandy Clayey SILT, dark grey	W	Fb			TOPSOIL
							0.15m					
						GC	**Clayey GRAVEL:** Fine to medium grained, subrounded/rounded, grey					COLLUVIAL
							0.30m					
						CH	**CLAY:** Medium to high plasticity	M > w_P	Fb			RESIDUAL
				0.5			0.50m					
							Hole Terminated at 0.50 m					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP7

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 486915 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519103 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered	E 0.10m				CL	**TOPSOIL:** Sandy CLAY, low plasticity, traces of grass roots to 5mm	M < w_P	Fb			TOPSOIL
							0.10m					
		E 0.25m				CH	**CLAY:** Medium to high plasticity, yellow	M > w_P	Fb / St			RESIDUAL
				0.5			0.50m					
							Hole Terminated at 0.50 m					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP8

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487019 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519180 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered	E 0.10m				CL	**TOPSOIL:** Sandy CLAY, low plasticity, pale grey, traces of grass roots to 5mm, traces of gravel fine to coarse grained, subangular	M < w_P	Fb			TOPSOIL
						GP	0.20m **Clayey GRAVEL:** Fine to coarse grained, rounded/subangular, grey	D				COLLUVIAL
				0.5		CH	0.40m **CLAY:** Medium to high plasticity	M < w_P	Fb			RESIDUAL
				1.0			0.50m Hole Terminated at 0.50 m					
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP9

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487065 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519157 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered					CL	**TOPSOIL:** Sandy CLAY, low plasticity, dark grey, traces of grass roots to 5mm	M < w_P	Fb			TOPSOIL
						GC	0.20m **Clayey GRAVEL:** Fine grained, subrounded/rounded	W				COLLUVIAL
						CH	0.35m **CLAY:** Medium to high plasticity, yellow	M > w_P	Fb			RESIDUAL
				0.5			0.50m Hole Terminated at 0.50 m					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP10

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487073 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519168 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered					CL	**TOPSOIL:** Sandy CLAY, low plasticity, dark grey, traces of grass roots to 5mm	M < w_P	Fb			TOPSOIL
						GC	0.25m **Clayey GRAVEL:** Fine grained, subrounded/rounded, grey	W				COLLUVIAL
				0.5		CH	0.40m **CLAY:** Medium to high plasticity, yellow	M > w_P	Fb			RESIDUAL
							0.50m Hole Terminated at 0.50 m					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP11

CLIENT: Love Project Management
PAGE: 1 of 1
PROJECT NAME: Proposed Residential Rezoning
JOB NO: RGS21064.1
SITE LOCATION: Northern Portion of Lot 499, Lake Innes
LOGGED BY: GC
TEST LOCATION: Refer to Figure 1
DATE: 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator
EASTING: 487080 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 0.4 m
NORTHING: 6519163 m
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered					CL	**TOPSOIL:** Sandy CLAY, low plasticity, dark grey	M < w_P	Fb			TOPSOIL
						GC	0.20m **Clayey GRAVEL:** Fine grained, subrounded, grey	M				COLLUVIAL
							0.30m Hole Terminated at 0.30 m					

0.5
1.0
1.5

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP12

CLIENT: Love Project Management
PAGE: 1 of 1
PROJECT NAME: Proposed Residential Rezoning
JOB NO: RGS21064.1
SITE LOCATION: Northern Portion of Lot 499, Lake Innes
LOGGED BY: GC
TEST LOCATION: Refer to Figure 1
DATE: 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator
EASTING: 487058 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 0.4 m
NORTHING: 6519162 m
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered					CL	**TOPSOIL:** Sandy CLAY, low plasticity, dark grey	M < w_P	Fb			TOPSOIL
						GC	0.20m **Clayey GRAVEL:** Fine grained, subrounded/rounded, grey	M				COLLUVIAL
				0.5			0.30m Hole Terminated at 0.30 m					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP13

CLIENT: Love Project Management
PAGE: 1 of 1
PROJECT NAME: Proposed Residential Rezoning
JOB NO: RGS21064.1
SITE LOCATION: Northern Portion of Lot 499, Lake Innes
LOGGED BY: GC
TEST LOCATION: Refer to Figure 1
DATE: 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator
EASTING: 489751 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 0.4 m
NORTHING: 6519151 m
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered					CL	**TOPSOIL:** Sandy CLAY, low plasticity, dark grey	M < w_P	Fb			TOPSOIL
						GC	0.20m **Clayey GRAVEL:** Fine grained, subrounded/rounded, grey	M				COLLUVIAL
				0.5			0.30m Hole Terminated at 0.30 m					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP14

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487047 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519168 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered	E 0.10m				CL	**FILL:** Sandy CLAY, low to medium plasticity, brown 0.10m	M < w_P	Fb			FILL/TOPSOIL
		0.30m				CH	**FILL:** Sandy CLAY, medium to high plasticity, pale brown 0.40m					FILL
		E 0.40m				CL	**TOPSOIL:** Sandy CLAY, low plasticity, dark grey 0.50m					TOPSOIL
				0.5			Hole Terminated at 0.50 m					
				1.0								
				1.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP15

CLIENT: Love Project Management | **PAGE:** 1 of 1

PROJECT NAME: Proposed Residential Rezoning | **JOB NO:** RGS21064.1

SITE LOCATION: Northern Portion of Lot 499, Lake Innes | **LOGGED BY:** GC

TEST LOCATION: Refer to Figure 1 | **DATE:** 15/1/21

EQUIPMENT TYPE: 3.5T Mini Excavator | **EASTING:** 487064 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 0.4 m | **NORTHING:** 6519111 m | **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
400mm Toothed Bucket	Not Encountered	E 0.10m				GP	**FILL:** Sandy GRAVEL, fine to medium grained, subangular, grey/dark grey	D				FILL
						GC	**Clayey GRAVEL:** Fine to medium grained, grey	W				COLLUVIAL
						CH	**CLAY:** Medium to high plasticity, yellow	M > w_P	Fb			RESIDUAL
				0.5			Hole Terminated at 0.40 m					
				1.0								
				1.5								

0.20m
0.30m
0.40m

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Appendix C

Laboratory Test Result Sheets

Comparison of Contamination Analysis Results with Adopted Investigation Levels (Results in mg/kg)

National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013)

REGIONAL GEOTECHNICAL SOLUTIONS

Client: Charley Brothers Pty Ltd
Job No. RGS21064.1
Project: Proposed Residential Development
Location: Northern Portion, Lot 499, Lake Innes

SAMPLE	DEPTH	Material	TOTAL RECOVERABLE HYDROCARBONS					PAH		DDT+DDE	Aldrin	PCB	BTEX		Heavy Metals							
	(m)		C6-C10	C10-C16	C16-C34	C34-C40	TOTAL	Total	b-a-p (TEQ)	Pesticides	Pesticides		Sum	Napthalene	As	Cd	Cr (Total)#	Cu	Pb	Ni	Zn	Hg
TP1	0 - 0.1	Topsoil	----	----	----	----	----	----	----	----	----	----	----	----	<5	<1	44	16	10	3	<5	<0.1
TP1	0.3 - 0.4	Residual	----	----	----	----	----	----	----	----	----	----	----	----	<5	<1	81	57	<5	13	10	<0.1
TP2	0 - 0.1	Topsoil	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.05	<0.1	<0.2	<1	<5	<1	64	21	11	3	<5	<0.1
TP2	0.4 - 0.5	Fill	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.05	<0.1	<0.2	<1	<5	<1	66	24	6	2	<5	<0.1
TP4	0.5 - 0.6	Fill	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.05	<0.1	<0.2	<1	<5	<1	46	121	<5	30	51	<0.1
TP3	0 - 0.1	Topsoil	----	----	----	----	----	----	----	----	----	----	----	----	<5	<1	236	10	7	6	<5	<0.1
TP3	0.3 - 0.4	Residual	----	----	----	----	----	----	----	----	----	----	----	----	<5	<1	292	28	10	16	<5	0.1
TP4	0 - 0.1	Topsoil	----	----	----	----	----	----	----	----	----	----	----	----	<5	<1	53	141	6	37	75	<0.1
TP5	0 - 0.1	Topsoil	----	----	----	----	----	----	----	----	----	----	----	----	<5	<1	21	16	<5	5	<5	<0.1
TP6	0 - 0.1	Fill	----	----	----	----	----	----	----	----	----	----	----	----	<5	<1	36	30	5	8	6	<0.1
TP7	0 - 0.1	Topsoil	----	----	----	----	----	----	----	----	----	----	----	----	<5	1	55	21	10	7	<5	<0.1
TP7	0.1 - 0.25	Fill	----	----	----	----	----	----	----	----	----	----	----	----	<5	1	57	19	10	5	<5	<0.1
TP8	0 - 0.1	Background	----	----	----	----	----	----	----	----	----	----	----	----	<5	2	325	60	9	22	17	<0.1
TP8	0 - 0.1	Background	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
TP14	0 - 0.1	Topsoil	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.05	<0.1	<0.2	<1	<5	<1	100	26	17	9	17	<0.1
TP14	0.3 -0.4	Fill	----	----	----	----	----	----	----	----	----	----	----	----	<5	<1	109	22	12	8	12	<0.1
TP15	0 - 0.1	Fill	----	----	----	----	----	----	----	----	----	----	----	----	24	<1	8	8	23	3	66	<0.1
D1	Duplicate	TP3 0.3-0.4	----	----	----	----	----			----	----	----	----	----	<5	<1	250	27	9	14	<5	<0.1
RPD %																	*15.5*	*3.6*	*10.5*	*13.3*		
CRITERIA (NEPM 2013)																						
Health Investigation Level (HIL):*								*300*	*3*	*240*	*6*				*100*	*20*	*100##*	*600*	*300*	*400*	*7400*	*40*
*Health Screening Level (HSL)***			*45*	*110*																		
*Ecological Screening Level (ESL)****			*180*	*120*	*300*	*2800*																
Ecological Investigation Level (EIL)@														*170*	*100*	*-*	*460*	*200*	*1100*	*240*	*-*	*-*

CRITERIA:
* Health Based Investigation Levels for Residential A (NEPM 2013)
** Health Screening Level (F2) for residential land use and coarse grained soil (sand), 0 - 1m depth
*** Ecological Screening Level for residential land use
@ Ecological Investigation Level - aged (>2 years) for residential landuse
# Total Chromium (CRIII + CRVI)
Chromium VI - Speciation testing confirmed only Chromium III present

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2102019**	Page	: 1 of 17
Amendment	: **1**		
Client	: **REGIONAL GEOTECHNICAL SOLUTION**	Laboratory	: Environmental Division Sydney
Contact	: MR TIM MORRIS	Contact	: Customer Services ES
Address	: 44 BENT STREET WINGHAM NSW, AUSTRALIA 2429	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6553 5641	Telephone	: +61-2-8784 8555
Project	: RGS21064.1 Proposed Rezoning	Date Samples Received	: 21-Jan-2021 09:20
Order number	: ----	Date Analysis Commenced	: 22-Jan-2021
C-O-C number	: ----	Issue Date	: 02-Feb-2021 16:11
Sampler	: ----		
Site	: Lot 499, Lake Innes, Port Maqcuarie		
Quote number	: EN/222		
No. of samples received	: 18		
No. of samples analysed	: 18		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Aleksandar Vujkovic	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- EA150H: Soil particle density results fell outside the scope of AS1289.3.6.3. Results should be scrutinised accordingly.
- EG048G: Poor spike recovery for Hexavalent Chromium by Alkaline Digestion due to matrix interferences.
- EG048G: LOR raised for Hexavalent Chromium by Alkaline Digestion on sample 13 due to sample matrix.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EG005: Poor matrix spike recovery was obtained for Zinc on sample ES2101876-#001. Results have been confirmed by re-extraction and reanalysis.
- EG005: Poor matrix spike recovery was obtained for Arsenic on sample ES2102019-#003. Results have been confirmed by re-extraction and reanalysis.
- Amendment (01/02/2021): This report has been amended and re-released to allow the reporting of additional analytical data, specifically speciated Cr for sample 13 as requested.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP1 0-0.1	TP1 0.3-0.4	TP2 0-0.1	TP2 0.4-0.5	TP3 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-001	ES2102019-002	ES2102019-003	ES2102019-004	ES2102019-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	17.5	24.2	21.4	26.8	13.1
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	44	81	64	66	236
Copper	7440-50-8	5	mg/kg	16	57	21	24	10
Lead	7439-92-1	5	mg/kg	10	<5	11	6	7
Nickel	7440-02-0	2	mg/kg	3	13	3	2	6
Zinc	7440-66-6	5	mg/kg	<5	10	<5	<5	<5
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<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	----
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	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP1 0-0.1	TP1 0.3-0.4	TP2 0-0.1	TP2 0.4-0.5	TP3 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-001	ES2102019-002	ES2102019-003	ES2102019-004	ES2102019-005
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	<0.05	<0.05	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	<0.05	<0.05	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	<0.2	<0.2	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	<0.05	<0.05	----
Diazinon	333-41-5	0.05	mg/kg	----	----	<0.05	<0.05	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	<0.05	<0.05	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	<0.2	<0.2	----
Malathion	121-75-5	0.05	mg/kg	----	----	<0.05	<0.05	----
Fenthion	55-38-9	0.05	mg/kg	----	----	<0.05	<0.05	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	<0.05	<0.05	----
Parathion	56-38-2	0.2	mg/kg	----	----	<0.2	<0.2	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	<0.05	<0.05	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	<0.05	<0.05	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	<0.05	<0.05	----
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	<0.05	<0.05	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	<0.05	<0.05	----
Ethion	563-12-2	0.05	mg/kg	----	----	<0.05	<0.05	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	<0.05	<0.05	----
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	<0.05	<0.05	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	----	----	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	----	----	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	----	----	<0.5	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	TP1 0-0.1	TP1 0.3-0.4	TP2 0-0.1	TP2 0.4-0.5	TP3 0-0.1
				Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit		ES2102019-001	ES2102019-002	ES2102019-003	ES2102019-004	ES2102019-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg		----	----	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	<0.5	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	**0.6**	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	**1.2**	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		----	----	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg		----	----	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg		----	----	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		----	----	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg		----	----	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	<50	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	<50	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg		----	----	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	<0.5	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP1 0-0.1	TP1 0.3-0.4	TP2 0-0.1	TP2 0.4-0.5	TP3 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-001	ES2102019-002	ES2102019-003	ES2102019-004	ES2102019-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
^ Sum of BTEX	----	0.2	mg/kg	----	----	<0.2	<0.2	----
^ Total Xylenes	----	0.5	mg/kg	----	----	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg	----	----	<1	<1	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	71.0	74.4	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	----	75.1	88.8	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	----	90.3	72.8	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	85.0	82.2	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	81.1	82.3	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	70.1	71.8	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	97.1	96.9	----
Anthracene-d10	1719-06-8	0.5	%	----	----	93.9	105	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	76.8	78.9	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	103	108	----
Toluene-D8	2037-26-5	0.2	%	----	----	103	109	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	99.8	104	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP3 0.3-0.4	TP4 0-0.1	TP4 0.5-0.6	TP5 0-0.1	TP6 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-006	ES2102019-007	ES2102019-008	ES2102019-009	ES2102019-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	26.1	24.4	22.7	23.1	37.8
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	292	53	46	21	36
Copper	7440-50-8	5	mg/kg	28	141	121	16	30
Lead	7439-92-1	5	mg/kg	10	6	<5	<5	5
Nickel	7440-02-0	2	mg/kg	16	37	30	5	8
Zinc	7440-66-6	5	mg/kg	<5	75	51	<5	6
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.1	<0.1	<0.1	<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	----	----
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	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP3 0.3-0.4	TP4 0-0.1	TP4 0.5-0.6	TP5 0-0.1	TP6 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-006	ES2102019-007	ES2102019-008	ES2102019-009	ES2102019-010
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	<0.05	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	<0.05	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	<0.2	----	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	<0.05	----	----
Diazinon	333-41-5	0.05	mg/kg	----	----	<0.05	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	<0.05	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	<0.2	----	----
Malathion	121-75-5	0.05	mg/kg	----	----	<0.05	----	----
Fenthion	55-38-9	0.05	mg/kg	----	----	<0.05	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	<0.05	----	----
Parathion	56-38-2	0.2	mg/kg	----	----	<0.2	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	<0.05	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	<0.05	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	<0.05	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	<0.05	----	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	<0.05	----	----
Ethion	563-12-2	0.05	mg/kg	----	----	<0.05	----	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	<0.05	----	----
Azinphos Methyl	86-50-0	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	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	TP3 0.3-0.4	TP4 0-0.1	TP4 0.5-0.6	TP5 0-0.1	TP6 0-0.1
				Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit		ES2102019-006	ES2102019-007	ES2102019-008	ES2102019-009	ES2102019-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
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	----	----
^ 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	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP3 0.3-0.4	TP4 0-0.1	TP4 0.5-0.6	TP5 0-0.1	TP6 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-006	ES2102019-007	ES2102019-008	ES2102019-009	ES2102019-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
^ Sum of BTEX	----	0.2	mg/kg	----	----	<0.2	----	----
^ Total Xylenes	----	0.5	mg/kg	----	----	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg	----	----	<1	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	84.9	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	----	94.6	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	----	132	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	102	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	90.5	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	63.8	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	97.6	----	----
Anthracene-d10	1719-06-8	0.5	%	----	----	96.9	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	87.7	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	107	----	----
Toluene-D8	2037-26-5	0.2	%	----	----	102	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	98.6	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP7 0-0.1	TP7 0.1-0.25	TP8 0-0.1	TP8 0-0.1	TP14 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-011	ES2102019-012	ES2102019-013	ES2102019-014	ES2102019-015
				Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	----	----	----	5.0	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	5.9	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	----	----	----	11	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	----	----	----	25.2	----
Moisture Content	----	1.0	%	14.7	28.0	22.7	----	19.8
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	----	21	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	----	----	----	2.32	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	5.9	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	4.5	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	0.4	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	0.2	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	11.0	----
Exchangeable Sodium Percent	----	0.1	%	----	----	----	1.4	----
EG005(ED093)T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	----	----	----	8.64	----
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	----	<5
Cadmium	7440-43-9	1	mg/kg	1	1	2	----	<1
Chromium	7440-47-3	2	mg/kg	55	57	325	----	100
Copper	7440-50-8	5	mg/kg	21	19	60	----	26
Lead	7439-92-1	5	mg/kg	10	10	9	----	17
Nickel	7440-02-0	2	mg/kg	7	5	22	----	9
Zinc	7440-66-6	5	mg/kg	<5	<5	17	----	17
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	----	----	<5.0	----	----
EG049: Trivalent Chromium								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP7 0-0.1	TP7 0.1-0.25	TP8 0-0.1	TP8 0-0.1	TP14 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-011	ES2102019-012	ES2102019-013	ES2102019-014	ES2102019-015
				Result	Result	Result	Result	Result
EG049: Trivalent Chromium - Continued								
Trivalent Chromium	16065-83-1	2	mg/kg	----	----	**325**	----	----
EP004: Organic Matter								
Organic Matter	----	0.5	%	----	----	----	**6.1**	----
Total Organic Carbon	----	0.5	%	----	----	----	**3.5**	----
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
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
EP068B: Organophosphorus Pesticides (OP)								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP7 0-0.1	TP7 0.1-0.25	TP8 0-0.1	TP8 0-0.1	TP14 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-011	ES2102019-012	ES2102019-013	ES2102019-014	ES2102019-015
				Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	----	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	----	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	----	<0.2
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	----	<0.05
Diazinon	333-41-5	0.05	mg/kg	----	----	----	----	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	----	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	----	<0.2
Malathion	121-75-5	0.05	mg/kg	----	----	----	----	<0.05
Fenthion	55-38-9	0.05	mg/kg	----	----	----	----	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	----	<0.05
Parathion	56-38-2	0.2	mg/kg	----	----	----	----	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	----	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	----	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	----	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	----	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	----	<0.05
Ethion	563-12-2	0.05	mg/kg	----	----	----	----	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	----	<0.05
Azinphos Methyl	86-50-0	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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP7 0-0.1	TP7 0.1-0.25	TP8 0-0.1	TP8 0-0.1	TP14 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-011	ES2102019-012	ES2102019-013	ES2102019-014	ES2102019-015
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
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
^ 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	----	0.5	mg/kg	----	----	----	----	<0.5
Naphthalene	91-20-3	1	mg/kg	----	----	----	----	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	**72.2**
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	----	----	----	**73.7**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP7 0-0.1	TP7 0.1-0.25	TP8 0-0.1	TP8 0-0.1	TP14 0-0.1
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00
Compound	CAS Number	LOR	Unit	ES2102019-011	ES2102019-012	ES2102019-013	ES2102019-014	ES2102019-015
				Result	Result	Result	Result	Result
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	----	----	----	69.5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	99.2
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	81.2
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	74.2
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	94.5
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	96.6
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	83.3
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	----	----	107
Toluene-D8	2037-26-5	0.2	%	----	----	----	----	102
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	----	----	99.0

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP14 0.3-0.4	TP15 0-0.1	D1	----	----
			Sampling date / time	15-Jan-2021 00:00	15-Jan-2021 00:00	15-Jan-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2102019-016	ES2102019-017	ES2102019-018	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**23.8**	**5.2**	**25.6**	**----**	**----**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	**24**	<5	**----**	**----**
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	**----**	**----**
Chromium	7440-47-3	2	mg/kg	**109**	**8**	**250**	**----**	**----**
Copper	7440-50-8	5	mg/kg	**22**	**8**	**27**	**----**	**----**
Lead	7439-92-1	5	mg/kg	**12**	**23**	**9**	**----**	**----**
Nickel	7440-02-0	2	mg/kg	**8**	**3**	**14**	**----**	**----**
Zinc	7440-66-6	5	mg/kg	**12**	**66**	<5	**----**	**----**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	**----**	**----**

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

Letter from Dr David Tully CEnvP SC

Contaminated Land Solutions

9 February 2021

Ref: CLS0122.L01

Regional Geotechnical Solutions Pty Ltd
1/12 Jindalee Road
Port Macquarie
NSW 2444

For the attention of Tim Morris

Dear Tim,

RE: Review of Stage 1 Site Contamination Assessment Report – Proposed Residential Development Lot 499 DP1258597, Lake Innes

I, Dr David Tully of Contaminated Land Solutions Pty Ltd, am a Certified Environmental Practitioner Site Contamination Specialist (General Certified Environmental Practitioner certification no. 1138 and Site Contamination Specialist certification no. SC40084).

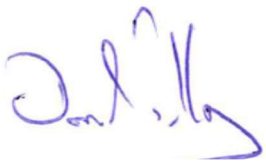
I confirm I have reviewed the Regional Geotechnical Solutions report entitled "Stage 1 Site Contamination Assessment Report – *Proposed Residential Development Lot 499 DP1258597, Lake Innes*" (Ref: RGS21064.1-AC), dated 8 February 2021 and a copy of which I have retained.

I can confirm that on the basis of the information contained within the report, I support the conclusions and recommendations provided therein.

Should the client, regulator or local authority have any queries regarding the report review, I can be contacted by e-mail via david.tully@contaminatedlandsolutions.com.au. Specific queries regarding the content of the report should be addressed to Tim Morris at Regional Geotechnical Solutions.

For and on behalf of

Contaminated Land Solutions Pty Ltd



Dr David Tully CEnvP SC
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