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Occupational Hygiene, Drone & Asbestos services

Supplementary report to the Detailed Site Investigation Report

44 Middle Arm Road, Middle Arm

Reference No:	DSI2023-219- Supp
Report Date:	10 August 2023
Prepared by:	CSH Consulting Pty Ltd

Contents

Revision	Details	Date	Amended By
00	Final version	10 August 2023	Julia Noonan

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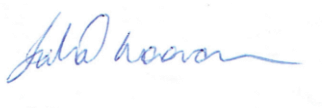
Signed: 

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Signed: 

Date: 10 August 2023

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1. Executive Summary

CSH Consulting Pty Ltd were engaged by IPG Invest Projects to carry out additional sampling of the soils at the property at 44 Middle Arm Rd, Middle Arm. The sampling is to support the previous sampling conducted for the Detailed Site Investigation Report (DSI Reference No DSI2023-219 dated 26 April 2023).

The objective of this supplementary report is to provide more detailed and definitive information to evaluate the likelihood of contamination on the land.

Soil samples were collected on 26/07/2023 with the sampling carried out in areas to encompass more of the property where activities associated with soil works are likely to have been conducted and to evaluate the likelihood of contamination on the land. Sampling locations are shown in Figure 1.

The house, garage and sheds were not sampled as the buildings are still being occupied by the owners and will be surveyed and sampled as a pre-demolition survey as per the remedial action plan (Section 10 of the DSI).

The analysis results from Envirolab report numbers 319030 (for soils collected 26/07/2023) and 319626 (for soils collected 24/03/2023) were compiled and compared to Health investigation levels (HIL), HIL A (residential); Health Screening Levels (HSL), HSL A & HSL B (Low – high density residential); and Ecological Investigation levels (EILs); set by *NEPM*; Specific contaminant concentration (SCC) and toxicity characteristics leaching procedure (TCLP) test values in *NSW EPA Waste Classification Guidelines Part 1: Classifying waste*; and the chemical concentrations stipulated in the *NSW EPA Excavated natural material order*.

Based on the results from the chemical analysis of all the soil samples collected from the various locations, as indicated on Figure 1, on 44 Middle Arm Rd, Middle Arm, both on 26/07/2023 and 24/03/2023 (used in the DSI), along with the information provided from the DSI and onsite surveys and discussions with the owners, there is an overall low risk to human and environmental health.

The two areas of concern identified in the DSI, the house and garage (PAEC01) and the sheds South of the house (PAEC06), and the potential contaminants area assumed to be present at these locations are controlled and sampled using the remediation action plan.

The remediation action plan in Section 10 of the DSI (reference No DSI2023-219, dated 26 April 2023) developed for the sampling, management and the demolition of house, garage and sheds and the removal of contaminated waste is to be followed to ensure the minimalisation of contamination during the demolition process and the sampling to validate the areas are free from contaminants.

Overall, based on the analysis of the soil, reported values were below the relevant criteria and the likelihood of contamination of that land is low. As a result, the site is deemed suitable for rezoning and development on the basis that remediation action plan is followed.

2. Introduction

CSH Consulting Pty Ltd were engaged by IPG Invest Projects to carry out additional sampling of the soils at the property at 44 Middle Arm Rd, Middle Arm. The sampling is to support the previous sampling conducted for the Detailed Site Investigation Report (DSI Reference No DSI2023-219 dated 26 April 2023).

The objective of this supplementary report is to provide more detailed and definitive information to evaluate the likelihood of contamination on the land.

3. Scope of works

This report is written to supplement the Detailed Site Investigation Report (DSI2023-219-01) to satisfy the requirements of the client to further determine any contamination in the soil.

This report covers the sampling of soils, the analysis results and conclusions and recommendations based on the site visit, analysis results and review of previous information provided in the DSI.

4. Sampling and analysis quality plan and sampling methodology

Soil samples were collected on 26/07/2023 with the sampling carried out in areas to encompass more of the property where activities associated with soil works are likely to have been conducted and to evaluate the likelihood of contamination on the land. Sampling locations are shown in Figure 1 below.

Soils were collected using a stainless steel shovel, cleaned after every sample, and contained in virgin high strength plastic sample bags, 250 mL virgin glass jar with Teflon sealed screw caps and virgin asbestos sample bags. All samples were labelled at the time they were taken. Samples were immediately stored in cooled storage bins prior to being delivered to the environmental laboratory under strict Chain-of-Custody conditions.

The house, garage and sheds were not sampled as the buildings are still being occupied by the owners and will be surveyed and sampled as a pre-demolition survey as per the remedial action plan (Section 10 of the DSI).

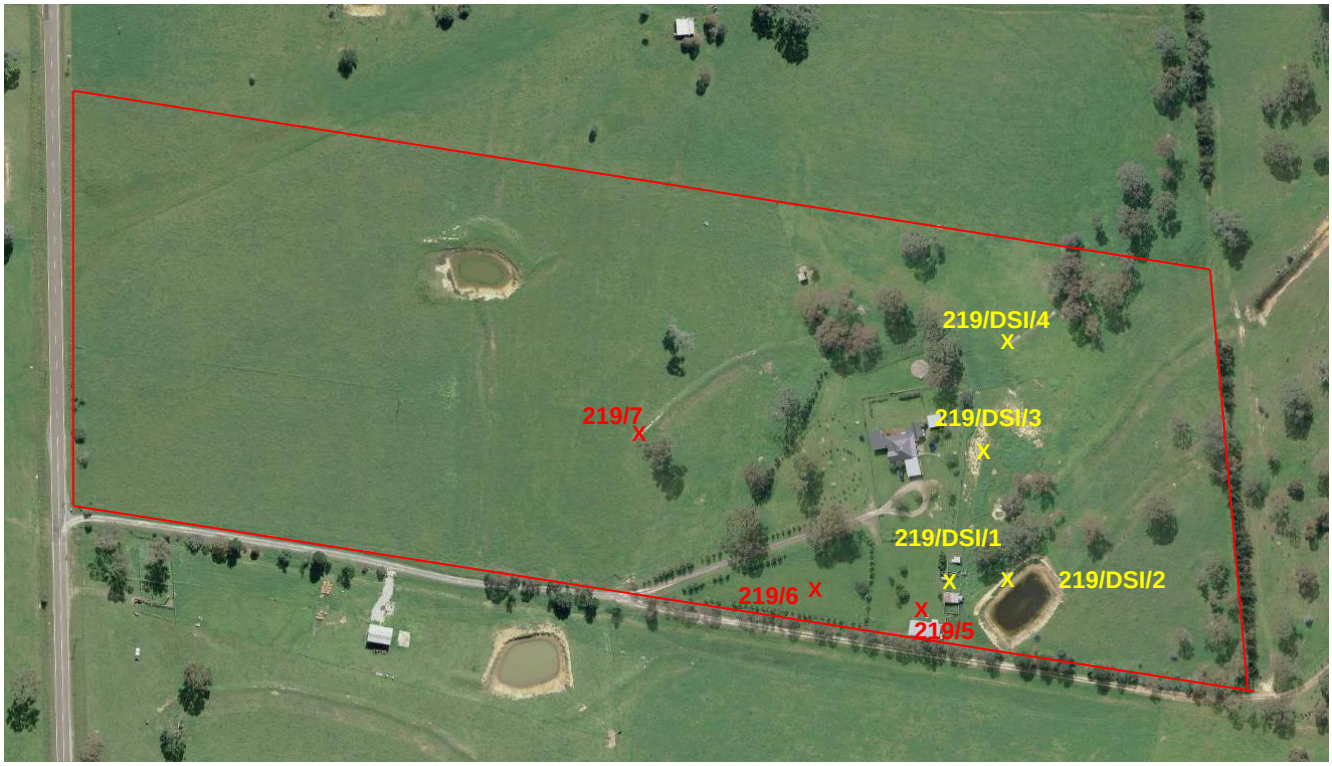

Figure 1: sampling locations collected on the 26/07/2023 shown in red. Previous sampling from the DSI, 24/03/2023 are shown in Yellow

5. Results

The analysis results from Envirolab report numbers 319030 (for soils collected 26/07/2023) and 319626 (for soils collected 24/03/2023) were compiled and compared to Health investigation levels (HIL), HIL A (residential); Health Screening Levels (HSL), HSL A & HSL B (Low – high density residential); and Ecological Investigation levels (EILs); set by *NEPM*; Specific contaminant concentration (SCC) and toxicity characteristics leaching procedure (TCLP) test values in *NSW EPA Waste Classification Guidelines Part 1: Classifying waste*; and the chemical concentrations stipulated in the *NSW EPA Excavated natural material order*.

Based on the analysis results, all values reported are below the relevant criteria from the documents above. Sample No 219/7 was taken from the top a ridge created from soil onsite returned a concentration level for total Chromium (130 mg/kg) higher than the investigation level for HILs A (Residential) set by NEPM (Chromium (VI) = 100 mg/kg). The sample 219/7 was further analysed for the concentration of Hexavalent Chromium (Cr(VI)), Envirolab Report No 329030-A, and was found to have a concentration of <1 mg/kg.

A summary of results in comparison to the assessment/investigation criteria can be found in Appendix A. The Analysis results for Report No 319030 and 329030-A can be found in Appendix B.

Due to the information obtained from the PSI, DSI and age of the house, it is presumed the house contains asbestos and paint to contain lead.

6. Conclusions and recommendations

Based on the results from the chemical analysis of all the soil samples collected from the various locations, as indicated on Figure 1, on 44 Middle Arm Rd, Middle Arm, both on 26/07/2023 and 24/03/2023 (used in the DSI), along with the information provided from the DSI and onsite surveys and discussions with the owners, there is an overall low risk to human and environmental health.

The ridge area where the sample 219/7 was taken indicated a level of Chromium that exceeds the HILs A investigation levels set by NEPM. However, it needs to be noted that the levels for chromium (Cr) reported in the analysis results from Envirolab are for total chromium which includes Cr(III) and Cr(VI) and the investigation levels set by NEPM are for Hexavalent Chromium (Cr(VI)) only. It was requested by CSH Consulting to Envirolab Services that further analysis on the sample No 219/7 be conducted to determine the concentration level of Cr(VI) in order to accurately determine the risk in this area. The analysis results indicate that the Cr(VI) concentration for sample 219/7 is <1 mg/kg (see Envirolab Report No. 329030-A (Appendix B). It can be concluded that the high level of Chromium in the sample is predominantly comprised of CR(III). Trivalent Chromium (Cr III) is naturally occurring in soils, rocks and plants and does not pose risks to human or environmental health.

When comparing the results for sample 219/7 to the Specific contaminant concentration (SCC) and toxicity characteristics leaching procedure (TCLP) test values set in the EPA Waste Classifications Guidelines, the results indicate the chromium does not exceed any concentration levels and as a result the soil can be classified as general solid waste.

By using the information gathered from results, from the investigations conducted during the development of the DSI and from onsite discussions and surveys, the site as a whole is acceptable.

The two areas of concern identified in the DSI, the house and garage (PAEC01) and the sheds South of the house (PAEC06), and the potential contaminants area assumed to be present at these locations are controlled and sampled using the remediation action plan.

The remediation action plan in Section 10 of the DSI (reference No DSI2023-219, dated 26 April 2023) developed for the sampling, management and the demolition of house, garage and sheds and the removal of contaminated waste is to be followed to ensure the minimalisation of contamination during the demolition process and the sampling to validate the areas are free from contaminants.

Overall, based on the analysis of the soil, reported values were below the relevant criteria and the likelihood of contamination of that land is low. As a result, the site is deemed suitable for rezoning and development on the basis that remediation action plan is followed.

7. References

CSH Consulting (2023), *Detailed Site Investigation Report,* prepared for IPG Invest Projects (Ref: DSI2023-219-01, dated 7 June 2023).

NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure 1999, as amended in 2013, National Environment Protection Council.

NSW EPA, Contaminated Land Guidelines, Consultants Reporting on Contaminated Land, April 2020.

NSW EPA, *The excavated natural material order 2014,* Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation, 2014.

NSW EPA Waste Classification guidelines, Part 1 Classifying Waste, 2014.

8. Limitations

This investigation consisted of a visual survey of the site and sampling of soils in selected areas. The house, garage and shed have not been surveyed as the survey will be completed as a pre-demolition survey.

Any person acting or relying on this report, in whole or in part, does so subject to the limitations expressed in this report and at their own risk.

All work is conducted in a conscientious and professional manner, with due diligence and appropriate care. However due to the disproportionate cost of potential damages or liability relative to the cost of our services, CSH Consulting Pty Ltd cannot offer any guarantee that all hazards have been identified. Liability to the client or any other party resulting from the performance or non-performance of the service, whether under contract law, tort law or otherwise, is limited by law.

CSH Consulting Pty Ltd reports are not to be reproduced or reviewed except in full. All reports are prepared for a particular client's objective, and therefore should not be used by any third party as a basis for future decision-making.

The Executive Summary must not be read in isolation, but should be read in conjunction with all sections of this report.

9. Appendix A – Analysis results summary

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NEPM, HILs A Comparison

Laboratory Analysis against NEPM 1999														
Table 1A(1)	Health investigation levels for soil contaminants						Sample Reference	329030-1	329032-2	329032-3	319626-1	319626-2	319626-3	319626-4
							Sample Name	219/5	219/6	219/7	219/DSI/1	219/DSI/2	219/DSI/3	219/DSI/4
							Date Sampled	26/07/2023	26/07/2023	26/07/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
								Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks
Group	**Chemical**	**Residential A**	**Dataset mean**	**Dataset median**	**Dataset standard deviation**	**95% UCL**	**Dataset maximum**	200 mm	200 mm	200 mm	Surface	Surface	Surface	Surface
Metals	Arsenic	100	5.57	5.00	1.51	1.4	8	6	7	8	5	5	<4	<4
	Cadmium	20	<0.4	<0.4	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Chromium	100	63.57	52.00	32.17	29.75	130	63	74	130	52	52	39	35
	Copper	6000	10.00	10.00	1.73	1.6	13	11	8	10	13	10	10	8
	Lead	300	25.43	25.00	6.5	6.01	34	29	34	32	25	19	22	17
	Mercury	40	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Nickel	400	6.00	7.00	1.41	1.31	7	7	4	7	7	7	6	4
	Zinc	7400	34.43	32.00	29.5	27.28	88	38	13	8	55	7	88	32
PAHs	Benzo(a)anthracene	0.1	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(a)pyrene	1	<0.05	<0.05	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Benzo(b,j+k)fluoranthene	0.1	<0.2	<0.2	0	0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Benzo(g,h,i)perylene	0.01	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chrysene	0.01	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Dibenzo(a,h)anthracene	1	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Indeno(1,2,3-c,d)pyrene	0.1	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(a)pyrene TEQ calc(PQL)	3	<0.5	<0.5	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total +ve PAHs[7]	300	<0.05	<0.05	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Organochlorine Pesticides	Aldrin	6	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Dieldrin	6	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endosulfan I	270	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endosulfan II		<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endosulfan Sulphate		<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endrin	10	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Apha-chlordane	50	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	gamma-chlordane		<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	HCB	10	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Heptachlor	6	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Methoxychlor	300	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Total +ve DDT+DDD+DDE	240	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
organophosphorus Pesticides	Chlorpyriphos	160	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCBs	Total +ve PCBs(1016-1260)	1	<0.1	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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NEPM, HSLs Comparison

Laboratory Analysis against NEPM 1999														
Table 1A(3)	Soil HSLs for vapour intrusion (mg/kg)						Sample Reference	329030-1	329030-2	329030-3	319626-1	319626-2	319626-3	319626-4
							Sample Name	219/5	219/6	219/7	219/DSI/1	219/DSI/2	219/DSI/3	219/DSI/4
							Date Sampled	26/07/2023	26/07/2023	26/07/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
								Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks
Chemical	**Soil texture**	**HSL A & HSL B 0m to <1m**	**Dataset mean**	**Dataset median**	**Dataset standard deviation**	**95% UCL**	**Dataset maximum**	200 mm	200 mm	200 mm	Surface	Surface	Surface	Surface
Toluene	Sand	160	<0.5	<0.5	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	Sand	55	<1	<1	0	0	<1	<1	<1	<1	<1	<1	<1	<1
Xylenes	Sand	40	<1	<1	0	0	<1	<1	<1	<1	<1	<1	<1	<1
Napthalene	Sand	3	<1	<1	0	0	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	Sand	0.5	<0.2	<0.2	0	0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
F1	Sand	45	<25	<25	0	0	<25	<25	<25	<25	<25	<25	<25	<25
F2	Sand	110	<50	<50	0	0	<50	<50	<50	<50	<50	<50	<50	<50

NEPM, ESLs Comparison

Laboratory Analysis against NEPM 1999														
Table 1B(6)	ESLs for TPH fractions F1-F4, BTEX and B(a)P in soils						Sample Reference	329030-1	329030-2	329030-3	319626-1	319626-2	319626-3	319626-4
							Sample Name	219/5	219/6	219/7	219/DSI/1	219/DSI/2	219/DSI/3	219/DSI/4
							Date Sampled	26/07/2023	26/07/2023	26/07/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
								Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks
Chemical	**Soil texture**	**Urban residential and public open space**	**Dataset mean**	**Dataset median**	**Dataset standard deviation**	**95% UCL**	**Dataset maximum**	200 mm	200 mm	200 mm	Surface	Surface	Surface	Surface
F1 C6-C10	Coarse/fine	180	<25	<25	0	0	<25	<25	<25	<25	<25	<25	<25	<25
F2 >C10-C16	Coarse/fine	120	<50	<50	0	0	<50	<50	<50	<50	<50	<50	<50	<50
F3 >C16-C34	Coarse	300	110.00	100.00	26.46	24.47	170	<100	<100	<100	170	<100	<100	<100
F3 >C16-C34	fine	1300												
F4 >C34-C40	Coarse	2800	<100	<100	0	0	<100	<100	<100	<100	<100	<100	<100	<100
F4 >C34-C40	fine	5600												
Benzene	coarse	50	<0.2	<0.2	0	0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzene	fine	65												
Toluene	Coarse	85	<0.5	<0.5	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	fine	105												
Ethylbenzene	Coarse	70	<1	<1	0	0	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	fine	125												
Xylenes	Coarse	105	<1	<1	0	0	<1	<1	<1	<1	<1	<1	<1	<1
Xylenes	fine	45												
Benzo(a)pyrene	Coarse/fine	0.7	<0.05	<0.05	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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EPA Waste Classification Comparison

Laboratory Analysis against EPA Waste Classification													
				Sample Reference			329030-1	329030-2	329030-3	319626-1	319626-2	319626-3	319626-4
				Sample Name			219/5	219/6	219/7	219/DSI/1	219/DSI/2	219/DSI/3	219/DSI/4
				Date Sampled			26/07/2023	26/07/2023	26/07/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
				Soil Matrix			Brown Coarse-grained soil and rocks	Brown Coarse-grained soil and rocks	Brown Coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks
Group	**Chemical**	**General Solid Waste CT1 (mg/kg)**	**Restricted solid waste CT2 (mg/kg)**	**Dataset Average**	**Standard deviation**	**95% UCL**	200 mm	200 mm	200 mm	surface	Surface	Surface	surface
TRH/BTEX	C_6-C_9	650	2600	<25	0	0	<25	<25	<25	<25	<25	<25	<25
	Total +ve TRH (C_{10}-C_{36})	10000	40000	62.86	34.02	31.46	<50	<50	<50	140	<50	<50	<50
	Benzene	10	40	<0.2	0	0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Toluene	288	1152	<0.5	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenze	600	2400	<1	0	0	<1	<1	<1	<1	<1	<1	<1
	Total +ve Xylenes	1000	400	<1	0	0	<1	<1	<1	<1	<1	<1	<1
PAHs	Benzo(a)pyrene	0.8	3.2	<0.05	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Total +ve PAHs[7]	200	800	<0.05	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Organochlorine Pesticides	Aldrin	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	alpha-BHC	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	beta-BHC	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	delta-BHC	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Dieldrin	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endosulfan I	60	240	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endosulfan II			<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endosulfan Sulphate			<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endrin	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endrin Aldehyde	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	gamma-BHC	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Apha-chlordane			<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	gamma-chlordane			<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	HCB			<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Heptachlor	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Heptachlor Epoxide	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Methoxychlor			<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Total +ve DDT+DDD+DDE	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCBs	Total +ve PCBs(1016-1260)	<50	<50	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Metals	Arsenic	100	400	5.57	1.51	1.4	6	7	8	5	5	<4	<4
	Cadmium	20	80	<0.4	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Chromium	100	400	63.57	32.17	29.75	63	74	130	52	52	39	35
	Copper			10.00	1.73	1.6	11	8	10	13	10	10	8
	Lead	100	400	25.43	6.5	6.01	29	34	32	25	19	22	17
	Mercury	4	16	<0.1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Nickel	40	160	6.00	1.41	1.31	7	4	7	7	7	6	4
	Zinc			34.43	29.5	27.28	38	13	8	55	7	88	32

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EPA Waste Classification TCLP Comparison

	TCLP Analysis against EPA Waste Classification										Sample Reference
											Sample Name
											Date Sampled
											sample Matrix
Group	**Chemical**	**General Solid Waste**		**Restricted Solid Waste**		TCLP Concentration			Specific Contaminant conc.		
		Leachable conc. TCLP1 (mg/L)	**Specific Contaminant Conc. SCC1 (mg/kg)**	**Leachable conc. TCLP2 (mg/L)**	**Specific Contaminant Conc. SCC2 (mg/kg)**	**Dataset Average**	**Standard deviation**	**95% UCL**	**Dataset Average**	**Standard deviation**	**95% UCL**
	Benzo(a)pyrene	0.04	10	0.16	23	<0.001	0	0	<0.05	0	0
	Total +ve PAHs7	N/A	200	N/A	800	NIL (+)VE	0	0	<0.05	0	0
Metals	Arsenic	5	500	5	2000	<0.05	0	0	5.57	1.51	1.4
	Cadmium	1	100	1	400	<0.01	0	0	<0.4	0	0
	Chromium	5	1900	5	7600	0.01	0	0	63.57	32.17	29.75
	Lead	5	1500	5	6000	<0.03	0	0	25.43	6.5	6.01
	Mercury	0.2	50	0.2	200	<0.0005	0	0	<0.1	0	0
	Nickel	2	1050	2	4200	<0.02	0	0	6.00	1.41	1.31

Sample Reference		329030-1		329030-2		329030-3		319626-1		319626-2		319626-3		319626-4	
Sample Name		219/5		219/6		219/7		219/DSI/1		219/DSI/2		219/DSI/3		219/DSI/4	
Date Sampled		26/07/2023		26/07/2023		26/07/2023		24/03/2023		24/03/2023		24/03/2023		24/03/2023	
sample Matrix		Brown coarse-grained soil and rocks		Brown coarse-grained soil and rocks		Brown coarse-grained soil and rocks		Brown coarse-grained soil and rocks		Brown coarse-grained soil and rocks		Brown coarse-grained soil and rocks		Brown coarse-grained soil and rocks	
aminant conc.		200 mm		200 mm		200 mm		surface		surface		surface		surface	
		TCLP (mg/L)	reported specific contamination concentration	TCLP (mg/L)	reported specific contamination concentration	TCLP (mg/L)	reported specific contamination concentration	TCLP	reported specific contamination concentration	TCLP	reported specific contamination concentration	TCLP	reported specific contamination concentration	TCLP	reported specific contamination concentration
		<0.001	<0.05	<0.001	<0.05	<0.001	<0.05	<0.001	<0.05	<0.001	<0.05	<0.001	<0.05	<0.001	<0.05
		NIL (+)VE	<0.05	NIL (+)VE	<0.05	NIL (+)VE	<0.05	NIL (+)VE	<0.05	NIL (+)VE	<0.05	NIL (+)VE	<0.05	NIL (+)VE	<0.05
		<0.05	6	<0.05	7	<0.05	8	<0.05	5	<0.05	5	<0.05	<4	<0.05	<4
		<0.01	<0.4	<0.01	<0.4	<0.01	<0.4	<0.01	<0.4	<0.01	<0.4	<0.01	<0.4	<0.01	<0.4
		0.01	63	<0.01	74	<0.01	130	0.01	52	<0.01	52	<0.01	39	<0.01	35
		<0.03	29	<0.03	34	<0.03	32	<0.03	25	<0.03	19	<0.03	22	<0.03	17
		<0.0005	<0.1	<0.0005	<0.1	<0.0005	<0.1	<0.0005	<0.1	<0.0005	<0.1	<0.0005	<0.1	<0.0005	<0.1
		<0.02	7	<0.02	4	<0.02	7	<0.02	7	<0.02	7	<0.02	6	<0.02	4

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EPA ENM comparison

Analyte	EPA ENM 2014 Table 1 Column 2: Maximum average concentration for characterisation	EPA ENM 2014 Table 1 Column 3: Absolute maximum concentration	Envirolab Analysis Report 329030 & 319626: Average reported concentration	Envirolab Analysis Report 329030 & 319626: maximum reported concentration		329030-1 219/5	329030-2 219/6	329030-3 219/7	319626-1 219/DSI/1	319626-2 219/DSI/2	319626-3 219/DSI/3	319626-4 219/DSI/4
	Units in mg/kg unless indicated				Depth	200 mm	200 mm	200 mm	surface	surface	surface	surface
Mercury	0.5	1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	0.5	1	<0.4	<0.4		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Lead	50	100	25.43	34		29	34	32.00	25	19	22.00	17
Arsenic	20	40	5.57	8		6	7	8	5	5	<4	<4
Chromium (Total)	75	150	63.57	130		63	74	130.00	52	52	39.00	35
Copper	100	200	10.00	13		11	8	10.00	13	10	10.00	8
Nickel	30	60	6.00	7		7	4	7.00	7	7	6.00	4
Zinc	150	300	34.43	88		38	13	8.00	55	7	88.00	32
Electrical conductivity	1.5 dS/m	3 dS/m	0.73	1.89	µS/cm	82	61	83.00	270	50	88.00	100
pH*	5 to 9	4.5 to 10	6.57	7	pH units	7	6.8	5.40	6.9	6.6	6.70	6.6
Total PAHs	20	40	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	0.5	1	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	N/A	0.5	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	N/A	65	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl benzene	N/A	25	<1	<1		<1	<1	<1	<1	<1	<1	<1
Xylene	N/A	15	<1	<1		<1	<1	<1	<1	<1	<1	<1
TRH C10 – C36	250	500	45	140		<50	<50	<50	140	<50	<50	<50
Rubber, plastic, bitumen (% by mass)	0.05%	0.1%	<0.05	<0.05	%	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
paper, cloth, paint & wood (% by mass)	0.05%	0.1%	<0.05	<0.05	%	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Asbestos	-		NAD, OF	NAD, OF		NAD, OF	NAD, OF	NAD, OF	NAD, OF	NAD, OF	NAD, OF	NAD, OF

* note: the ranges given for pH are for minimum and maximum acceptable values

10. Appendix B – Envirolab Report

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CERTIFICATE OF ANALYSIS 329030

Client Details

Client	CSH Consulting Pty Ltd
Attention	Kevin King
Address	3 Pass Ave, Thirroul, NSW, 2515

Sample Details

Your Reference	**219**
Number of Samples	3 Soil
Date samples received	27/07/2023
Date completed instructions received	27/07/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	28/07/2023
Date of Issue	28/07/2023

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Anthony Clark
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Inorganics Supervisor
Dragana Tomas, Senior Chemist
Greta Petzold, Operation Manager
Loren Bardwell, Development Chemist
Lucy Zhu, Asbestos Supervisor

Authorised By
Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date extracted	-	27/07/2023	27/07/2023	27/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
TRH C_6 - C_9	mg/kg	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	104	103	103

svTRH (C10-C40) in Soil				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date extracted	-	27/07/2023	27/07/2023	27/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50
Surrogate o-Terphenyl	%	88	84	85

PAHs in Soil				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date extracted	-	27/07/2023	27/07/2023	27/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	75	74	73

Organochlorine Pesticides in soil				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date extracted	-	27/07/2023	27/07/2023	27/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	93	91	98

Organophosphorus Pesticides in Soil				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date extracted	-	27/07/2023	27/07/2023	27/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Mevinphos	mg/kg	<0.1	<0.1	<0.1
Phorate	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Disulfoton	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1
Parathion-Methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Fenthion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Methidathion	mg/kg	<0.1	<0.1	<0.1
Fenamiphos	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Phosalone	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Coumaphos	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	93	91	98

PCBs in Soil				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date extracted	-	27/07/2023	27/07/2023	27/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	93	91	98

Acid Extractable metals in soil				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	28/07/2023	28/07/2023	28/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
Arsenic	mg/kg	6	7	8
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	63	74	130
Copper	mg/kg	11	8	10
Lead	mg/kg	29	34	32
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	7	4	7
Zinc	mg/kg	38	13	8

Moisture				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	27/07/2023	27/07/2023	27/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
Moisture	%	11	10	9.0

Metals from Leaching Fluid pH 2.9 or 5				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date extracted	-	28/07/2023	28/07/2023	28/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
pH of soil for fluid# determ.	pH units	6.6	6.8	5.9
pH of soil TCLP (after HCl)	pH units	1.7	1.7	1.7
Extraction fluid used		1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0
Arsenic	mg/L	<0.05	<0.05	<0.05
Cadmium	mg/L	<0.01	<0.01	<0.01
Chromium	mg/L	0.01	<0.01	<0.01
Copper	mg/L	<0.01	<0.01	<0.01
Lead	mg/L	<0.03	<0.03	<0.03
Mercury	mg/L	<0.0005	<0.0005	<0.0005
Nickel	mg/L	<0.02	<0.02	<0.02
Zinc	mg/L	0.06	<0.02	<0.02

PAHs in TCLP (USEPA 1311)				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date extracted	-	28/07/2023	28/07/2023	28/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	77	89	81

Misc Inorg - Soil				
Our Reference	UNITS	329030-1	329030-2	329030-3
Your Reference		219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	28/07/2023	28/07/2023	28/07/2023
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
pH 1:5 soil:water	pH Units	7.0	6.8	5.4
Electrical Conductivity 1:5 soil:water	µS/cm	82	61	83

Asbestos ID - soils				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date analysed	-	28/07/2023	28/07/2023	28/07/2023
Sample mass tested	g	Approx. 35g	Approx. 45g	Approx. 50g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Excavated natural material order				
Our Reference		329030-1	329030-2	329030-3
Your Reference	UNITS	219/5	219/6	219/7
Depth		200mm	200mm	200mm
Date Sampled		26/07/2023	26/07/2023	26/07/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	27/07/2023	27/07/2023	27/07/2023
Date analysed	-	28/07/2022	28/07/2022	28/07/2022
Sample Mass Tested	g	6,600	6,700	6,700
Rubber, plastic, bitumen	%	<0.05	<0.05	<0.05
paper, cloth, paint and wood	%	<0.05	<0.05	<0.05

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-080	This method is based on RTA T276 and as per NSW DECC Resource Recovery Exemption Guidelines. RTA T276 requires at least 6kg of sample for this test. Where foreign materials are found, more details may be available on the types and/or quantities in the Comments section of the report.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-021	Determination of Mercury by Cold Vapour AAS following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.

Method ID	Methodology Summary
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	[NT]
Date extracted	-			27/07/2023	[NT]	[NT]	[NT]	[NT]	27/07/2023	[NT]
Date analysed	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	99	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	92	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	93	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	77	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	[NT]
Date extracted	-			27/07/2023	[NT]	[NT]	[NT]	[NT]	27/07/2023	[NT]
Date analysed	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	126	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	121	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	126	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	121	[NT]
Surrogate o-Terphenyl	%		Org-020	91	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	[NT]
Date extracted	-			27/07/2023	[NT]	[NT]	[NT]	[NT]	27/07/2023	[NT]
Date analysed	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	79	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	82	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	85	[NT]	[NT]	[NT]	[NT]	89	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	[NT]
Date extracted	-			27/07/2023	[NT]	[NT]	[NT]	[NT]	27/07/2023	[NT]
Date analysed	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	107	[NT]	[NT]	[NT]	[NT]	114	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	[NT]
Date extracted	-			27/07/2023	[NT]	[NT]	[NT]	[NT]	27/07/2023	[NT]
Date analysed	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Mevinphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Phorate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Disulfoton	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion-Methyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Malathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Fenthion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Methidathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fenamiphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	78	[NT]
Phosalone	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Coumaphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	107	[NT]	[NT]	[NT]	[NT]	114	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	[NT]
Date extracted	-			27/07/2023	[NT]	[NT]	[NT]	[NT]	27/07/2023	[NT]
Date analysed	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	107	[NT]	[NT]	[NT]	[NT]	114	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	[NT]
Date prepared	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
Date analysed	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	114	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	104	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
Date analysed	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
Arsenic	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	99	[NT]
Cadmium	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	90	[NT]
Chromium	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	89	[NT]
Copper	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	92	[NT]
Lead	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	89	[NT]
Mercury	mg/L	0.0005	Metals-021	<0.0005	[NT]	[NT]	[NT]	[NT]	117	[NT]
Nickel	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	87	[NT]
Zinc	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	90	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
Date analysed	-			28/07/2023	[NT]	[NT]	[NT]	[NT]	28/07/2023	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	86	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	80	[NT]
Fluorene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	80	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	80	[NT]
Anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	80	[NT]
Pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	86	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	78	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	70	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	83	[NT]	[NT]	[NT]	[NT]	91	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-14	[NT]
Date prepared	-			28/07/2023	1	28/07/2023	28/07/2023		28/07/2023	[NT]
Date analysed	-			28/07/2023	1	28/07/2023	28/07/2023		28/07/2023	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	1	7.0	7.0	0	99	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	1	82	88	7	106	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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CERTIFICATE OF ANALYSIS 329030-A

Client Details

Client	CSH Consulting Pty Ltd
Attention	Admin
Address	3 Pass Ave, Thirroul, NSW, 2515

Sample Details

Your Reference	**219**
Number of Samples	Additional Cr6 analysis 1 sample
Date samples received	27/07/2023
Date completed instructions received	08/08/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	09/08/2023
Date of Issue	09/08/2023

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Anthony Clark
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Priya Samarawickrama, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

Misc Soil - Inorg		
Our Reference		329030-A-3
Your Reference	UNITS	219/7
Depth		200mm
Date Sampled		26/07/2023
Type of sample		Soil
Date prepared	-	09/08/2023
Date analysed	-	09/08/2023
Hexavalent Chromium, Cr^{6+}	mg/kg	<1

Method ID	Methodology Summary
Inorg-118	Hexavalent Chromium (Cr6+) - determined firstly by separation using ion chromatography followed by the colourimetric analytical finish. Water samples are ideally field filtered into alkali preserved containers prior to receipt for dissolved Cr6+ analysis. Unfiltered water samples into alkali preserved containers (or pH adjusted to pH 8-9 on receipt) can be classified as Total (unfiltered) Cr6+. Please note, for 'Total/Unfiltered' Trivalent Chromium in waters [calculated], these results may be exaggerated due to the digestive limitation of 'Total/Unfiltered' Hexavalent Chromium in NaOH at pH 8-9 compared to more comprehensive digestion for Total Chromium using the mineral acids HNO3 and HCl. Solid (includes soils, filters, paints, swabs for example) samples are extracted in a buffered catalysed solution prior to the analytical finish above. Water extractable options are available (e.g. as an option for filters) on request. Impingers may need pH adjusting to pH 8-9 prior to IC-colourimetric analytical finish.

QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			09/08/2023	[NT]	[NT]	[NT]	[NT]	09/08/2023	[NT]
Date analysed	-			09/08/2023	[NT]	[NT]	[NT]	[NT]	09/08/2023	[NT]
Hexavalent Chromium, Cr^{6+}	mg/kg	1	Inorg-118	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]

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