7. Appendix 3
Site Validation Report

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Environmental Site Assessment: Site Validation Report (SVR) – Soil Contamination

Waiata Shores Residential Development (Phase 1)

Former Manukau Golf Course – 1V Great South Road, Conifer Grove

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ENVIRONMENTAL SITE ASSESSMENT
SITE VALIDATION REPORT (SVR)
WAIATA SHORES RESIDENTIAL DEVELOPMENT (PHASE 1)
Former Manukau Golf Course – 1V Great South Road, Conifer Grove

Job Number:	13065
Name of Project:	Waiata Shores Residential Development - Manukau Golf Course (Stage 1), Takanini
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1.0 Introduction

Soil and Rock Consultants (SRC) were engaged by Fletcher Residential Ltd. to undertake the validation of remediation works (soil contamination) and prepare a Site Validation Report (SVR) in relation to the Waiata Shores (Phase 1) Residential Development site (former Manukau Golf Course [MGC]) in Takanini, Auckland.

This report is in accordance with Ministry for the Environment's (MfE) guidelines and relevant Council requirements for contaminated site investigations.

1.1 Proposed Development

The proposed development works are divided in two phases:

- ***MGC Phase 1 (referred as the "SITE" in this report)*** – comprise approximately the northern half of the property;
- *MGC Phase 2* – encompasses approximately the southern half of the property.

Development drawings (latest March 2017) prepared by Harrison Grierson Consultants Ltd. have been forwarded to us showing the approved extent of works. Specific drawings (attached in Appendix A) have been referred as follows:

- **Ref. 129698-1-150, Revision C02, *'Proposed Development Plan Overall Site – Issued for Construction'*, 19 December 2016** – shows the property extent to be subdivided into 7 stages multiple residential lots with allotment for access roadways and amenities (e.g. esplanade reserves, drainage, etc.);
- **Ref. 129698-1-151, Revision C02, *'Proposed Development Plan Stage 1 – Issued for Construction'*, 19 December 2016** – shows the extent of development for the MGC Phase 1 Site;
- **Ref. 129698-1-220, Revision C03, *'Earthworks Plan Phase 1 – Issued for Construction'*, 21 February 2017** – shows the extent of earthworks (cut/fill) across the MGC Phase 1 Site.

This report is for the MGC Phase 1 SITE only. A separate SVR is being carried out for the MGC Phase 2 and will be reported under separate cover upon completion of Phase 2 works. Figure 1 shows the property extent and the "SITE".

Figure 1: Site Location and Vicinity

1.2 Validation Objectives

The SVR validates the completed remediation works carried out within the site. The goal of site validation is to show that:

- The objectives of remedial activities have been met;
- Residual soils remaining within the site are within the Soil Acceptance Criteria (SAC), thus reducing any potential risk to the environment and human health;
- Soils within the site that may exhibit further elevated levels of contaminants are identified and remediated;
- Soils excavated and removed from the site are disposed of to a tipping facility (or site) corresponding to the levels of contamination found;
- The site is suitable for its ongoing or future use.

This SVR provides verification using objective and measurable criteria to show the site is free of unacceptable levels of contamination, remediation works have been carried out and the site is suitable for its ongoing or future use.

1.3 Limitations

This report has been prepared for the sole benefit of our client, Fletcher Residential Ltd., with reference to the information given to us. This report may be used by the Auckland Council or their appointed Consultants if required and may be relied upon when considering a Resource Consent application in association with the proposed development. The data and/or opinions contained in this report may not be used in other contexts or for any other purpose without our prior review and agreement. Any additional future development may require further work.

2.0 Site Description

2.1 Site Location

The MGC Phase 1 (the "SITE") covers approximately the northern half of the former MGC property. The property is irregular in shape and comprises individual sections legally described as:

- 3 Great South Road, Conifer Grove – Section 23 Blk XIV Otahuhu SD SO 54154, 3.5143 Ha;
- 1V Great South Road, Conifer Grove – PT LOTS 1 2 DP 26562 + SEC 7 SO 41869 BLK XIV OTAHUHU SD BAL AT 34830/65, 43.8983 Ha.

Under the Auckland Unitary Plan Operative in part (AUP, notified 15 November 2016), the property is zoned as "Residential – Mixed Housing Urban Zone". It is bounded to the north by Great South Road and the southern periphery is bordered by the Pahurehure Inlet, a sub-tidal estuary which is part of the Manukau Harbour. The majority of the eastern boundary is made up of residential properties and the west is bordered by the Papakura Stream which flows south towards the inlet. Primarily the drainage appears to flow towards the Papakura Stream.

A search of Auckland Council GIS underground services shows reticulated wastewater lines running western and southern property boundary and cuts to the northern section across Great South Road.

2.2 Geology

2.2.1 Published Geology

According to the Auckland Urban Area Geological Map, Sheet R11, Scale 1: 50,000 dated 1992 the site is underlain by Pleistocene deposits of Puketoka Formation soils (Alluvial Deposits), underlain by Weathered Waitemata Group soils.

2.2.2 Site Geology (Lithology)

SRC has conducted the following Geotechnical Investigations within the former Manukau Golf Course property:

- SRC Ref. 13063, Revision A, Geotechnical Investigation – Manukau Golf Course, 10 June 2013;
- SRC Ref. 13063, Revision A, Addendum Geotechnical Investigation – Proposed Residential Subdivision (Stage 1) Wetlands 1 & 2 and Stream Embankments, Manukau Golf Course Takanini, 25 February 2016;
- SRC Ref. 13063, Revision A, Geotechnical Investigation for Proposed Residential Subdivision, Phase 2 Manukau Golf Course, 20 March 2017.

The general subsoil encountered comprised a surficial layer of topsoil/fill underlain by Puketoka Formation deposits and residual soils of the Waitemata Group. These soil deposits are generally variable in strength ranging from soft to very stiff and are over consolidated or normally consolidated. They have been deposited for a longer geological time scale than any more recent localised Alluvial Deposits and therefore are generally more consolidated and of higher strength. Waitemata Group soils are present beneath the Puketoka Formation soils.

Topsoil/fill encountered were recorded at depths between 0.0 – 2.5 m below ground level (bgl). Buried deeper fill (referenced to the SRC's 2013 Geotechnical Investigation Report) were encountered within the northern and the western section of the site adjacent to the Papakura Stream. Fill mounds up to a 1.0m depth were recorded within the eastern section of the site.

2.3 Surface Water and Groundwater

Variable depths of groundwater was recorded for the site, referenced from SRC's previous Geotechnical investigations (2013 & 2016). Shallow groundwater table were recorded within the western section of the site (between 1.0m – 2.0m bgl), closer to the Papakura stream. Deeper groundwater tables (>2.0m bgl) were recorded on most of the augerholes drilled within the site's midsection towards the eastern site boundary.

It is considered likely that the groundwater table may fluctuate during differing seasonal conditions. Groundwater elevation may rise higher than the measured depths following periods of prolonged and/or heavy rainfall or drop during dry summer periods.

3.0 Background Information

The site has been utilised as a golf course by the Manukau Golf Club since its inception in 1932. The club (now known as Windross Farm Golf Course) has moved to a new location at Alfriston-Ardmore Road, approximately 8km east of the site. The site remained as a golf course until it was vacated on 31st August 2016.

Preliminary Site Investigation, SRC, 2013

SRC has carried out a Preliminary Site Investigation (PSI Ref. 13065 Revision A, *"Environmental Site Assessment – Preliminary Site Investigation for Manukau Golf Course, Takanini"*, SRC, March 2013) to give a preliminary overview of potential areas of contamination and recognised areas of concern across the site. The limited sampling carried out identified the former greenkeeper's shed and areas of fill (buried and stockpiled) as potential hotspot locations.

Due to the site's recognised use as a golf course and identified as an activity under the Hazardous Activities and Industries List (HAIL), a further Detailed Site Investigation (DSI) was recommended.

3.1 Resource Consent

A Resource Consent (RC) (R/VCC/2013/2042/2) was granted by the Auckland Council on 18 May 2016 to vary Conditions 1-16 and 101 of earlier Resource Consent (R/JSL/2013/2042) and add conditions 102-104 and 112. Related Consents and Permits granted as part of the RC R/VCC/2013/2042/2 comprised the following:

- Joint Land and Subdivision Consent (R/JSL/2013/2042);
- Contaminated Site Discharge (41807) and NES Consent (R/JSL/2013/2042);
- Permits – Regional Earthworks (41808), Stormwater Discharge (41440) and River/stream Diversion (41809).

Conditions of the RC R/VCC/2013/2042/2 specifically relating to site contamination includes:

- **Condition 41** – refers to Remediation of Contaminated Soil. The condition states that all conditions under *Contamination Discharge Permit 41807* and *NES Consent R/JSL/2013/2042* shall be met prior to earthworks commencing on the site and evidence of compliance shall be supplied to the satisfaction of Auckland Council prior to the Section 224(c) Certificate being issued;
- **Conditions 124-139** – conditions relating to both *Contamination Discharge Permit 41807* and *NES Consent R/JSL/2013/2042*;
    - **Condition 128-131** – pre-earthworks requirements including carrying out a DSI and submitting a finalised Site Management Plan (SMP);
- **Conditions 140-142** – conditions relating to *Contamination Discharge Permit 41807* only;
- **Conditions 143-144** – conditions relating to *NES Consent R/JSL/2013/2042* only;
- Further Environmental Investigation & Reporting Requirements are included under:
    - **Condition 128-130** – pre-earthworks requirements including carrying out a DSI and submitting a finalised SMP;
    - **Condition 139** – preparation of a SVR.

3.2 Detailed Site Investigation, Site Management Plan and Supplementary Sampling

Detailed Site Investigation (DSI)

SRC has carried out a DSI (Ref. 15812, Revision A, *'DSI – Manukau Golf Course [MGC], Takanini – Stage 1 Residential Development'*, SRC, 13 September 2016) in relation to the proposed residential subdivision and development and in compliance to the RC R/VCC/2013/2042/2 requirements under Condition Nos. 128-130.

The field investigation was carried out through a combination of systematic gridded sampling (64 composite samples) across the extent of the former golf course area and targeted discrete sampling (20 soil samples) within identified potential hotspot locations. Samples were analysed for potential Contaminants of Concern (CoC) including Heavy Metals (HM) and Organochlorine Pesticides (OCP), Polycyclic Aromatic Hydrocarbons (PAH), Total Petroleum Hydrocarbons (TPH) and Asbestos Presence/Absence.

Sampling results revealed a number of areas exceeding the adopted Soil Acceptance Criteria (SAC). A preliminary contour plan was prepared showing the extent of impacted areas.

Site Management Plan (SMP) / Remediation Action Plan (RAP)

The SMP/RAP (Ref. 13065 Revision A, 'SMP/RAP – MGC Stage1 Residential Subdivision and Development', SRC, 13 September 2016) was prepared and submitted in concurrence with the DSI report, and in compliance to the RC R/VCC/2013/2042/2 requirements under Condition Nos. 128-130. Relevant controls, management measures and remediation actions within identified areas of concern were all detailed in the submitted SMP/RAP.

Supplementary Sampling

Following the DSI results, a supplementary investigation (Ref. 13065 Revision A, 'Supplementary Soil Sampling and Analysis – MGC Stage 1 Development', SRC, 5 October 2016) was carried out to delineate the extent of impacted areas and potentially narrow down the areas of concern. This included:

- Retesting of individual subsamples used to prepare each composite sample (exceeding the SAC); and
- Further additional sampling across the identified impacted areas (from the DSI) to redefine the lateral extent.

A final contour plan was generated and formed the basis for site remediation. The site was categorised into three management areas as follows and are shown in Figure 2:

- **Contaminated Soils (Remediation Areas)** – areas with soil contaminant concentrations exceeding the SAC (i.e. NES Human Health & AUP Environmental Discharge);
- **Light Contamination Soils (Non-Clean fill Soils)** – areas with soil contaminant concentrations above HM BG Levels and/or detected of organic contaminants, however are below the SAC;
- **Site Clean Fill** – areas with soil contaminant concentrations above below HM Background (BG) Levels and no detection of organic contaminants.

Figure 2 – Management Categories and Remediation Area

4.0 Site Remediation

The objective of site remediation works was to ensure the suitability of the site for the proposed land use and ascertain residual soils onsite do not pose a significant Human Health or Environmental risk.

Eighteen (18) remediation locations were identified (refer to Figure 2) based on SRC's DSI and supplementary investigation. Each remediation area was surveyed prior to remediation works. The identified remediation areas were marked out/pegged by the contractor, cordoned off, and no earthworks were allowed until confirmation to be clear of elevated contamination. The actual remediation extent (lateral and vertical) however, was determined following the results of validation sampling conducted within each specific area.

4.1 Summary of Completed Works

A summary of the completed works (*relating to Contaminated Site Management*) following the RC approval are described in Table 1 below. This includes SRC's previous investigation (DSI & supplementary sampling/analysis), remediation observations and subsequent validation sampling visits. Periodical visits were carried out following clean-up of each remediation area however, SRC was not involved in the day-to-day management of impacted soils removed.

Table 1: Summary of Completed Works

Activity	Date (s)
Resource Consent Approval	18 May 2016
Manukau Golf Club vacated the property	31 Aug 2016

Environmental Investigations (SRC)
• DSI (MGC Phase 1)
  ○ fieldwork (sampling) dates
  ○ DSI report, SMP/RAP
• Supplementary Investigation
  ○ fieldwork (sampling) dates
  ○ Sampling & Assessment Report, Updated Management Area Plan
	
	1–2 Sep 2016
	13 Sep 2016
	
	26-27 Sep 2016
	5 Oct 2016

Preliminary Site Works • Contractor Mobilisation & Establishment • Preliminary Site Clearing (site features/structures, trees, etc) • Preliminary Earthworks Commencement ○ HG received dispensation of consent conditions for works to commence following completion of DSI Phase 1 (ref. HG Minutes of Meeting [MoM] 001 dated 28 Sep 2016)	 ~ commenced early Sep 2016 ~ commenced mid Sep 2016 ~ commenced 3rd week Sep 2016
Pre-Earthworks Site Meeting (attended by SRC)	20 Sep 2016
Site Remediation and Validation Sampling • Conducted progressively (refer to Table 2)	Oct 2016 – Mar 2017

4.2 Remediation and Site Management

In summary, site remediation and management of soils comprised:

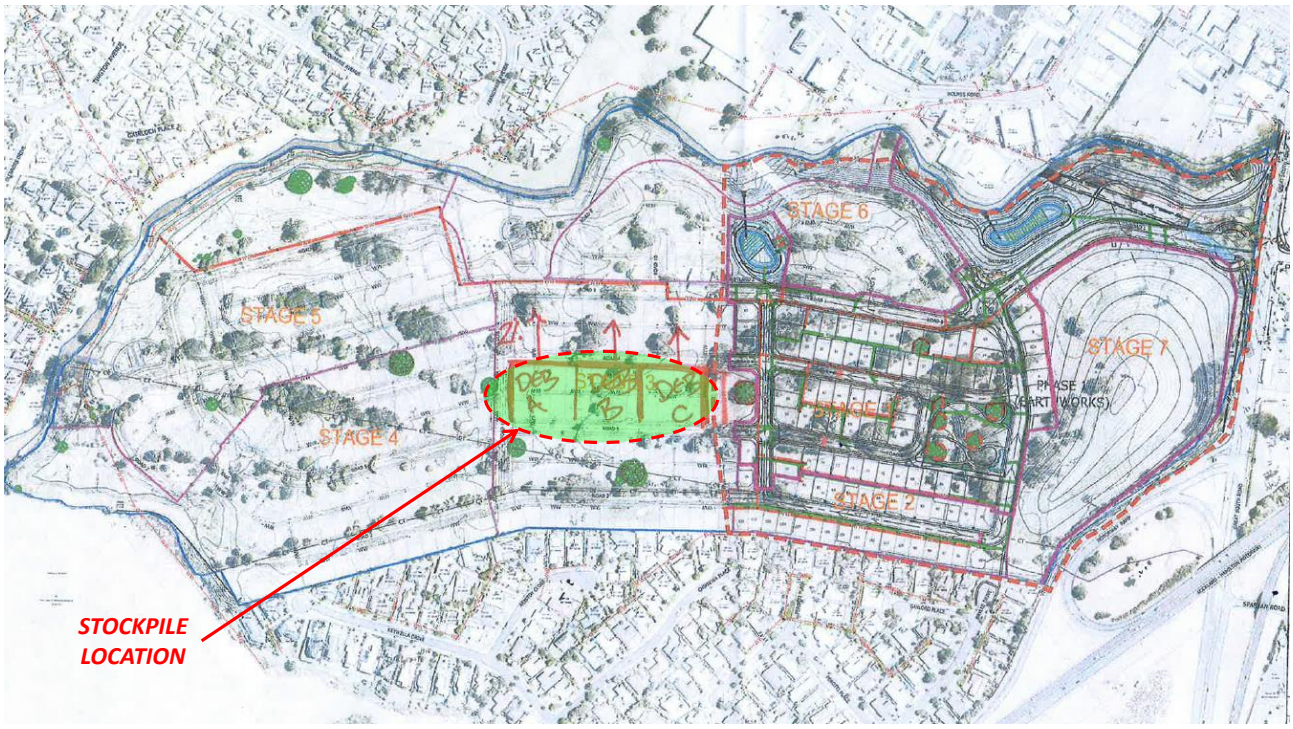
- **Contaminated Soils** (refer to the Contour Plan in Figure 2)
  - Former Golf Greens (Remediation Areas 1-12, 15-18) – removal of topsoil layer (~ 0.1 – 0.35m bpgl);
  - Former Carpark (Remediation Area 13) – removal of fill layer (~ 0.6m – 1.2m bpgl);
  - Contaminated Fill Area (Remediation Area 14) – removal of fill layer (~ 0.6 – 1.8m bpgl);
  - Contaminated soil removed were stockpiled within the property (MGC Phase 2 area);
- **Non-Cleanfill Soils** (refer to the Contour Plan in Figure 2)
  - Topsoil/fill removed were stockpiled within the property (MGC Phase 2 area). Generally, these soils are not considered a Human Health (Residential Use) or an Environmental concern;
  - 'Non-Cleanfill topsoils' were reused as capping material/fill within esplanade reserves while some will be used within residential lots following structural development. A plan of the filled areas (at the time of writing this report) is attached in Appendix B.

4.3 Impacted Soil Removal

Due to the volume of soils requiring management, soils scraped across the site have been stockpiled within the property's midsection, particularly within the *MGC Phase 2, Stage 3 Development Area*. Three (3) separate soil stockpiles have been created as categorised under Section 3.2 (i.e. *'Contaminated Soils'*, *'Non-Cleanfill Soils'*, and *'Site Cleanfill'*). No information yet has been provided in relation to potential future disposal location. None of the reported 'Contaminated Soils' or 'light contamination (non-cleanfill) soils' has left the property (at the time of writing this report).

Figure 3 shows the location of the stockpiling area. Clean soils were use as soil bunds to demarcate each stockpiling area.

Figure 3 – Soil Stockpile Location



Source: Harrison Grierson Consultants Ltd.

5.0 Site Validation Works

5.1 Validation Criteria

The standards to which the site had to be remediated and which the soils have been validated are set under:

- AUP – Background Levels & PAC (Discharge);
- National Environmental Standard (NES) – Human Health (Residential 10% Produce Land Use Criteria);
- Health and Safety at Work (Asbestos) Regulations 2016.

5.2 Soil Validation Sampling

Remediation of the identified impacted areas were conducted progressively throughout the earthworks stage. In each occasion, SRC carried out validation sampling following completion of clean-up within each remediation area. Further remediation (soil removal) and subsequent validation sampling was carried out on some areas returning further elevated contamination. Table 2 presents a summary of the respective remediation areas, validation soil samples collected and sampling dates.

Table 2: Site Remediation Areas & Validation Sampling Dates

Remediation Area #	Validation Soil Sample Nos.	Sampling Dates
1	16 (B) & 17 (SW)	9 Nov 2016
2	1(B), 2(B) & 3(SW)	12 Oct 2016
	4(B), 5(B), 6(SW), 7(SW) & 8(SW)	28 Oct 2016
3	28(B), 29(SW)	8 Nov 2016
4	30(B), 31(SW)	8 Nov 2016
5	32(B), 33(SW)	8 Nov 2016
6	18(B), 19(SW)	8 Nov 2016
7	20(SW), 21(B), 22(SW), 23(SW), 24(B), 25(SW), 26(B), 27(SW)	8 Nov 2016
	54(SW), 55(SW), 56(SW), 57(SW), 58(SW), 59(SW)	16 Nov 2016
	66(B), 67(B), 68(SW), 69(SW), 70(SW)	30 Nov 2016
	71(SW), 72(SW)	6 Dec 2016
8	34(B)	8 Nov 2016
9	35(SW), 36(B)	8 Nov 2016
	60(SW)	16 Nov 2016
10	73(B), 74(B), 75(B)	14 Feb 2017
11	37(SW), 38(B), 39(SW), 40(B), 41(SW), 42(B), 43(SW)	8 Nov 2016
12	12(B), 13(SW)	1 Nov 2016
13	76(SW), 77(SW), 78(SW), 79(SW)	16 Mar 2017
	80(B), 81(B)	17 Mar 2017
14	TP5-1 (0.2m – 0.3m), TP5-2 (1.0m), TP5-3(1.8m)	21 Oct 2016
	10(B), 11(SW)	1 Nov 2016
	51(B), 52(SW), 53(SW)	9 Nov 2016
15	44(B), 45(SW)	8 Nov 2016
	64(B), 65 (SW)	16 Nov 2016
16	46(SW), 47(B), 48(B), 49(SW), 50(SW)	8 Nov 2016
	61(B), 62(B), 63(B)	16 Nov 2016
17	14(B), 15(SW)	1 Nov 2016
18	9 (B)	28 Oct 2016

Note: B – Base Sample (excavation base) SW – Sidewall sample (excavation sidewall)

Sampling Methodology

Soil sampling (validation) were collected through hand auger drilling and analysed for CoC. Base samples were collected to verify contaminant concentrations at the bottom of the excavation area, while sidewall samples were collected to verify lateral extent of contaminants.

All soil samples were collected in accordance with strict environmental sampling protocols to ensure reliable and representative results. Samples were collected in a controlled manner to prevent any potential cross-contamination. Disposable nitrile gloves were used and replaced between handling of each soil samples.

All sample containers and preservatives were supplied by the subcontract laboratory and were consistent with the specifications provided in the Contaminated Land Management Guidelines No. 5 (MfE). All samples were labelled with unique identifiers indicating the sampling location. Samples were couriered directly to the laboratory under continuous Chain of Custody documentation comprising a unique laboratory number.

5.2.1 Validation Sampling Results

A summary of the validation sampling results are shown in Table 3. Full laboratory reports are attached in Appendix C.

Table 3: Contaminant Screening in Soils

					Test Analysis Levels (mg/kg)																			Auckland Council		MfE	
	Sample No.	SV16 (B)	SV17 (SW)	SV1 (B)	SV2 (B)	SV3 (SW)	SV4 (B)	SV5 (B)	SV6 (SW)	SV7 (SW)	SV8 (SW)	SV28 (B)	SV29 (SW)	SV30 (B)	SV31 (SW)	SV32 (B)	SV33 (SW)	SV18 (B)	SV19 (SW)	SV34 (B)	SV35 (SW)	SV36 (B)	SV60 (SW)	BG Level [1]	PAC [2]	NES[3]	PHC G[4]
	Sampling Date	9 Nov 2016		12 Oct 2016			28 Oct 2016					8 Nov 2016		8 Nov 2016		8 Nov 2016		8 Nov 2016		8 Nov 2016	8 Nov 2016		16 Nov 16				
Remediation Area #		(1)		(2)								(3)		(4)		(5)		(6)		(8)	(9)						
Material (Soil) Status		Stockpiled		Stockpiled			Stockpiled					Stockpiled		Stockpiled		Stockpiled		Stockpiled		Stockpiled	Stockpiled	Stockpiled	Stockpiled				
Heavy Metals	Arsenic (As)	15	9.8	4	4.8	5.4	6.1	17	7.3	8.3	7.3	11	5.4	6.6	17	4	7.1	< 2	7.7	8.4	**26**	6.1	6.7	< 12.0*	100	20	-
	Cadmium (Cd)	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.65*	7.5	3	-
	Chromium (Cr)	28	33	19	20	14	23	18	24	23	23	27	20	31	22	27	20	11	12	24	20	29	15	< 55	400	460	-
	Copper (Cu)	24	22	16	16	13	24	19	28	25	21	24	13	34	18	30	19	< 5	8.2	42	27	22	15	< 45	325	<10,000	-
	Lead (Pb)	27	24	15	16	55	25	17	28	27	24	23	17	29	35	22	22	11	16	28	41	20	17	< 65.0*	250	210	-
	Mercury (Hg)	0.4	0.7	0.4	0.5	0.3	0.7	0.5	0.4	0.4	0.3	0.5	0.5	0.4	0.5	0.5	0.4	0.2	0.2	0.4	**0.8**	0.4	0.2	< 0.45	0.75	310	
	Nickel (Ni)	18	20	11	12	8	15	13	16	17	16	9.3	5.5	9.7	8.1	11	7.8	< 5	5.4	11	9.3	11	6.7	< 35	105	600	-
	Zinc (Zn)	61	42	33	43	42	44	35	57	61	60	48	38	49	51	39	52	11	32	190	290	41	41	< 180	400	7,000	-

Table 3: Contaminant Screening in Soils (Continued)

		Test Analysis Levels (mg/kg)																					Auckland Council		MfE	
	Sample No.	SV20 (SW)	SV21 (B)	SV22 (SW)	SV23 (SW)	SV24 (B)	SV25 (SW)	SV26 (B)	SV27 (SW)	SV54 (SW)	SV55 (SW)	SV56 (SW)	SV57 (SW)	SV58 (SW)	SV59 (SW)	SV66 (B)	SV67 (B)	SV68 (SW)	SV69 (SW)	SV70 (SW)	SV71 (SW)	SV72 (SW)	BG Level [1]	PAC [2]	NES[3]	PHCG [4]
	Sampling Date	8 Nov 2016								16 Nov 2016						30 Nov 2016					6 Dec 2016					
Remediation Area #		(7)								(7)						(7)					(7)					
Material (Soil) Status		Remaining		Removed	Remaining		Removed	Remaining	Removed	Remaining	Removed		Removed	Remaining		Remaining			Removed	Remaining	Remaining					
Heavy Metals	Arsenic (As)	7.7	5.8	**23**	17	5.5	**26**	6.1	**36**	< 2	**190**	**26**	**35**	9.3	12	3.5	4.8	6.5	**47**	11	< 2	7.5	< 12.0*	100	20	-
	Cadmium (Cd)	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.65*	7.5	3	-
	Chromium (Cr)	22	32	21	20	27	20	25	23	20	22	18	20	19	17	22	24	22	21	20	24	15	< 55	400	460	-
	Copper (Cu)	28	39	27	26	35	18	24	25	22	23	18	18	16	20	23	22	31	28	20	24	14	< 45	325	<10,000	-
	Lead (Pb)	27	27	25	22	21	28	21	26	19	25	19	19	19	20	22	25	23	31	20	20	13	< 65.0*	250	210	-
	Mercury (Hg)	0.3	0.4	0.4	0.4	0.5	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.4	0.4	0.3	0.3	0.3	0.3	< 0.1	< 0.45	0.75	310	-
	Nickel (Ni)	14	17	12	11	10	13	13	10	11	11	9.4	9.6	10	8.9	12	12	12	11	8.9	12	7.1	< 35	105	600	-
	Zinc (Zn)	73	69	83	77	48	66	67	84	65	94	69	64	55	58	80	84	83	110	73	69	47	< 180	400	7,000	-

Notes *Combined volcanic & non-volcanic range B – Base Sample (excavation base) SW – Sidewall sample (excavation sidewall)

Concentration: Values below accepted background range (HM),
Concentration: Values above accepted background range (HM),
Concentration: Values above the Soil Acceptance Criteria / SCSs

[1] Background Level – Auckland Region (Non-Volcanic Soils)
[2] PAC – Permitted Activity Criteria (Discharge): Auckland Unitary Plan (AUP) Operative in Part
[3] MfE – NES for Assessing and Managing Contaminants in Soil to Protect Human Health (Residential 10% Produce Land Use)

Table 3: Contaminant Screening in Soils (Continued)

		Test Analysis Levels (mg/kg)																								Auckland Council		MfE	
	Sample No.	SV73 (B)	SV73 (B)	SV73 (B)	SV37 (SW)	SV38 (B)	SV39 (SW)	SV40 (B)	SV41 (SW)	SV42 (B)	SV43 (SW)	SV12 (B)	SV13 (SW)	SV44 (B)	SV45 (SW)	SV64 (B)	SV65 (SW)	SV46 (SW)	SV47 (B)	SV48 (B)	SV49 (SW)	SV50 (SW)	SV61 (B)	SV62 (B)	SV63 (B)	BG Level [1]	PAC [2]	NES_3	$PHCG_4$
	Sampling Date	14 Feb 2017			8 Nov 2016							1 Nov 2016		8 Nov 2016		16 Nov 2016	30 Nov 2016	8-9 Nov 2016					16 Nov 2016						
Remediation Area #		(10)			(11)							(12)		(15)				(16)											
Material (Soil) Status		Remaining			Remaining							Remaining		Remaining	Removed	Removed	Remaining	Removed	Remaining			Removed	Remaining						
Heavy Metals	Arsenic (As)	< 2	< 2	< 2	7.6	6.8	11	6.2	17	5.9	17	8.9	11	< 2	**21**	5.4	6.2	**43**	5.5	6.3	12	**35**	< 2	< 2	< 2	< 12.0*	100	20	-
	Cadmium (Cd)	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.65*	7.5	3	-
	Chromium (Cr)	15	25	26	24	30	23	26	20	23	23	32	30	12	21	13	29	22	25	27	25	25	24	27	24	< 55	400	460	-
	Copper (Cu)	9.4	23	22	30	29	28	31	23	26	28	30	35	< 5	15	16	18	22	21	22	21	22	24	24	21	< 45	325	<10,000	-
	Lead (Pb)	13	20	20	26	24	38	23	24	24	24	26	34	8.8	27	20	21	33	22	24	26	66	24	17	16	< 65.0*	250	210	-
	Mercury (Hg)	0.2	0.4	0.4	0.3	0.3	0.3	0.5	0.3	0.4	0.4	0.4	0.3	0.1	0.6	**1.9**	0.3	0.4	0.5	0.4	0.3	**1.7**	0.3	0.5	0.4	< 0.45	0.75	310	-
	Nickel (Ni)	6.3	11	13	14	14	13	18	13	15	11	20	22	< 5	13	7.8	16	11	12	13	13	12	12	12	13	< 35	105	600	-
	Zinc (Zn)	23	61	56	83	61	86	47	89	60	92	62	91	16	**940**	54	30	68	39	55	82	62	68	47	63	< 180	400	7,000	-

Table 3: Contaminant Screening in Soils (Continued)

		Test Analysis Levels (mg/kg)																	Auckland Council		MfE	
	Sample No.	SV76 (SW)	SV77 (SW)	SV78 (SW)	SV79 (SW)	SV80 (B)	SV81 (B)	TP5-1 (0.2m)	TP5-2 (1.0m)	TP5-3 (1.8m)	SV10 (B)	SV11 (SW)	SV51 (B)	SV52 (SW)	SV53 (SW)	SV14 (B)	SV15 (SW)	SV9 (B)	BG Level [1]	PAC [2]	NES_3	$PHCG_4$
	Sampling Date	16 Mar 2017				17 Mar 2017		21 Oct 2016			1 Nov 2016		9 Nov 2016			1 Nov 2016		28 Oct 2016				
Remediation Area #		(13)						(14)								(17)		(18)				
Material (Soil) Status		Stockpiled						Stockpiled			Remaining	Removed	Remaining			Remaining		Remaining				
Heavy Metals	Arsenic (As)	14	6.3	8.7	4.2	14	12	< 2	5.8	< 2	2.6	6.6	2.9	6.3	< 2	9.5	18	4.3	< 12.0*	100	20	-
	Cadmium (Cd)	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	1.2	< 0.4	< 0.4	< 0.4	0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.65*	7.5	3	-
	Chromium (Cr)	25	26	29	19	25	25	250	39	49	19	23	18	27	14	32	31	30	< 55	400	460	-
	Copper (Cu)	18	35	22	27	26	17	100	25	18	< 5	36	6.5	18	< 5	26	31	23	< 45	325	<10,000	-
	Lead (Pb)	18	23	21	67	25	18	150	16	10	12	**490**	13	16	12	25	28	20	< 65.0*	250	210	-
	Mercury (Hg)	0.2	0.4	0.4	0.2	0.1	0.1	0.4	0.1	0.1	0.1	0.3	0.2	0.1	0.2	0.4	0.4	0.3	< 0.45	0.75	310	
	Nickel (Ni)	22	18	19	16	36	13	37	24	29	6.3	14	6.1	16	< 5	21	22	17	< 35	105	600	-
	Zinc (Zn)	37	50	50	82	47	46	290	74	38	220	170	31	35	17	44	65	32	< 180	400	7,000	-
TPH	C7-C9	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	-	-	-	-	-	-	-	-	-	-	-	500
	C10-C14	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-	-	-	-	-	-	-	-	-	-	-	510
	C15-C36	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	-	-	-	-	-	-	-	-	-	-	-	>20,000
PAH	BaP Eq	0.04	0.04	0.04	0.04	0.04	0.04	0.28	0.44	0.04	0.04	0.04	0.04	0.04	0.04	-	-	-	-	20	10	-
	Naphthalene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	-	-
	Non-carc. (Pyrene)	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04	0.24	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	-	-	-	-	-	-	-

Notes *Combined volcanic & non-volcanic range

Concentration: Values below accepted background range (HM), Detection of TPH/PAH
Concentration: Values above accepted background range (HM), Detection of TPH/PAH
Concentration: Values above the Soil Acceptance Criteria / SCSs

B – Base Sample (excavation base)

SW – Sidewall sample (excavation sidewall)

[1] Background Level – Auckland Region (Non-Volcanic Soils)
[2] PAC – Permitted Activity Criteria (Discharge): Auckland Unitary Plan (AUP) Operative in Part
[3] MfE – NES for Assessing and Managing Contaminants in Soil to Protect Human Health (Residential 10% Produce Land Use)
[4] MfE –Tier 1 Soil Acceptance Criteria (Commercial/Industrial Use), Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE 2011), <1m, Sandy Silt Soil type , Limiting Pathway Criterion: (m) maintenance/excavation

5.3 Asbestos-Containing Material (ACM) Removal

Asbestos/Asbestos-Containing Material (ACM) were discovered during the course of site works and was removed by the Client's appointed contractor. Under the 'Health and Safety at Work (Asbestos) Regulations 2016', handling and removal of Asbestos/ACM requires licensed removalists. The Asbestos/ACM removal works (i.e. former MGC office building demolition, etc.) were conducted by Ward Demolition Ltd. (Ward Demolition). Asbestos/ACM were found in the following areas of the site:

- Former MGC building (within building material);
- Asbestos pipe (part of former irrigation system) situated along the site's midsection. A plan showing the indicative location of the pipe removed was provided to SRC and attached in Appendix D;
- An area within the former carpark area (beneath the previous pavement). Two soil samples (collected by Ward Demolition) following removal.

The Asbestos/ACM removed were reported as non-friable material. SRC was not involved in any of the Asbestos/ACM removal and clearance works within the specified areas. A copy of the information provided to SRC is attached in Appendix D.

6.0 Discussions

In summary:

- **Remediation of Contaminated Soils**. Soils identified as contaminated (based from SRC's previous investigation) have been cleared/removed across the MGC Phase 1 site. Validation sampling results in each remediation area complies with the SAC / Validation Criteria;
- Excavated soils/material ('*Contaminated Soils'* and *'Light contamination (non-cleanfill) soils'* were stockpiled within the property's midsection, particularly within the *MGC Phase 2, Stage 3 Development Area.* None of these materials have left the property (at the time of writing this report). Validation of this area will form part of the MGC Phase 2 validation report;
- **Topsoil reused onsite**. Topsoil reused onsite generally are not considered a Human Health (Residential Use) or an Environmental concern.
    - Topsoil categorised as *'Non-Cleanfill'* were reused over esplanade reserves while some will be spread over residential lots at some stage following structural development;
    - Topsoil qualifying as *'Site Cleanfill'* were reused over recreation park/playground;
    - A plan of the areas filled (at the time of writing this report) is attached in Appendix B;
- Asbestos/ACM discovered during the course of works were identified, removed and each area were cleared by the Client's contractor.

7.0 Conclusion

This SVR has been prepared in accordance with the scope of work and current applicable regulations (AUP and the NES). The investigation and reporting has been prepared, reviewed and authorised by Suitably Qualified and Experienced Practitioners (SQEPs), as required under the NES. This report is in accordance with MfE guidelines for contaminated site investigations and Auckland Council requirements.

Our previous investigation recorded elevated contaminant concentrations across the site extent. Figure 2 of this report shows the indicative extent of impacted areas and the scope of the remediation and validation.

Remediation of the identified impacted areas were conducted progressively throughout the earthworks stage. In each occasion, SRC carried out validation sampling following completion of clean-up within each remediation area. Further remediation (soil removal) and subsequent validation sampling was carried out on some areas returning further elevated contamination.

Due to the volume of soils requiring management, soils scraped across the site have been stockpiled within the property's midsection, particularly within the *MGC Phase 2, Stage 3 Development Area*. None of the reported 'Contaminated Soils' or 'Light contamination (Non-cleanfill) soils' have left the property (at the time of writing this report).

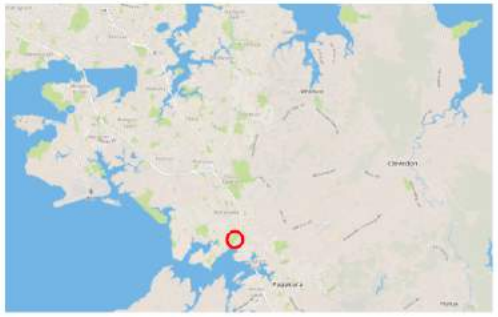
Topsoil/fill reused onsite generally are not considered a Human Health (Residential Use) or an environmental concern.

Based on the completed remediation works and results of validation sampling, the site would be considered suitable for the intended residential use.

End of Report

Appendix A

Validation Sampling Plan
Development Drawings



LOCATION MAP

1769307.30 E
5899108.44 N

MGC Phase 1 (SITE)

Soil Samples (Validation Sampling)

Remediation Extent

AMENDMENTS		
DATE	REV	DESCRIPTION

Notes:
1. Locations of features approximate only.
2. Boundary information on this Site plan adapted from information on Auckland GIS Service

Soil&Rock Consultants
For well-grounded solutions
Level 1, 131 Lincoln Road, PO Box 21-424 Henderson, Waitakere 0650
Ph 09 835 1740 Fax 09 835 1847
www.soilandrock.co.nz

Manukau Golf Course (MGC)

Phase 1 Development

SAMPLING PLAN
(Site Validation)

DRAWING NO.	REV:	DATE:
13065/SVR	A	15 Aug 2017
SCALE: 1:2500 @ A3		DRAWN: GC

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NOTES

1. THIS PLAN IS PREPARED FOR INFORMATION ONLY. FOR DETAILS REFER TO RELEVANT ENGINEERING DRAWINGS.

LEGEND

- RESIDENTIAL LOTS
- ROAD RESERVE
- DRAINAGE RESERVE
- ESPLANADE RESERVE
- RECREATION RESERVE
- BALANCE LOT
- SITE BOUNDARY

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REF	REVISIONS	BY	DATE
C02	REVISED EARTHWORKS AND LOT NUMBERS	DCG	19.12.16
C01	ISSUED FOR CONSTRUCTION	DCG	30.09.16

PROJECT:

FLETCHER RESIDENTIAL LIMITED
MANUKAU GOLF COURSE - STAGE 1
GREAT SOUTH ROAD, TAKANINI

TITLE:

PROPOSED DEVELOPMENT PLAN
OVERALL SITE

ORIGINATOR: LCK	DATE: 05.2014	SIGNED:	PLOT BY: DCG
DRAWN: DCG	DATE: 30.09.16	SIGNED:	PLOT DATE: 27.02.17
CHECKED: LCK	DATE: 19.12.16	SIGNED:	SURVEY BY:
APPROVED: JCT	DATE: 19.12.16	SIGNED:	SURVEY DATE:

ISSUE STATUS: ISSUED FOR CONSTRUCTION

PROJECT No:	SCALES:	
1050-129698-01	1:2000-A1 1:4000-A3	A1

DRAWING No: 129698-1-150 REV C02

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: WELLINGTON \\WELLINGTON1\JOBS\1050\129698_A_MANUKAU_GOLF\CAD\01-CAD-STAGE-1\129698-1-150.DWG

Appendix B

Plans: Soil Stockpile Area,
Areas Filled with "Light Contamination" Soils

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NOTES

1. FOR SITE NOTES REFER DRAWING 129698-1-101.

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REF	REVISIONS	BY	DATE
B	FUTURE DEVOLVEMENT	DCG	7.10.16
A	FOR INFORMATION	DCG	23.08.16

PROJECT:

FLETCHER RESIDENTIAL LIMITED
MANUKAU GOLF COURSE - STAGE 1
GREAT SOUTH ROAD, TAKANINI

TITLE:

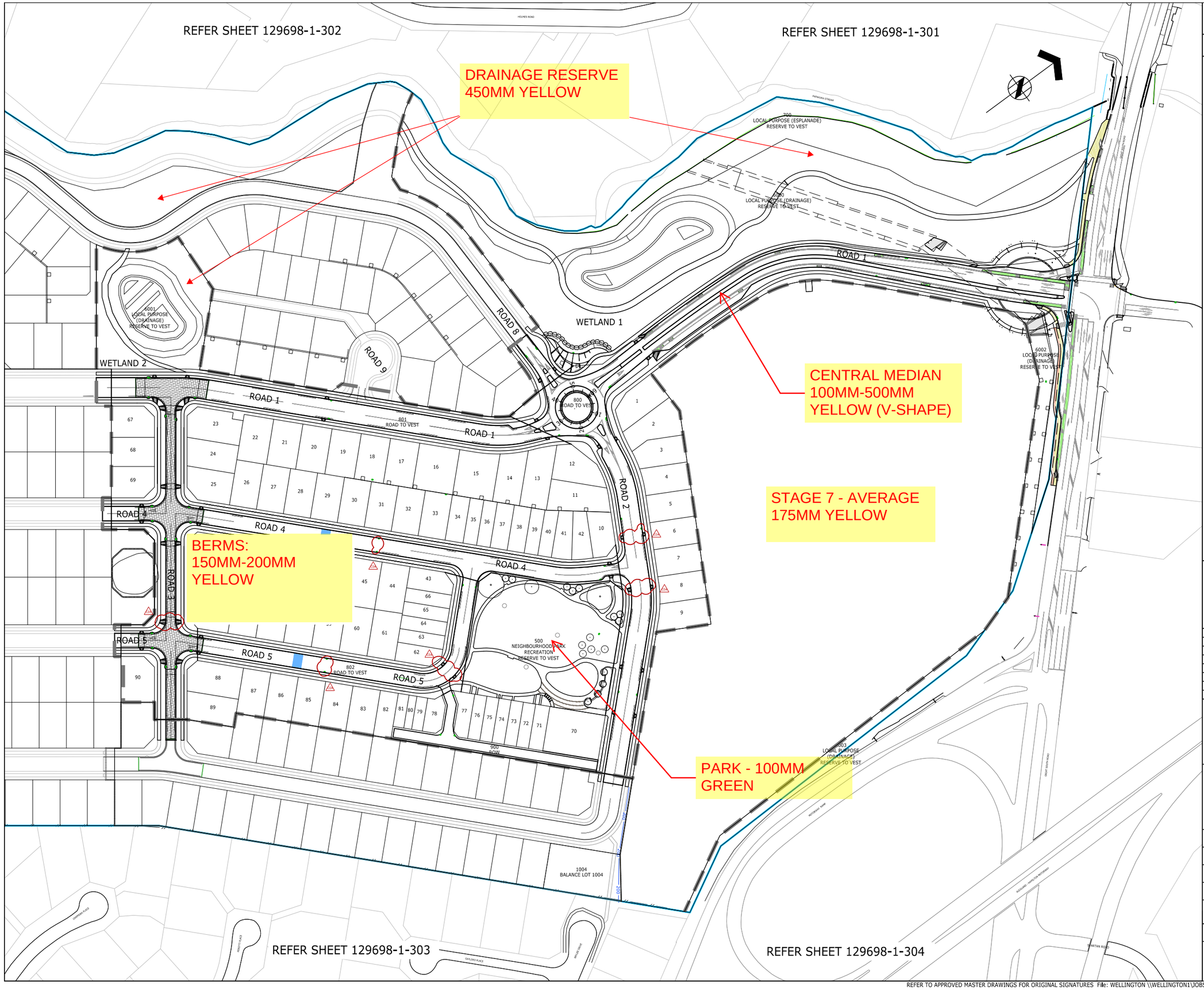
EXISTING SITE PLAN
WITH AERIAL PHOTO
OVERALL SITE

DESIGNATED: LCK	DATE: 08.2016	SIGNED:	PLOT BY: DCG
DRAWN: DCG	DATE: 7.10.16	SIGNED:	PLOT DATE 07.10.16
CHECKED: LCK	DATE: 7.10.16	SIGNED:	SURVEY BY:
APPROVED: JCT	DATE: 7.10.16	SIGNED:	SURVEY DATE

ISSUE STATUS: FOR INFORMATION

PROJECT No: 1050-129698-01	SCALES: 1:2000-A1 1:4000-A3	A1
DRAWING No: 129698-1-SK-077		REV B

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: WELLINGTON \\WELLINGTON1\JOBS\1050\129698_A_MANUKAU_GOLF\CAD\01-CAD\129698-1-SK-077-76.DWG



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NOTES

1. ALL WORKS AND MATERIALS ARE TO COMPLY WITH CURRENT AUCKLAND COUNCIL ENGINEERING STANDARDS AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING CODE.
2. CONTRACTOR IS TO BE SOLELY RESPONSIBLE TO SEARCH, LOCATE, PROTECT AND MAINTAIN ALL EXISTING AND NEW SERVICES AT ALL TIMES.
3. FOR ROAD LONGSECTIONS REFER SHEETS 129698-1-320 SERIES.
4. FOR ROAD CROSS SECTIONS REFER SHEETS 129698-1-330 SERIES.
5. FOR ROAD INTERSECTION DETAILS REFER SHEETS 129698-1-350 SERIES.
6. FOR STANDARD ROAD DETAILS REFER SHEETS 129698-1-390 SERIES.
7. FOR LANDSCAPING DETAILS REFER SHEETS 129698-1-700 SERIES.
8. FOR ROAD SIGNS AND MARKING DETAILS REFER WES EDWARDS CONSULTING DRAWINGS.
9. FOR GREAT SOUTH ROAD SIGNS AND MARKING DETAILS REFER WES EDWARDS CONSULTING DRAWINGS.
10. ENGINEER TO INSPECT SUBGRADE PRIOR TO PLACEMENT OF METAL. ANY SOFT, WEAK SPOTS TO BE UNDERCUT AS DIRECTED BY THE ENGINEER. LIME STABILISATION 16 Kg/m² ON INSTRUCTION BY THE ENGINEER.
11. PAVEMENT DESIGN BASED ON CBR 5. CONTRACTOR TO PROVIDE CBR VALUES OF FINISHED SUBGRADE TO CONFIRM PAVEMENT DETAIL AS DIRECTED BY THE ENGINEER AND OBTAIN ENGINEER APPROVAL BEFORE LAYING SUBBASE.
12. MANHOLE LIDS TO BE SET TO FINISHED SURFACE LEVEL.
13. GEOTEXTILE CLOTH TO BE PLACED PRIOR TO METAL PLACEMENT AS DIRECTED BY THE ENGINEER IF REQUIRED.
14. BEAM TESTING TO BE CARRIED OUT ON BASECOURSE.
15. CONTRACTOR TO ALLOW FOR ALL WORKS AND TEMPORARY DIVERSION etc. AS REQUIRED TO COMPLETE WORKS.

DEPTH OF TOPSOIL
PREPARED
24/08/2017

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REF	REVISIONS	BY	DATE
C04	UPDATED PRAM CROSSING & CATCHPIT	DCG	28.04.17
C03	UPDATED PRAM CROSSING	DCG	15.03.17
C02	REVISED EARTHWORKS AND LOT NUMBERS	DCG	19.12.16
C01	ISSUED FOR CONSTRUCTION	DCG	14.10.16

PROJECT:

FLETCHER RESIDENTIAL LIMITED
MANUKAU GOLF COURSE - STAGE 1
GREAT SOUTH ROAD, TAKANINI

TITLE:

ROADING PLAN
STAGE 1 - OVERALL

ORIGINATOR: LCK	DATE: 05.2014	SIGNED:	PLOT BY: DCG
DRAWN: DCG	DATE: 14.10.16	SIGNED:	PLOT DATE: 28.04.17
CHECKED: LCK	DATE: 28.04.17	SIGNED:	SURVEY BY:
APPROVED: JCT	DATE: 28.04.17	SIGNED:	SURVEY DATE:

ISSUE STATUS: ISSUED FOR CONSTRUCTION

PROJECT No: 1050-129698-01
SCALES: 1:1000-A1, 1:2000-A3
A1

DRAWING No: 129698-1-300
REV C04

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: WELLINGTON \\WELLINGTON1\JOBS\1050\129698_A_MANUKAU_GOLF\CAD\01-CAD-STAGE-1\129698-1-300.DWG

Appendix C

Laboratory Analytical Reports (Validation Sampling)

eurofins | mgt

Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **519267-S**
Project name MGC
Project ID 13065
Received Date Oct 12, 2016

Client Sample ID			**MGC1-SV001**	**MGC1-SV002**	**MGC1-SV003**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-Oc09987**	**Z16-Oc09988**	**Z16-Oc09989**
Date Sampled			**Oct 12, 2016**	**Oct 12, 2016**	**Oct 12, 2016**
Test/Reference	LOR	Unit			
Metals M8 (NZ MfE)					
Arsenic	2	mg/kg	4.0	4.8	5.4
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	19	20	14
Copper	5	mg/kg	16	16	13
Lead	5	mg/kg	15	16	55
Mercury	0.1	mg/kg	0.4	0.5	0.3
Nickel	5	mg/kg	11	12	8.0
Zinc	5	mg/kg	33	43	42
% Moisture	1	%	42	46	40

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8 (NZ MfE)	Melbourne	Oct 14, 2016	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Oct 12, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

eurofins | mgt

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Melbourne
2-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Oct 12, 2016 2:30 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	519267	**Due:**	Oct 14, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	1 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MGC1-SV001	Oct 12, 2016		Soil	Z16-Oc09987	X	X
2	MGC1-SV002	Oct 12, 2016		Soil	Z16-Oc09988	X	X
3	MGC1-SV003	Oct 12, 2016		Soil	Z16-Oc09989	X	X
Test Counts						3	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Metals M8 (NZ MfE)									
Arsenic			mg/kg	< 2			2	Pass	
Cadmium			mg/kg	< 0.4			0.4	Pass	
Chromium			mg/kg	< 5			5	Pass	
Copper			mg/kg	< 5			5	Pass	
Lead			mg/kg	< 5			5	Pass	
Mercury			mg/kg	< 0.1			0.1	Pass	
Nickel			mg/kg	< 5			5	Pass	
Zinc			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Metals M8 (NZ MfE)									
Arsenic			%	108			80-120	Pass	
Cadmium			%	119			80-120	Pass	
Chromium			%	110			80-120	Pass	
Copper			%	108			80-120	Pass	
Lead			%	111			80-120	Pass	
Mercury			%	109			75-125	Pass	
Nickel			%	109			80-120	Pass	
Zinc			%	108			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z16-Oc09988	CP	%	46	46	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention:	Garry Cepe
Report	520574-AID
Project Name	MGC STAGE 1
Project ID	13065
Received Date	Oct 21, 2016
Date Reported	Oct 31, 2016

Methodology:

Asbestos ID	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. Bulk samples include building materials, soils and ores.
Subsampling Soil Samples	The whole sample submitted is first dried and then sieved through a 10mm sieve followed by a 2mm sieve. All fibrous matter viz greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) Iron ores - Sampling and Sample preparation procedures is employed. Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis in accordance with AS 4964-2004.
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated and where required interfering organic fibres or matter may be removed by treating the sample for several hours at a temperature not exceeding 400 ± 30°C. The resultant material is then ground and examined in accordance with AS 4964-2004.
Limit of Reporting	The nominal detection limit of the AS4964 method is around 0.01%. The examination of large sample sizes (at least 500 ml is recommended) may improve the likelihood of identifying asbestos material in the greater than 2 mm fraction. The NEPM screening level of 0.001% w/w asbestos in soil for FA and AF (i.e. non-bonded/friable asbestos) only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. NOTE: NATA News, September 2011 – page 34, states, “Weighing of fibres is problematic and can lead to loss of fibres and potential exposure for laboratory analysts. To request laboratories to report information which is outside the scope of AS 4964-2004 and the scope of their accreditation is misleading and is most unwise” therefore such values reported are outside the scope of Eurofins | mgt NATA accreditation as designated by an asterisk.

Project Name MGC STAGE 1
Project ID 13065
Date Sampled Oct 21, 2016
Report 520574-AID

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
TP5-1	16-Oc19360	Oct 21, 2016	Approximate Sample 56g Sample consisted of: Brown fine grain soil and rocks	No asbestos detected. Organic fibre detected. No respirable fibres detected.
TP5-2	16-Oc19361	Oct 21, 2016	Approximate Sample 75g Sample consisted of: Brown fine grain soil and rocks	No asbestos detected. Organic fibre detected. No respirable fibres detected.
TP5-3	16-Oc19362	Oct 21, 2016	Approximate Sample 70g Sample consisted of: Brown fine grain soil and rocks	No asbestos detected. Organic fibre detected. No respirable fibres detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Oct 21, 2016	Indefinite

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NATA # 1261 Site # 18217

Brisbane
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Murarrie QLD 4172
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NATA # 1261 Site # 20794

Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Oct 21, 2016 1:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	520574	**Due:**	Oct 28, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	5 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC STAGE 1				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Asbestos Absence /Presence	Moisture Set	Total Petroleum Hydrocarbons (NZ MfE 1999)	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X					
Brisbane Laboratory - NATA Site # 20794											
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	TP5-1	Oct 21, 2016		Soil	Z16-Oc19360	X	X	X	X	X	X
2	TP5-2	Oct 21, 2016		Soil	Z16-Oc19361	X	X	X	X	X	X
3	TP5-3	Oct 21, 2016		Soil	Z16-Oc19362	X	X	X	X	X	X
Test Counts						3	3	3	3	3	3

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
COC	Chain of custody
SRA	Sample Receipt Advice
ISO	International Stardards Organisation
AS	Australian Standards
WA DOH	Western Australia Department of Health
NOHSC	National Occupational Health and Safety Commission
ACM	Bonded asbestos-containing material means any material containing more than 1% asbestos and comprises asbestos-containing-material which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin. Common examples of ACM include but are not limited to: pipe and boiler insulation, sprayed-on fireproofing, troweled-on acoustical plaster, floor tile and mastic, floor linoleum, transite shingles, roofing materials, wall and ceiling plaster, ceiling tiles, and gasket materials. This term is restricted to material that cannot pass a 7 mm x 7 mm sieve. This sieve size is selected because it approximates the thickness of common asbestos cement sheeting and for fragments to be smaller than this would imply a high degree of damage and hence potential for fibre release.
FA	FA comprises friable asbestos material and includes severely weathered cement sheet, insulation products and woven asbestos material. This type of friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. This material is typically unbonded or was previously bonded and is now significantly degraded (crumbling).
PACM	Presumed Asbestos-Containing Material means thermal system insulation and surfacing material found in buildings, vessels, and vessel sections constructed no later than 1980 that are assumed to contain greater than one percent asbestos but have not been sampled or analyzed to verify or negate the presence of asbestos.
AF	Asbestos fines (AF) are defined as free fibres, or fibre bundles, smaller than 7mm. It is the free fibres which present the greatest risk to human health, although very small fibres (< 5 microns in length) are not considered to be such a risk. AF also includes small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve. (Note that for bonded ACM fragments to pass through a 7 mm x 7 mm sieve implies a substatntial degree of damage which increases the potential for fibre release.)
AC	Asbestos cement means a mixture of cement and asbestos fibres (typically 90:10 ratios).

Comments

The samples received were not collected in approved asbestos bags and were therefore sub-sampled from the 250mL glass jars. Valid sub-sampling procedures were applied so as to ensure that the sub-samples to be analysed accurately represented the samples received.

The samples received were not collected in approved asbestos bags and were therefore sub-sampled from the 250mL glass jars. Valid sub-sampling procedures were applied so as to ensure that the sub-samples to be analysed accurately represented the samples received.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N/A	Not applicable

Authorised by:

Rhys Thomas Senior Analyst-Asbestos (NSW)

Glenn Jackson
National Operations Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

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Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

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The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **520574-S**
Project name MGC STAGE 1
Project ID 13065
Received Date Oct 21, 2016

Client Sample ID			**TP5-1**	**TP5-2**	**TP5-3**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-Oc19360**	**Z16-Oc19361**	**Z16-Oc19362**
Date Sampled			**Oct 21, 2016**	**Oct 21, 2016**	**Oct 21, 2016**
Test/Reference	LOR	Unit			
Total Petroleum Hydrocarbons (NZ MfE 1999)					
TPH-SG C10-C14	10	mg/kg	< 10	< 10	< 10
TPH-SG C15-C36	20	mg/kg	< 20	< 20	< 20
TPH-SG C7-C36 (Total)	35	mg/kg	< 35	< 35	< 35
TPH-SG C7-C9	5	mg/kg	< 5	< 5	< 5
Organochlorine Pesticides (NZ MfE)					
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.02	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.02	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	< 0.02	< 0.01
4.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01
4.4'-DDE	0.01	mg/kg	< 0.01	< 0.02	< 0.01
4.4'-DDT	0.01	mg/kg	< 0.02	< 0.01	< 0.01
a-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	0.02	< 0.01	< 0.01
b-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	0.33	1.5	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.02	< 0.02	< 0.01
d-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	0.09	< 0.02	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.02	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.02
g-BHC (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.02	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.02	< 0.01
Dibutylchlorendate (surr.)	1	%	138	130	73
Tetrachloro-m-xylene (surr.)	1	%	109	111	83

Client Sample ID			TP5-1	TP5-2	TP5-3
Sample Matrix			Soil	Soil	Soil
Eurofins | mgt Sample No.			Z16-Oc19360	Z16-Oc19361	Z16-Oc19362
Date Sampled			Oct 21, 2016	Oct 21, 2016	Oct 21, 2016
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons (NZ MfE)					
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benz(a)anthracene	0.03	mg/kg	0.08	0.17	< 0.03
Benzo(a)pyrene	0.03	mg/kg	0.11	0.29	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	0.28	0.44	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.28	0.44	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.28	0.44	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	0.07	0.20	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	0.13	0.18	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	0.04	0.12	< 0.03
Chrysene	0.03	mg/kg	0.05	0.15	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	0.13	0.08	< 0.03
Fluoranthene	0.03	mg/kg	0.04	0.22	< 0.03
Fluorene	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	0.16	0.14	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Phenanthrene	0.03	mg/kg	< 0.03	0.08	< 0.03
Pyrene	0.03	mg/kg	0.04	0.24	< 0.03
p-Terphenyl-d14 (surr.)	1	%	124	111	128
2-Fluorobiphenyl (surr.)	1	%	130	150	127
Metals M8 (NZ MfE)					
Arsenic	2	mg/kg	< 2	5.8	< 2
Cadmium	0.4	mg/kg	1.2	< 0.4	< 0.4
Chromium	5	mg/kg	250	39	49
Copper	5	mg/kg	100	25	18
Lead	5	mg/kg	150	16	10
Mercury	0.1	mg/kg	0.4	0.1	0.1
Nickel	5	mg/kg	37	24	29
Zinc	5	mg/kg	290	74	38
% Moisture	1	%	24	21	26

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Petroleum Hydrocarbons (NZ MfE 1999)	Melbourne	Oct 26, 2016	14 Day
- Method: LTM-ORG-2010-R5			
Organochlorine Pesticides (NZ MfE)	Melbourne	Oct 26, 2016	14 Day
- Method: Method: USEPA 8081 Organochlorine Pesticides			
Polycyclic Aromatic Hydrocarbons (NZ MfE)	Melbourne	Oct 26, 2016	14 Day
- Method: USEPA 8270 Polycyclic Aromatic Hydrocarbons			
Metals M8 (NZ MfE)	Melbourne	Oct 26, 2016	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Oct 21, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

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NATA # 1261 Site # 20794

Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Oct 21, 2016 1:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	520574	**Due:**	Oct 28, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	5 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC STAGE 1				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Asbestos Absence /Presence	Moisture Set	Total Petroleum Hydrocarbons (NZ MfE 1999)	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X					
Brisbane Laboratory - NATA Site # 20794											
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	TP5-1	Oct 21, 2016		Soil	Z16-Oc19360	X	X	X	X	X	X
2	TP5-2	Oct 21, 2016		Soil	Z16-Oc19361	X	X	X	X	X	X
3	TP5-3	Oct 21, 2016		Soil	Z16-Oc19362	X	X	X	X	X	X
Test Counts						3	3	3	3	3	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Petroleum Hydrocarbons (NZ MfE 1999)							
TPH-SG C10-C14	mg/kg	< 10			10	Pass	
TPH-SG C15-C36	mg/kg	< 20			20	Pass	
TPH-SG C7-C36 (Total)	mg/kg	< 35			35	Pass	
TPH-SG C7-C9	mg/kg	< 5			5	Pass	
Method Blank							
Organochlorine Pesticides (NZ MfE)							
2.4'-DDD	mg/kg	< 0.01			0.01	Pass	
2.4'-DDE	mg/kg	< 0.01			0.01	Pass	
2.4'-DDT	mg/kg	< 0.01			0.01	Pass	
4.4'-DDD	mg/kg	< 0.01			0.01	Pass	
4.4'-DDE	mg/kg	< 0.01			0.01	Pass	
4.4'-DDT	mg/kg	< 0.01			0.01	Pass	
a-BHC	mg/kg	< 0.01			0.01	Pass	
Aldrin	mg/kg	< 0.01			0.01	Pass	
b-BHC	mg/kg	< 0.01			0.01	Pass	
Chlordanes - Total	mg/kg	< 0.01			0.01	Pass	
cis-Chlordane	mg/kg	< 0.01			0.01	Pass	
d-BHC	mg/kg	< 0.01			0.01	Pass	
Dieldrin	mg/kg	< 0.01			0.01	Pass	
Endosulfan I	mg/kg	< 0.01			0.01	Pass	
Endosulfan II	mg/kg	< 0.01			0.01	Pass	
Endosulfan sulphate	mg/kg	< 0.01			0.01	Pass	
Endrin	mg/kg	< 0.01			0.01	Pass	
Endrin aldehyde	mg/kg	< 0.01			0.01	Pass	
Endrin ketone	mg/kg	< 0.01			0.01	Pass	
g-BHC (Lindane)	mg/kg	< 0.01			0.01	Pass	
Heptachlor	mg/kg	< 0.01			0.01	Pass	
Heptachlor epoxide	mg/kg	< 0.01			0.01	Pass	
Hexachlorobenzene	mg/kg	< 0.01			0.01	Pass	
Methoxychlor	mg/kg	< 0.01			0.01	Pass	
Toxaphene	mg/kg	< 0.1			0.1	Pass	
trans-Chlordane	mg/kg	< 0.01			0.01	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	mg/kg	< 0.03			0.03	Pass	
Acenaphthylene	mg/kg	< 0.03			0.03	Pass	
Anthracene	mg/kg	< 0.03			0.03	Pass	
Benz(a)anthracene	mg/kg	< 0.03			0.03	Pass	
Benzo(a)pyrene	mg/kg	< 0.03			0.03	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.03			0.03	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Chrysene	mg/kg	< 0.03			0.03	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.03			0.03	Pass	
Fluoranthene	mg/kg	< 0.03			0.03	Pass	
Fluorene	mg/kg	< 0.03			0.03	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.03			0.03	Pass	
Naphthalene	mg/kg	< 0.1			0.1	Pass	
Phenanthrene	mg/kg	< 0.03			0.03	Pass	
Pyrene	mg/kg	< 0.03			0.03	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Metals M8 (NZ MfE)							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Petroleum Hydrocarbons (NZ MfE 1999)							
TPH-SG C10-C14	%	104			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides (NZ MfE)							
4.4'-DDD	%	116			70-130	Pass	
4.4'-DDE	%	114			70-130	Pass	
4.4'-DDT	%	116			70-130	Pass	
a-BHC	%	117			70-130	Pass	
Aldrin	%	114			70-130	Pass	
b-BHC	%	112			70-130	Pass	
cis-Chlordane	%	112			70-130	Pass	
d-BHC	%	125			70-130	Pass	
Dieldrin	%	111			70-130	Pass	
Endosulfan I	%	110			70-130	Pass	
Endosulfan II	%	111			70-130	Pass	
Endosulfan sulphate	%	122			70-130	Pass	
Endrin	%	109			70-130	Pass	
Endrin aldehyde	%	110			70-130	Pass	
Endrin ketone	%	124			70-130	Pass	
g-BHC (Lindane)	%	117			70-130	Pass	
Heptachlor	%	110			70-130	Pass	
Heptachlor epoxide	%	118			70-130	Pass	
Hexachlorobenzene	%	114			70-130	Pass	
Methoxychlor	%	111			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	%	91			70-130	Pass	
Acenaphthylene	%	98			70-130	Pass	
Anthracene	%	101			70-130	Pass	
Benz(a)anthracene	%	76			70-130	Pass	
Benzo(a)pyrene	%	70			70-130	Pass	
Benzo(b&j)fluoranthene	%	79			70-130	Pass	
Benzo(g.h.i)perylene	%	78			70-130	Pass	
Benzo(k)fluoranthene	%	87			70-130	Pass	
Chrysene	%	83			70-130	Pass	
Dibenz(a.h)anthracene	%	82			70-130	Pass	
Fluoranthene	%	82			70-130	Pass	
Fluorene	%	101			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	81			70-130	Pass	
Naphthalene	%	85			70-130	Pass	
Phenanthrene	%	97			70-130	Pass	
Pyrene	%	81			70-130	Pass	
LCS - % Recovery							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Metals M8 (NZ MfE)									
Arsenic			%	101			80-120	Pass	
Cadmium			%	96			80-120	Pass	
Chromium			%	104			80-120	Pass	
Copper			%	102			80-120	Pass	
Lead			%	103			80-120	Pass	
Nickel			%	100			80-120	Pass	
Zinc			%	99			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Acenaphthene	Z16-Oc19529	NCP	%	98			70-130	Pass	
Acenaphthylene	Z16-Oc19529	NCP	%	104			70-130	Pass	
Anthracene	Z16-Oc19529	NCP	%	105			70-130	Pass	
Benz(a)anthracene	Z16-Oc19529	NCP	%	81			70-130	Pass	
Benzo(a)pyrene	Z16-Oc19529	NCP	%	75			70-130	Pass	
Benzo(b&j)fluoranthene	Z16-Oc19529	NCP	%	93			70-130	Pass	
Benzo(g.h.i)perylene	Z16-Oc19529	NCP	%	94			70-130	Pass	
Benzo(k)fluoranthene	Z16-Oc19529	NCP	%	99			70-130	Pass	
Chrysene	Z16-Oc19529	NCP	%	84			70-130	Pass	
Dibenz(a.h)anthracene	Z16-Oc19529	NCP	%	99			70-130	Pass	
Fluoranthene	Z16-Oc19529	NCP	%	90			70-130	Pass	
Fluorene	Z16-Oc19529	NCP	%	107			70-130	Pass	
Indeno(1.2.3-cd)pyrene	Z16-Oc19529	NCP	%	96			70-130	Pass	
Naphthalene	Z16-Oc19529	NCP	%	93			70-130	Pass	
Phenanthrene	Z16-Oc19529	NCP	%	102			70-130	Pass	
Pyrene	Z16-Oc19529	NCP	%	86			70-130	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-Oc19372	NCP	%	99			75-125	Pass	
Cadmium	Z16-Oc19372	NCP	%	84			75-125	Pass	
Copper	Z16-Oc19372	NCP	%	91			75-125	Pass	
Lead	Z16-Oc19382	NCP	%	84			75-125	Pass	
Mercury	Z16-Oc19372	NCP	%	81			70-130	Pass	
Nickel	Z16-Oc19382	NCP	%	87			75-125	Pass	
Spike - % Recovery									
Organochlorine Pesticides (NZ MfE)				Result 1					
4.4'-DDD	Z16-Oc19528	NCP	%	120			70-130	Pass	
4.4'-DDE	Z16-Oc19528	NCP	%	116			70-130	Pass	
4.4'-DDT	Z16-Oc17925	NCP	%	128			70-130	Pass	
a-BHC	Z16-Oc19528	NCP	%	118			70-130	Pass	
Aldrin	Z16-Oc19528	NCP	%	111			70-130	Pass	
b-BHC	Z16-Oc19528	NCP	%	111			70-130	Pass	
cis-Chlordane	Z16-Oc19528	NCP	%	105			70-130	Pass	
d-BHC	Z16-Oc19528	NCP	%	129			70-130	Pass	
Dieldrin	Z16-Oc19528	NCP	%	105			70-130	Pass	
Endosulfan I	Z16-Oc19528	NCP	%	101			70-130	Pass	
Endosulfan II	Z16-Oc19528	NCP	%	102			70-130	Pass	
Endosulfan sulphate	Z16-Oc19528	NCP	%	109			70-130	Pass	
Endrin	Z16-Oc19528	NCP	%	119			70-130	Pass	
Endrin aldehyde	Z16-Oc19528	NCP	%	88			70-130	Pass	
Endrin ketone	Z16-Oc19528	NCP	%	124			70-130	Pass	
g-BHC (Lindane)	Z16-Oc19528	NCP	%	117			70-130	Pass	
Heptachlor	Z16-Oc19528	NCP	%	118			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heptachlor epoxide	Z16-Oc19528	NCP	%	111			70-130	Pass	
Hexachlorobenzene	Z16-Oc19528	NCP	%	119			70-130	Pass	
Methoxychlor	Z16-Oc19528	NCP	%	113			70-130	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Chromium	Z16-Oc19372	NCP	%	79			75-125	Pass	
Zinc	Z16-Oc19372	NCP	%	78			75-125	Pass	
Spike - % Recovery									
Total Petroleum Hydrocarbons (NZ MfE 1999)				Result 1					
TPH-SG C10-C14	Z16-Oc19362	CP	%	92			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD			
Chlordanes - Total	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	Z16-Oc19528	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	Z16-Oc19528	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	Z16-Oc19528	NCP	mg/kg	0.15	0.14	9.0	30%	Pass	
Benz(a)anthracene	Z16-Oc19528	NCP	mg/kg	0.83	0.85	2.0	30%	Pass	
Benzo(a)pyrene	Z16-Oc19528	NCP	mg/kg	1.1	1.1	2.0	30%	Pass	
Benzo(b&j)fluoranthene	Z16-Oc19528	NCP	mg/kg	0.70	0.69	1.0	30%	Pass	
Benzo(g.h.i)perylene	Z16-Oc19528	NCP	mg/kg	0.82	0.75	8.0	30%	Pass	
Benzo(k)fluoranthene	Z16-Oc19528	NCP	mg/kg	0.50	0.55	10	30%	Pass	
Chrysene	Z16-Oc19528	NCP	mg/kg	0.59	0.59	<1	30%	Pass	
Dibenz(a.h)anthracene	Z16-Oc19528	NCP	mg/kg	0.42	0.42	1.0	30%	Pass	
Fluoranthene	Z16-Oc19528	NCP	mg/kg	0.98	1.0	2.0	30%	Pass	
Fluorene	Z16-Oc19528	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	Z16-Oc19528	NCP	mg/kg	0.69	0.66	5.0	30%	Pass	
Naphthalene	Z16-Oc19528	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	Z16-Oc19528	NCP	mg/kg	0.42	0.40	7.0	30%	Pass	
Pyrene	Z16-Oc19528	NCP	mg/kg	1.1	1.0	4.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-Oc19371	NCP	mg/kg	4.0	2.2	58	30%	Fail	Q15
Cadmium	Z16-Oc19371	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-Oc19528	NCP	mg/kg	95	100	6.0	30%	Pass	
Copper	Z16-Oc19371	NCP	mg/kg	8.4	7.2	14	30%	Pass	
Lead	Z16-Oc19371	NCP	mg/kg	6.4	< 5	46	30%	Fail	Q15
Mercury	Z16-Oc19371	NCP	mg/kg	0.6	0.3	52	30%	Fail	Q15
Nickel	Z16-Oc19371	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	Z16-Oc19528	NCP	mg/kg	150	150	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z16-Oc19371	NCP	%	8.8	9.7	10	30%	Pass	
Duplicate									
Total Petroleum Hydrocarbons (NZ MfE 1999)				Result 1	Result 2	RPD			
TPH-SG C10-C14	Z16-Oc19361	CP	mg/kg	< 10	< 10	<1	30%	Pass	
TPH-SG C15-C36	Z16-Oc19361	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TPH-SG C7-C36 (Total)	Z16-Oc19361	CP	mg/kg	< 35	< 35	<1	30%	Pass	
TPH-SG C7-C9	Z16-Oc19361	CP	mg/kg	< 5	< 5	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD			
2.4'-DDD	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2.4'-DDE	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2.4'-DDT	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDD	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDE	Z16-Oc17923	NCP	mg/kg	0.02	0.02	14	30%	Pass	
4.4'-DDT	Z16-Oc17923	NCP	mg/kg	0.01	0.02	15	30%	Pass	
a-BHC	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Aldrin	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
b-BHC	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
cis-Chlordane	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
d-BHC	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Dieldrin	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan I	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan II	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan sulphate	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin aldehyde	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin ketone	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
g-BHC (Lindane)	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor epoxide	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Hexachlorobenzene	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Methoxychlor	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Toxaphene	Z16-Oc17923	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
trans-Chlordane	Z16-Oc17923	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Rhys Thomas	Senior Analyst-Asbestos (NSW)
Alex Petridis	Senior Analyst-Organic (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **521691-S**
Project name MGC STAGE 1
Project ID 13065
Received Date Oct 28, 2016

Client Sample ID			**MGC1-SV4**	**MGC1-SV5**	**MGC1-SV6**	**MGC1-SV7**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-Oc28305**	**Z16-Oc28306**	**Z16-Oc28307**	**Z16-Oc28308**
Date Sampled			**Oct 28, 2016**	**Oct 28, 2016**	**Oct 28, 2016**	**Oct 28, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	6.1	17	7.3	8.3
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	23	18	24	23
Copper	5	mg/kg	24	19	28	25
Lead	5	mg/kg	25	17	28	27
Mercury	0.1	mg/kg	0.7	0.5	0.4	0.4
Nickel	5	mg/kg	15	13	16	17
Zinc	5	mg/kg	44	35	57	61
% Moisture	1	%	36	35	38	34

Client Sample ID			**MGC1-SV8**	**MGC1-SV9**
Sample Matrix			**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-Oc28309**	**Z16-Oc28310**
Date Sampled			**Oct 28, 2016**	**Oct 28, 2016**
Test/Reference	LOR	Unit		
Metals M8 (NZ MfE)				
Arsenic	2	mg/kg	7.3	4.3
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	23	30
Copper	5	mg/kg	21	23
Lead	5	mg/kg	24	20
Mercury	0.1	mg/kg	0.3	0.3
Nickel	5	mg/kg	16	17
Zinc	5	mg/kg	60	32
% Moisture	1	%	32	38

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8 (NZ MfE)	Melbourne	Nov 02, 2016	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Oct 31, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

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Site # 1254 & 14271

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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
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Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Oct 28, 2016 3:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	521691	**Due:**	Nov 3, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	3 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC STAGE 1				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MGC1-SV4	Oct 28, 2016		Soil	Z16-Oc28305	X	X
2	MGC1-SV5	Oct 28, 2016		Soil	Z16-Oc28306	X	X
3	MGC1-SV6	Oct 28, 2016		Soil	Z16-Oc28307	X	X
4	MGC1-SV7	Oct 28, 2016		Soil	Z16-Oc28308	X	X
5	MGC1-SV8	Oct 28, 2016		Soil	Z16-Oc28309	X	X
6	MGC1-SV9	Oct 28, 2016		Soil	Z16-Oc28310	X	X
Test Counts						6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
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USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Metals M8 (NZ MfE)									
Arsenic			mg/kg	< 2			2	Pass	
Cadmium			mg/kg	< 0.4			0.4	Pass	
Chromium			mg/kg	< 5			5	Pass	
Copper			mg/kg	< 5			5	Pass	
Lead			mg/kg	< 5			5	Pass	
Mercury			mg/kg	< 0.1			0.1	Pass	
Nickel			mg/kg	< 5			5	Pass	
Zinc			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Metals M8 (NZ MfE)									
Arsenic			%	98			80-120	Pass	
Cadmium			%	98			80-120	Pass	
Chromium			%	102			80-120	Pass	
Copper			%	104			80-120	Pass	
Lead			%	101			80-120	Pass	
Mercury			%	118			75-125	Pass	
Nickel			%	103			80-120	Pass	
Zinc			%	97			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-Oc28306	CP	%	109			75-125	Pass	
Cadmium	Z16-Oc28306	CP	%	102			75-125	Pass	
Chromium	Z16-Oc28306	CP	%	110			75-125	Pass	
Lead	Z16-Oc28306	CP	%	103			75-125	Pass	
Mercury	Z16-Oc28306	CP	%	111			70-130	Pass	
Nickel	Z16-Oc28306	CP	%	104			75-125	Pass	
Zinc	Z16-Oc28306	CP	%	113			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-Oc28305	CP	mg/kg	6.1	6.1	1.0	30%	Pass	
Cadmium	Z16-Oc28305	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-Oc28305	CP	mg/kg	23	24	4.0	30%	Pass	
Copper	Z16-Oc28305	CP	mg/kg	24	25	5.0	30%	Pass	
Lead	Z16-Oc28305	CP	mg/kg	25	25	<1	30%	Pass	
Mercury	Z16-Oc28305	CP	mg/kg	0.7	0.7	4.0	30%	Pass	
Nickel	Z16-Oc28305	CP	mg/kg	15	16	5.0	30%	Pass	
Zinc	Z16-Oc28305	CP	mg/kg	44	45	3.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-Oc28306	CP	mg/kg	17	18	5.0	30%	Pass	
Cadmium	Z16-Oc28306	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-Oc28306	CP	mg/kg	18	19	3.0	30%	Pass	
Copper	Z16-Oc28306	CP	mg/kg	19	19	3.0	30%	Pass	
Lead	Z16-Oc28306	CP	mg/kg	17	18	2.0	30%	Pass	
Mercury	Z16-Oc28306	CP	mg/kg	0.5	0.4	4.0	30%	Pass	
Nickel	Z16-Oc28306	CP	mg/kg	13	13	2.0	30%	Pass	
Zinc	Z16-Oc28306	CP	mg/kg	35	36	1.0	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z16-Oc28309	CP	%	32	32	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **522004-S**
Project name MGC STAGE 1
Project ID 13065
Received Date Nov 01, 2016

Client Sample ID			**MGC1-SV10**	**MGC1-SV11**	**MGC1-SV12**	**MGC1-SV13**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No01273**	**Z16-No01274**	**Z16-No01275**	**Z16-No01276**
Date Sampled			**Nov 01, 2016**	**Nov 01, 2016**	**Nov 01, 2016**	**Nov 01, 2016**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	-	-
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	-	-
Anthracene	0.03	mg/kg	< 0.03	< 0.03	-	-
Benz(a)anthracene	0.03	mg/kg	< 0.05	< 0.05	-	-
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	0.04	-	-
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08	-	-
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	< 0.03	-	-
Chrysene	0.03	mg/kg	< 0.03	< 0.03	-	-
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.03	< 0.03	-	-
Fluoranthene	0.03	mg/kg	< 0.03	< 0.03	-	-
Fluorene	0.03	mg/kg	< 0.03	< 0.03	-	-
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03	-	-
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	-	-
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03	-	-
Pyrene	0.03	mg/kg	< 0.03	< 0.03	-	-
p-Terphenyl-d14 (surr.)	1	%	65	58	-	-
2-Fluorobiphenyl (surr.)	1	%	71	68	-	-
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	2.6	6.6	8.9	11
Cadmium	0.4	mg/kg	< 0.4	0.5	< 0.4	< 0.4
Chromium	5	mg/kg	19	23	32	30
Copper	5	mg/kg	< 5	36	30	35
Lead	5	mg/kg	12	490	26	34
Mercury	0.1	mg/kg	0.1	0.3	0.4	0.3
Nickel	5	mg/kg	6.3	14	20	22
Zinc	5	mg/kg	220	170	62	91
% Moisture	1	%	18	32	38	36

Client Sample ID			MGC1-SV14	MGC1-SV15
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			Z16-No01277	Z16-No01278
Date Sampled			Nov 01, 2016	Nov 01, 2016
Test/Reference	LOR	Unit		
Metals M8 (NZ MfE)				
Arsenic	2	mg/kg	9.5	18
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	32	31
Copper	5	mg/kg	26	31
Lead	5	mg/kg	25	28
Mercury	0.1	mg/kg	0.4	0.4
Nickel	5	mg/kg	21	22
Zinc	5	mg/kg	44	65
% Moisture	1	%	43	36

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons (NZ MfE)	Melbourne	Nov 03, 2016	14 Day
- Method: USEPA 8270 Polycyclic Aromatic Hydrocarbons			
Metals M8 (NZ MfE)	Melbourne	Nov 03, 2016	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Nov 02, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

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Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Nov 1, 2016 2:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	522004	**Due:**	Nov 2, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	1 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC STAGE 1				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)
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Sydney Laboratory - NATA Site # 18217								
Brisbane Laboratory - NATA Site # 20794								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	MGC1-SV10	Nov 01, 2016		Soil	Z16-No01273	X	X	X
2	MGC1-SV11	Nov 01, 2016		Soil	Z16-No01274	X	X	X
3	MGC1-SV12	Nov 01, 2016		Soil	Z16-No01275	X	X	
4	MGC1-SV13	Nov 01, 2016		Soil	Z16-No01276	X	X	
5	MGC1-SV14	Nov 01, 2016		Soil	Z16-No01277	X	X	
6	MGC1-SV15	Nov 01, 2016		Soil	Z16-No01278	X	X	
Test Counts						6	6	2

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Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Polycyclic Aromatic Hydrocarbons (NZ MfE)									
Acenaphthene			mg/kg	< 0.03			0.03	Pass	
Acenaphthylene			mg/kg	< 0.03			0.03	Pass	
Anthracene			mg/kg	< 0.03			0.03	Pass	
Benz(a)anthracene			mg/kg	< 0.03			0.03	Pass	
Benzo(a)pyrene			mg/kg	< 0.03			0.03	Pass	
Benzo(b&j)fluoranthene			mg/kg	< 0.03			0.03	Pass	
Benzo(g.h.i)perylene			mg/kg	< 0.03			0.03	Pass	
Benzo(k)fluoranthene			mg/kg	< 0.03			0.03	Pass	
Chrysene			mg/kg	< 0.03			0.03	Pass	
Dibenz(a.h)anthracene			mg/kg	< 0.03			0.03	Pass	
Fluoranthene			mg/kg	< 0.03			0.03	Pass	
Fluorene			mg/kg	< 0.03			0.03	Pass	
Indeno(1.2.3-cd)pyrene			mg/kg	< 0.03			0.03	Pass	
Naphthalene			mg/kg	< 0.1			0.1	Pass	
Phenanthrene			mg/kg	< 0.03			0.03	Pass	
Pyrene			mg/kg	< 0.03			0.03	Pass	
LCS - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)									
Acenaphthene			%	89			70-130	Pass	
Acenaphthylene			%	84			70-130	Pass	
Anthracene			%	85			70-130	Pass	
Benz(a)anthracene			%	83			70-130	Pass	
Benzo(a)pyrene			%	77			70-130	Pass	
Benzo(b&j)fluoranthene			%	79			70-130	Pass	
Benzo(g.h.i)perylene			%	92			70-130	Pass	
Benzo(k)fluoranthene			%	83			70-130	Pass	
Chrysene			%	82			70-130	Pass	
Dibenz(a.h)anthracene			%	91			70-130	Pass	
Fluoranthene			%	77			70-130	Pass	
Fluorene			%	85			70-130	Pass	
Indeno(1.2.3-cd)pyrene			%	82			70-130	Pass	
Naphthalene			%	90			70-130	Pass	
Phenanthrene			%	88			70-130	Pass	
Pyrene			%	84			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Acenaphthene	Z16-Oc28262	NCP	%	96			70-130	Pass	
Acenaphthylene	Z16-Oc28262	NCP	%	89			70-130	Pass	
Anthracene	Z16-Oc28262	NCP	%	89			70-130	Pass	
Benz(a)anthracene	Z16-Oc28262	NCP	%	89			70-130	Pass	
Benzo(a)pyrene	Z16-Oc28262	NCP	%	80			70-130	Pass	
Benzo(b&j)fluoranthene	Z16-Oc28262	NCP	%	81			70-130	Pass	
Benzo(g.h.i)perylene	Z16-Oc28262	NCP	%	102			70-130	Pass	
Benzo(k)fluoranthene	Z16-Oc28262	NCP	%	89			70-130	Pass	
Chrysene	Z16-Oc28262	NCP	%	94			70-130	Pass	
Dibenz(a.h)anthracene	Z16-Oc28262	NCP	%	101			70-130	Pass	
Fluoranthene	Z16-Oc28262	NCP	%	83			70-130	Pass	
Fluorene	Z16-Oc28262	NCP	%	90			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene	Z16-Oc28262	NCP	%	89			70-130	Pass	
Naphthalene	Z16-Oc28262	NCP	%	97			70-130	Pass	
Phenanthrene	Z16-Oc28262	NCP	%	92			70-130	Pass	
Pyrene	Z16-Oc28262	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-No01274	CP	%	111			75-125	Pass	
Cadmium	Z16-No01274	CP	%	118			75-125	Pass	
Chromium	Z16-No01274	CP	%	112			75-125	Pass	
Copper	Z16-No01274	CP	%	105			75-125	Pass	
Mercury	Z16-No01274	CP	%	104			70-130	Pass	
Nickel	Z16-No01274	CP	%	112			75-125	Pass	
Zinc	Z16-No01274	CP	%	115			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	Z16-Oc28260	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	Z16-Oc28260	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	Z16-Oc28260	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benz(a)anthracene	Z16-Oc28260	NCP	mg/kg	0.08	0.11	27	30%	Pass	
Benzo(a)pyrene	Z16-Oc28260	NCP	mg/kg	0.09	0.12	29	30%	Pass	
Benzo(b&j)fluoranthene	Z16-Oc28260	NCP	mg/kg	0.08	0.10	26	30%	Pass	
Benzo(g.h.i)perylene	Z16-Oc28260	NCP	mg/kg	0.07	0.09	29	30%	Pass	
Benzo(k)fluoranthene	Z16-Oc28260	NCP	mg/kg	0.07	0.09	23	30%	Pass	
Chrysene	Z16-Oc28260	NCP	mg/kg	0.06	0.09	34	30%	Fail	Q15
Dibenz(a.h)anthracene	Z16-Oc28260	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluoranthene	Z16-Oc28260	NCP	mg/kg	0.09	0.16	58	30%	Fail	Q15
Fluorene	Z16-Oc28260	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	Z16-Oc28260	NCP	mg/kg	0.07	0.09	29	30%	Pass	
Naphthalene	Z16-Oc28260	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	Z16-Oc28260	NCP	mg/kg	0.04	0.05	17	30%	Pass	
Pyrene	Z16-Oc28260	NCP	mg/kg	0.10	0.17	55	30%	Fail	Q15
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No01274	CP	mg/kg	6.6	6.6	1.0	30%	Pass	
Cadmium	Z16-No01274	CP	mg/kg	0.5	0.5	2.0	30%	Pass	
Chromium	Z16-No01274	CP	mg/kg	23	23	1.0	30%	Pass	
Copper	Z16-No01274	CP	mg/kg	36	37	1.0	30%	Pass	
Lead	Z16-No01274	CP	mg/kg	490	500	1.0	30%	Pass	
Mercury	Z16-No01274	CP	mg/kg	0.3	0.3	2.0	30%	Pass	
Nickel	Z16-No01274	CP	mg/kg	14	14	2.0	30%	Pass	
Zinc	Z16-No01274	CP	mg/kg	170	180	1.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **522856-S**
Project name MGC STAGE 1
Project ID 13065
Received Date Nov 08, 2016

Client Sample ID			**MGC1-SV18**	**MGC1-SV19**	**MGC1-SV20**	**MGC1-SV21**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No07205**	**Z16-No07206**	**Z16-No07207**	**Z16-No07208**
Date Sampled			**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	< 2	7.7	7.7	5.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	11	12	22	32
Copper	5	mg/kg	< 5	8.2	28	39
Lead	5	mg/kg	11	16	27	27
Mercury	0.1	mg/kg	0.2	0.2	0.3	0.4
Nickel	5	mg/kg	< 5	5.4	14	17
Zinc	5	mg/kg	11	32	73	69
% Moisture	1	%	20	27	43	41

Client Sample ID			**MGC1-SV22**	**MGC1-SV23**	**MGC1-SV24**	**MGC1-SV25**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No07209**	**Z16-No07210**	**Z16-No07211**	**Z16-No07212**
Date Sampled			**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	23	17	5.5	26
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	21	20	27	20
Copper	5	mg/kg	27	26	35	18
Lead	5	mg/kg	25	22	21	28
Mercury	0.1	mg/kg	0.4	0.4	0.5	0.2
Nickel	5	mg/kg	12	11	10	13
Zinc	5	mg/kg	83	77	48	66
% Moisture	1	%	39	45	43	59

Client Sample ID			MGC1-SV26	MGC1-SV27	MGC1-SV28	MGC1-SV29
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No07213**	**Z16-No07214**	**Z16-No07215**	**Z16-No07216**
Date Sampled			**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	6.1	36	11	5.4
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	25	23	27	20
Copper	5	mg/kg	24	25	24	13
Lead	5	mg/kg	21	26	23	17
Mercury	0.1	mg/kg	0.3	0.4	0.5	0.5
Nickel	5	mg/kg	13	10	9.3	5.5
Zinc	5	mg/kg	67	84	48	38
% Moisture	1	%	43	41	42	42

Client Sample ID			MGC1-SV30	MGC1-SV31	MGC1-SV32	MGC1-SV33
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No07217**	**Z16-No07218**	**Z16-No07219**	**Z16-No07220**
Date Sampled			**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	6.6	17	4.0	7.1
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	31	22	27	20
Copper	5	mg/kg	34	18	30	19
Lead	5	mg/kg	29	35	22	22
Mercury	0.1	mg/kg	0.4	0.5	0.5	0.4
Nickel	5	mg/kg	9.7	8.1	11	7.8
Zinc	5	mg/kg	49	51	39	52
% Moisture	1	%	45	45	50	45

Client Sample ID			MGC1-SV34	MGC1-SV35	MGC1-SV36	MGC1-SV37
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No07221**	**Z16-No07222**	**Z16-No07223**	**Z16-No07224**
Date Sampled			**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	8.4	26	6.1	7.6
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	24	20	29	24
Copper	5	mg/kg	42	27	22	30
Lead	5	mg/kg	28	41	20	26
Mercury	0.1	mg/kg	0.4	0.8	0.4	0.3
Nickel	5	mg/kg	11	9.3	11	14
Zinc	5	mg/kg	190	290	41	83
% Moisture	1	%	40	40	41	39

Client Sample ID			MGC1-SV38	MGC1-SV39	MGC1-SV40	MGC1-SV41
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No07225**	**Z16-No07226**	**Z16-No07227**	**Z16-No07228**
Date Sampled			**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	6.8	11	6.2	17
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	30	23	26	20
Copper	5	mg/kg	29	28	31	23
Lead	5	mg/kg	24	38	23	24
Mercury	0.1	mg/kg	0.3	0.3	0.5	0.3
Nickel	5	mg/kg	14	13	18	13
Zinc	5	mg/kg	61	86	47	89
% Moisture	1	%	28	43	38	39

Client Sample ID			MGC1-SV42	MGC1-SV43	MGC1-SV44	MGC1-SV45
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No07229**	**Z16-No07230**	**Z16-No07231**	**Z16-No07232**
Date Sampled			**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	5.9	17	< 2	21
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	23	23	12	21
Copper	5	mg/kg	26	28	< 5	15
Lead	5	mg/kg	24	24	8.8	27
Mercury	0.1	mg/kg	0.4	0.4	0.1	0.6
Nickel	5	mg/kg	15	11	< 5	13
Zinc	5	mg/kg	60	92	16	940
% Moisture	1	%	38	42	22	33

Client Sample ID			MGC1-SV46	MGC1-SV47	MGC1-SV48	MGC1-SV50
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No07233**	**Z16-No07234**	**Z16-No07235**	**Z16-No07237**
Date Sampled			**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**	**Nov 08, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	43	5.5	6.3	35
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	22	25	27	25
Copper	5	mg/kg	22	21	22	22
Lead	5	mg/kg	33	22	24	66
Mercury	0.1	mg/kg	0.4	0.5	0.4	1.7
Nickel	5	mg/kg	11	12	13	12
Zinc	5	mg/kg	68	39	55	62
% Moisture	1	%	43	37	44	37

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8 (NZ MfE)	Melbourne	Nov 09, 2016	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Nov 09, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

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Brisbane
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NATA # 1261 Site # 20794

Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Nov 8, 2016 3:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	522856	**Due:**	Nov 11, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	3 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC STAGE 1				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MGC1-SV18	Nov 08, 2016		Soil	Z16-No07205	X	X
2	MGC1-SV19	Nov 08, 2016		Soil	Z16-No07206	X	X
3	MGC1-SV20	Nov 08, 2016		Soil	Z16-No07207	X	X
4	MGC1-SV21	Nov 08, 2016		Soil	Z16-No07208	X	X
5	MGC1-SV22	Nov 08, 2016		Soil	Z16-No07209	X	X
6	MGC1-SV23	Nov 08, 2016		Soil	Z16-No07210	X	X
7	MGC1-SV24	Nov 08, 2016		Soil	Z16-No07211	X	X
8	MGC1-SV25	Nov 08, 2016		Soil	Z16-No07212	X	X
9	MGC1-SV26	Nov 08, 2016		Soil	Z16-No07213	X	X
10	MGC1-SV27	Nov 08, 2016		Soil	Z16-No07214	X	X

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NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name:	Soil & Rock Consultants	**Order No.:**	
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	522856
		Phone:	0011 64 9 835 1740
		Fax:	0011 64 9 835 1847
Project Name:	MGC STAGE 1		
Project ID:	13065		

Received:	Nov 8, 2016 3:00 PM
Due:	Nov 11, 2016
Priority:	3 Day
Contact Name:	Garry Cepe

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
External Laboratory							
11	MGC1-SV28	Nov 08, 2016		Soil	Z16-No07215	X	X
12	MGC1-SV29	Nov 08, 2016		Soil	Z16-No07216	X	X
13	MGC1-SV30	Nov 08, 2016		Soil	Z16-No07217	X	X
14	MGC1-SV31	Nov 08, 2016		Soil	Z16-No07218	X	X
15	MGC1-SV32	Nov 08, 2016		Soil	Z16-No07219	X	X
16	MGC1-SV33	Nov 08, 2016		Soil	Z16-No07220	X	X
17	MGC1-SV34	Nov 08, 2016		Soil	Z16-No07221	X	X
18	MGC1-SV35	Nov 08, 2016		Soil	Z16-No07222	X	X
19	MGC1-SV36	Nov 08, 2016		Soil	Z16-No07223	X	X
20	MGC1-SV37	Nov 08, 2016		Soil	Z16-No07224	X	X
21	MGC1-SV38	Nov 08, 2016		Soil	Z16-No07225	X	X
22	MGC1-SV39	Nov 08, 2016		Soil	Z16-No07226	X	X

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NATA # 1261 Site # 20794

Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Nov 8, 2016 3:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	522856	**Due:**	Nov 11, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	3 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC STAGE 1				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
External Laboratory							
23	MGC1-SV40	Nov 08, 2016		Soil	Z16-No07227	X	X
24	MGC1-SV41	Nov 08, 2016		Soil	Z16-No07228	X	X
25	MGC1-SV42	Nov 08, 2016		Soil	Z16-No07229	X	X
26	MGC1-SV43	Nov 08, 2016		Soil	Z16-No07230	X	X
27	MGC1-SV44	Nov 08, 2016		Soil	Z16-No07231	X	X
28	MGC1-SV45	Nov 08, 2016		Soil	Z16-No07232	X	X
29	MGC1-SV46	Nov 08, 2016		Soil	Z16-No07233	X	X
30	MGC1-SV47	Nov 08, 2016		Soil	Z16-No07234	X	X
31	MGC1-SV48	Nov 08, 2016		Soil	Z16-No07235	X	X
32	MGC1-SV50	Nov 08, 2016		Soil	Z16-No07237	X	X
Test Counts						32	32

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Metals M8 (NZ MfE)									
Arsenic			mg/kg	< 2			2	Pass	
Cadmium			mg/kg	< 0.4			0.4	Pass	
Chromium			mg/kg	< 5			5	Pass	
Copper			mg/kg	< 5			5	Pass	
Lead			mg/kg	< 5			5	Pass	
Mercury			mg/kg	< 0.1			0.1	Pass	
Nickel			mg/kg	< 5			5	Pass	
Zinc			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Metals M8 (NZ MfE)									
Arsenic			%	96			80-120	Pass	
Cadmium			%	98			80-120	Pass	
Chromium			%	102			80-120	Pass	
Copper			%	103			80-120	Pass	
Lead			%	99			80-120	Pass	
Mercury			%	116			75-125	Pass	
Nickel			%	101			80-120	Pass	
Zinc			%	103			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-No07206	CP	%	103			75-125	Pass	
Cadmium	Z16-No07206	CP	%	104			75-125	Pass	
Chromium	Z16-No07206	CP	%	105			75-125	Pass	
Copper	Z16-No07206	CP	%	120			75-125	Pass	
Lead	Z16-No07206	CP	%	102			75-125	Pass	
Mercury	Z16-No07206	CP	%	100			70-130	Pass	
Nickel	Z16-No07206	CP	%	100			75-125	Pass	
Zinc	Z16-No07206	CP	%	113			75-125	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-No07216	CP	%	101			75-125	Pass	
Cadmium	Z16-No07216	CP	%	102			75-125	Pass	
Chromium	Z16-No07216	CP	%	108			75-125	Pass	
Copper	Z16-No07216	CP	%	119			75-125	Pass	
Lead	Z16-No07216	CP	%	98			75-125	Pass	
Mercury	Z16-No07216	CP	%	103			70-130	Pass	
Nickel	Z16-No07216	CP	%	96			75-125	Pass	
Zinc	Z16-No07216	CP	%	110			75-125	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-No07226	CP	%	101			75-125	Pass	
Cadmium	Z16-No07226	CP	%	100			75-125	Pass	
Chromium	Z16-No07226	CP	%	100			75-125	Pass	
Copper	Z16-No07226	CP	%	119			75-125	Pass	
Lead	Z16-No07226	CP	%	89			75-125	Pass	
Mercury	Z16-No07226	CP	%	116			70-130	Pass	
Nickel	Z16-No07226	CP	%	94			75-125	Pass	
Zinc	Z16-No07226	CP	%	108			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-No07237	CP	%	107			75-125	Pass	
Cadmium	Z16-No07237	CP	%	112			75-125	Pass	
Chromium	Z16-No07237	CP	%	110			75-125	Pass	
Copper	Z16-No07237	CP	%	132			75-125	Fail	Q08
Lead	Z16-No07237	CP	%	101			75-125	Pass	
Mercury	Z16-No07237	CP	%	113			70-130	Pass	
Nickel	Z16-No07237	CP	%	101			75-125	Pass	
Zinc	Z16-No07237	CP	%	109			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No07205	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	Z16-No07205	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No07205	CP	mg/kg	11	11	1.0	30%	Pass	
Copper	Z16-No07205	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	Z16-No07205	CP	mg/kg	11	10	3.0	30%	Pass	
Mercury	Z16-No07205	CP	mg/kg	0.2	0.1	5.0	30%	Pass	
Nickel	Z16-No07205	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	Z16-No07205	CP	mg/kg	11	12	3.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No07206	CP	mg/kg	7.7	8.1	4.0	30%	Pass	
Cadmium	Z16-No07206	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No07206	CP	mg/kg	12	12	<1	30%	Pass	
Copper	Z16-No07206	CP	mg/kg	8.2	8.3	1.0	30%	Pass	
Lead	Z16-No07206	CP	mg/kg	16	16	<1	30%	Pass	
Mercury	Z16-No07206	CP	mg/kg	0.2	0.2	7.0	30%	Pass	
Nickel	Z16-No07206	CP	mg/kg	5.4	5.4	1.0	30%	Pass	
Zinc	Z16-No07206	CP	mg/kg	32	32	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z16-No07212	CP	%	59	56	4.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No07215	CP	mg/kg	11	8.3	27	30%	Pass	
Cadmium	Z16-No07215	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No07215	CP	mg/kg	27	25	6.0	30%	Pass	
Copper	Z16-No07215	CP	mg/kg	24	23	5.0	30%	Pass	
Lead	Z16-No07215	CP	mg/kg	23	22	7.0	30%	Pass	
Mercury	Z16-No07215	CP	mg/kg	0.5	0.5	1.0	30%	Pass	
Nickel	Z16-No07215	CP	mg/kg	9.3	8.9	4.0	30%	Pass	
Zinc	Z16-No07215	CP	mg/kg	48	47	1.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No07216	CP	mg/kg	5.4	5.7	5.0	30%	Pass	
Cadmium	Z16-No07216	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No07216	CP	mg/kg	20	21	6.0	30%	Pass	
Copper	Z16-No07216	CP	mg/kg	13	14	7.0	30%	Pass	
Lead	Z16-No07216	CP	mg/kg	17	18	6.0	30%	Pass	
Mercury	Z16-No07216	CP	mg/kg	0.5	0.5	1.0	30%	Pass	
Nickel	Z16-No07216	CP	mg/kg	5.5	6.0	8.0	30%	Pass	
Zinc	Z16-No07216	CP	mg/kg	38	39	3.0	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z16-No07222	CP	%	40	40	1.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No07225	CP	mg/kg	6.8	6.7	2.0	30%	Pass	
Cadmium	Z16-No07225	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No07225	CP	mg/kg	30	28	6.0	30%	Pass	
Copper	Z16-No07225	CP	mg/kg	29	29	1.0	30%	Pass	
Lead	Z16-No07225	CP	mg/kg	24	23	7.0	30%	Pass	
Mercury	Z16-No07225	CP	mg/kg	0.3	0.3	2.0	30%	Pass	
Nickel	Z16-No07225	CP	mg/kg	14	14	1.0	30%	Pass	
Zinc	Z16-No07225	CP	mg/kg	61	60	2.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No07226	CP	mg/kg	11	11	2.0	30%	Pass	
Cadmium	Z16-No07226	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No07226	CP	mg/kg	23	22	4.0	30%	Pass	
Copper	Z16-No07226	CP	mg/kg	28	27	4.0	30%	Pass	
Lead	Z16-No07226	CP	mg/kg	38	37	<1	30%	Pass	
Mercury	Z16-No07226	CP	mg/kg	0.3	0.3	2.0	30%	Pass	
Nickel	Z16-No07226	CP	mg/kg	13	13	<1	30%	Pass	
Zinc	Z16-No07226	CP	mg/kg	86	82	5.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z16-No07232	CP	%	33	37	11	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No07235	CP	mg/kg	6.3	5.6	11	30%	Pass	
Cadmium	Z16-No07235	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No07235	CP	mg/kg	27	26	6.0	30%	Pass	
Copper	Z16-No07235	CP	mg/kg	22	20	11	30%	Pass	
Lead	Z16-No07235	CP	mg/kg	24	23	5.0	30%	Pass	
Mercury	Z16-No07235	CP	mg/kg	0.4	0.4	8.0	30%	Pass	
Nickel	Z16-No07235	CP	mg/kg	13	12	7.0	30%	Pass	
Zinc	Z16-No07235	CP	mg/kg	55	52	5.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No07237	CP	mg/kg	35	33	4.0	30%	Pass	
Cadmium	Z16-No07237	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No07237	CP	mg/kg	25	24	3.0	30%	Pass	
Copper	Z16-No07237	CP	mg/kg	22	22	2.0	30%	Pass	
Lead	Z16-No07237	CP	mg/kg	66	64	3.0	30%	Pass	
Mercury	Z16-No07237	CP	mg/kg	1.7	1.7	1.0	30%	Pass	
Nickel	Z16-No07237	CP	mg/kg	12	12	3.0	30%	Pass	
Zinc	Z16-No07237	CP	mg/kg	62	61	3.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **523090-S**
Project name MGC STAGE 1
Project ID 13065
Received Date Nov 10, 2016

Client Sample ID			**MGC1-SV16**	**MGC1-SV17**	**MGC1-SV49**	**MGC1-SV51**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No08741**	**Z16-No08742**	**Z16-No08743**	**Z16-No08744**
Date Sampled			**Nov 09, 2016**	**Nov 09, 2016**	**Nov 09, 2016**	**Nov 09, 2016**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	-	-	-	< 0.03
Acenaphthylene	0.03	mg/kg	-	-	-	< 0.03
Anthracene	0.03	mg/kg	-	-	-	< 0.03
Benz(a)anthracene	0.03	mg/kg	-	-	-	< 0.03
Benzo(a)pyrene	0.03	mg/kg	-	-	-	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	-	-	-	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	-	-	-	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	-	-	-	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	-	-	-	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	-	-	-	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	-	-	-	< 0.03
Chrysene	0.03	mg/kg	-	-	-	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	-	-	-	< 0.03
Fluoranthene	0.03	mg/kg	-	-	-	< 0.03
Fluorene	0.03	mg/kg	-	-	-	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	-	-	-	< 0.03
Naphthalene	0.1	mg/kg	-	-	-	< 0.1
Phenanthrene	0.03	mg/kg	-	-	-	< 0.03
Pyrene	0.03	mg/kg	-	-	-	< 0.03
p-Terphenyl-d14 (surr.)	1	%	-	-	-	59
2-Fluorobiphenyl (surr.)	1	%	-	-	-	66
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	15	9.8	12	2.9
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	28	33	25	18
Copper	5	mg/kg	24	22	21	6.5
Lead	5	mg/kg	27	24	26	13
Mercury	0.1	mg/kg	0.4	0.7	0.3	0.2
Nickel	5	mg/kg	18	20	13	6.1
Zinc	5	mg/kg	61	42	82	31
% Moisture	1	%	35	35	36	21

Client Sample ID			MGC1-SV52	MGC1-SV53
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			Z16-No08745	Z16-No08746
Date Sampled			Nov 09, 2016	Nov 09, 2016
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons (NZ MfE)				
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03
Anthracene	0.03	mg/kg	< 0.03	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.03	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.03	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	< 0.03
Chrysene	0.03	mg/kg	< 0.03	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	0.03	mg/kg	< 0.03	< 0.03
Fluorene	0.03	mg/kg	< 0.03	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03
Pyrene	0.03	mg/kg	< 0.03	< 0.03
p-Terphenyl-d14 (surr.)	1	%	63	53
2-Fluorobiphenyl (surr.)	1	%	66	66
Metals M8 (NZ MfE)				
Arsenic	2	mg/kg	6.3	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	27	14
Copper	5	mg/kg	18	< 5
Lead	5	mg/kg	16	12
Mercury	0.1	mg/kg	0.1	0.2
Nickel	5	mg/kg	16	< 5
Zinc	5	mg/kg	35	17
% Moisture	1	%	32	21

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons (NZ MfE)	Melbourne	Nov 11, 2016	14 Day
- Method: USEPA 8270 Polycyclic Aromatic Hydrocarbons			
Metals M8 (NZ MfE)	Melbourne	Nov 11, 2016	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Nov 10, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

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NATA # 1261
Site # 1254 & 14271

Sydney
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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
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NATA # 1261 Site # 20794

Perth
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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 18217

Company Name: Soil & Rock Consultants
Address: Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Project Name: MGC STAGE 1
Project ID: 13065

Order No.:
Report #: 523090
Phone: 0011 64 9 835 1740
Fax: 0011 64 9 835 1847

Received: Nov 10, 2016 2:30 PM
Due: Nov 15, 2016
Priority: 3 Day
Contact Name: Garry Cepe

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X
Sydney Laboratory - NATA Site # 18217								
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 18217								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	MGC1-SV16	Nov 09, 2016		Soil	Z16-No08741	X	X	
2	MGC1-SV17	Nov 09, 2016		Soil	Z16-No08742	X	X	
3	MGC1-SV49	Nov 09, 2016		Soil	Z16-No08743	X	X	
4	MGC1-SV51	Nov 09, 2016		Soil	Z16-No08744	X	X	X
5	MGC1-SV52	Nov 09, 2016		Soil	Z16-No08745	X	X	X
6	MGC1-SV53	Nov 09, 2016		Soil	Z16-No08746	X	X	X
Test Counts						6	6	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	mg/kg	< 0.03			0.03	Pass	
Acenaphthylene	mg/kg	< 0.03			0.03	Pass	
Anthracene	mg/kg	< 0.03			0.03	Pass	
Benz(a)anthracene	mg/kg	< 0.03			0.03	Pass	
Benzo(a)pyrene	mg/kg	< 0.03			0.03	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.03			0.03	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Chrysene	mg/kg	< 0.03			0.03	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.03			0.03	Pass	
Fluoranthene	mg/kg	< 0.03			0.03	Pass	
Fluorene	mg/kg	< 0.03			0.03	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.03			0.03	Pass	
Naphthalene	mg/kg	< 0.1			0.1	Pass	
Phenanthrene	mg/kg	< 0.03			0.03	Pass	
Pyrene	mg/kg	< 0.03			0.03	Pass	
Method Blank							
Metals M8 (NZ MfE)							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	%	108			70-130	Pass	
Acenaphthylene	%	110			70-130	Pass	
Anthracene	%	107			70-130	Pass	
Benz(a)anthracene	%	108			70-130	Pass	
Benzo(a)pyrene	%	107			70-130	Pass	
Benzo(b&j)fluoranthene	%	119			70-130	Pass	
Benzo(g.h.i)perylene	%	111			70-130	Pass	
Benzo(k)fluoranthene	%	105			70-130	Pass	
Chrysene	%	108			70-130	Pass	
Dibenz(a.h)anthracene	%	123			70-130	Pass	
Fluoranthene	%	109			70-130	Pass	
Fluorene	%	106			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	112			70-130	Pass	
Naphthalene	%	106			70-130	Pass	
Phenanthrene	%	110			70-130	Pass	
Pyrene	%	110			70-130	Pass	
LCS - % Recovery							
Metals M8 (NZ MfE)							
Arsenic	%	110			80-120	Pass	
Cadmium	%	110			80-120	Pass	
Chromium	%	111			80-120	Pass	
Copper	%	113			80-120	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead			%	111			80-120	Pass	
Mercury			%	119			75-125	Pass	
Nickel			%	111			80-120	Pass	
Zinc			%	114			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-No08742	CP	%	103			75-125	Pass	
Cadmium	Z16-No08742	CP	%	107			75-125	Pass	
Chromium	Z16-No08742	CP	%	102			75-125	Pass	
Copper	Z16-No08742	CP	%	119			75-125	Pass	
Lead	Z16-No08742	CP	%	101			75-125	Pass	
Mercury	Z16-No08742	CP	%	95			70-130	Pass	
Nickel	Z16-No08742	CP	%	98			75-125	Pass	
Zinc	Z16-No08742	CP	%	99			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Acenaphthene	Z16-No08745	CP	%	82			70-130	Pass	
Acenaphthylene	Z16-No08745	CP	%	84			70-130	Pass	
Anthracene	Z16-No08745	CP	%	85			70-130	Pass	
Benz(a)anthracene	Z16-No08745	CP	%	80			70-130	Pass	
Benzo(a)pyrene	Z16-No08745	CP	%	78			70-130	Pass	
Benzo(b&j)fluoranthene	Z16-No08745	CP	%	84			70-130	Pass	
Benzo(g.h.i)perylene	Z16-No08745	CP	%	85			70-130	Pass	
Benzo(k)fluoranthene	Z16-No08745	CP	%	79			70-130	Pass	
Chrysene	Z16-No08745	CP	%	81			70-130	Pass	
Dibenz(a.h)anthracene	Z16-No08745	CP	%	91			70-130	Pass	
Fluoranthene	Z16-No08745	CP	%	79			70-130	Pass	
Fluorene	Z16-No08745	CP	%	81			70-130	Pass	
Indeno(1.2.3-cd)pyrene	Z16-No08745	CP	%	82			70-130	Pass	
Naphthalene	Z16-No08745	CP	%	85			70-130	Pass	
Phenanthrene	Z16-No08745	CP	%	82			70-130	Pass	
Pyrene	Z16-No08745	CP	%	80			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No08741	CP	mg/kg	15	13	13	30%	Pass	
Cadmium	Z16-No08741	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No08741	CP	mg/kg	28	27	3.0	30%	Pass	
Copper	Z16-No08741	CP	mg/kg	24	23	3.0	30%	Pass	
Lead	Z16-No08741	CP	mg/kg	27	25	7.0	30%	Pass	
Mercury	Z16-No08741	CP	mg/kg	0.4	0.4	3.0	30%	Pass	
Nickel	Z16-No08741	CP	mg/kg	18	17	2.0	30%	Pass	
Zinc	Z16-No08741	CP	mg/kg	61	60	3.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No08742	CP	mg/kg	9.8	61	1.0	30%	Pass	
Cadmium	Z16-No08742	CP	mg/kg	< 0.4	54	<1	30%	Pass	
Chromium	Z16-No08742	CP	mg/kg	33	84	1.0	30%	Pass	
Copper	Z16-No08742	CP	mg/kg	22	82	<1	30%	Pass	
Lead	Z16-No08742	CP	mg/kg	24	75	<1	30%	Pass	
Mercury	Z16-No08742	CP	mg/kg	0.7	0.7	1.0	30%	Pass	
Nickel	Z16-No08742	CP	mg/kg	20	68	2.0	30%	Pass	
Zinc	Z16-No08742	CP	mg/kg	42	91	1.0	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benz(a)anthracene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(a)pyrene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(b&j)fluoranthene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(g.h.i)perylene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(k)fluoranthene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Chrysene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Dibenz(a.h)anthracene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluoranthene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluorene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Naphthalene	Z16-No08744	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Pyrene	Z16-No08744	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z16-No08746	CP	%	21	20	3.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **523983-S**
Project name MGC STAGE 1
Project ID 13065
Received Date Nov 16, 2016

Client Sample ID			**MGC1-SV54**	**MGC1-SV55**	**MGC1-SV56**	**MGC1-SV57**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No14936**	**Z16-No14937**	**Z16-No14938**	**Z16-No14939**
Date Sampled			**Nov 16, 2016**	**Nov 16, 2016**	**Nov 16, 2016**	**Nov 16, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	< 2	190	26	35
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	20	22	18	20
Copper	5	mg/kg	22	23	18	18
Lead	5	mg/kg	19	25	19	19
Mercury	0.1	mg/kg	0.3	0.3	0.3	0.3
Nickel	5	mg/kg	11	11	9.4	9.6
Zinc	5	mg/kg	65	94	69	64
% Moisture	1	%	42	46	41	45

Client Sample ID			**MGC1-SV58**	**MGC1-SV59**	**MGC1-SV60**	**MGC1-SV61**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No14940**	**Z16-No14941**	**Z16-No14942**	**Z16-No14943**
Date Sampled			**Nov 16, 2016**	**Nov 16, 2016**	**Nov 16, 2016**	**Nov 16, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	9.3	12	6.7	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	19	17	15	24
Copper	5	mg/kg	16	20	15	24
Lead	5	mg/kg	19	20	17	24
Mercury	0.1	mg/kg	0.2	0.2	0.2	0.3
Nickel	5	mg/kg	10	8.9	6.7	12
Zinc	5	mg/kg	55	58	41	68
% Moisture	1	%	40	44	31	38

Client Sample ID			**MGC1-SV62**	**MGC1-SV63**	**MGC1-SV64**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-No14944**	**Z16-No14945**	**Z16-No14946**
Date Sampled			**Nov 16, 2016**	**Nov 16, 2016**	**Nov 16, 2016**
Test/Reference	LOR	Unit			
Metals M8 (NZ MfE)					
Arsenic	2	mg/kg	< 2	< 2	5.4
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	27	24	13
Copper	5	mg/kg	24	21	16
Lead	5	mg/kg	17	16	20
Mercury	0.1	mg/kg	0.5	0.4	1.9
Nickel	5	mg/kg	12	13	7.8
Zinc	5	mg/kg	47	63	54
% Moisture	1	%	43	42	32

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8 (NZ MfE)	Melbourne	Nov 18, 2016	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Nov 17, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

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NATA # 1261 Site # 18217

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Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 18217

Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Nov 16, 2016 4:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	523983	**Due:**	Nov 21, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	3 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC STAGE 1				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 18217							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MGC1-SV54	Nov 16, 2016		Soil	Z16-No14936	X	X
2	MGC1-SV55	Nov 16, 2016		Soil	Z16-No14937	X	X
3	MGC1-SV56	Nov 16, 2016		Soil	Z16-No14938	X	X
4	MGC1-SV57	Nov 16, 2016		Soil	Z16-No14939	X	X
5	MGC1-SV58	Nov 16, 2016		Soil	Z16-No14940	X	X
6	MGC1-SV59	Nov 16, 2016		Soil	Z16-No14941	X	X
7	MGC1-SV60	Nov 16, 2016		Soil	Z16-No14942	X	X
8	MGC1-SV61	Nov 16, 2016		Soil	Z16-No14943	X	X
9	MGC1-SV62	Nov 16, 2016		Soil	Z16-No14944	X	X

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Site # 1254 & 14271

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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

Perth
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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 18217

Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Nov 16, 2016 4:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	523983	**Due:**	Nov 21, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	3 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC STAGE 1				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 18217							
10	MGC1-SV63	Nov 16, 2016		Soil	Z16-No14945	X	X
11	MGC1-SV64	Nov 16, 2016		Soil	Z16-No14946	X	X
Test Counts						11	11

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Metals M8 (NZ MfE)									
Arsenic			mg/kg	< 2			2	Pass	
Cadmium			mg/kg	< 0.4			0.4	Pass	
Chromium			mg/kg	< 5			5	Pass	
Copper			mg/kg	< 5			5	Pass	
Lead			mg/kg	< 5			5	Pass	
Mercury			mg/kg	< 0.1			0.1	Pass	
Nickel			mg/kg	< 5			5	Pass	
Zinc			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Metals M8 (NZ MfE)									
Arsenic			%	91			80-120	Pass	
Cadmium			%	102			80-120	Pass	
Chromium			%	104			80-120	Pass	
Copper			%	112			80-120	Pass	
Lead			%	110			80-120	Pass	
Mercury			%	115			75-125	Pass	
Nickel			%	106			80-120	Pass	
Zinc			%	104			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-No14937	CP	%	305			75-125	Fail	Q08
Cadmium	Z16-No14937	CP	%	108			75-125	Pass	
Chromium	Z16-No14937	CP	%	106			75-125	Pass	
Copper	Z16-No14937	CP	%	123			75-125	Pass	
Lead	Z16-No14937	CP	%	103			75-125	Pass	
Mercury	Z16-No14937	CP	%	102			70-130	Pass	
Nickel	Z16-No14937	CP	%	100			75-125	Pass	
Zinc	Z16-No14937	CP	%	96			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No14936	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	Z16-No14936	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No14936	CP	mg/kg	20	21	<1	30%	Pass	
Copper	Z16-No14936	CP	mg/kg	22	22	1.0	30%	Pass	
Lead	Z16-No14936	CP	mg/kg	19	19	2.0	30%	Pass	
Mercury	Z16-No14936	CP	mg/kg	0.3	0.3	5.0	30%	Pass	
Nickel	Z16-No14936	CP	mg/kg	11	11	1.0	30%	Pass	
Zinc	Z16-No14936	CP	mg/kg	65	65	<1	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No14937	CP	mg/kg	190	190	1.0	30%	Pass	
Cadmium	Z16-No14937	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No14937	CP	mg/kg	22	23	2.0	30%	Pass	
Copper	Z16-No14937	CP	mg/kg	23	24	2.0	30%	Pass	
Lead	Z16-No14937	CP	mg/kg	25	25	1.0	30%	Pass	
Mercury	Z16-No14937	CP	mg/kg	0.3	0.4	6.0	30%	Pass	
Nickel	Z16-No14937	CP	mg/kg	11	11	1.0	30%	Pass	
Zinc	Z16-No14937	CP	mg/kg	94	93	1.0	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z16-No14937	CP	%	46	45	3.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-No14946	CP	mg/kg	5.4	6.6	20	30%	Pass	
Cadmium	Z16-No14946	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-No14946	CP	mg/kg	13	13	1.0	30%	Pass	
Copper	Z16-No14946	CP	mg/kg	16	16	4.0	30%	Pass	
Lead	Z16-No14946	CP	mg/kg	20	26	27	30%	Pass	
Mercury	Z16-No14946	CP	mg/kg	1.9	2.1	9.0	30%	Pass	
Nickel	Z16-No14946	CP	mg/kg	7.8	7.3	6.0	30%	Pass	
Zinc	Z16-No14946	CP	mg/kg	54	54	1.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **525792-S**
Project name MGC STAGE 1
Project ID 13065
Received Date Nov 30, 2016

Client Sample ID			**MGC1-SV65**	**MGC1-SV66**	**MGC1-SV67**	**MGC1-SV68**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-De00001**	**Z16-De00002**	**Z16-De00003**	**Z16-De00004**
Date Sampled			**Nov 30, 2016**	**Nov 30, 2016**	**Nov 30, 2016**	**Nov 30, 2016**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	6.2	3.5	4.8	6.5
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	29	22	24	22
Copper	5	mg/kg	18	23	22	31
Lead	5	mg/kg	21	22	25	23
Mercury	0.1	mg/kg	0.3	0.4	0.4	0.3
Nickel	5	mg/kg	16	12	12	12
Zinc	5	mg/kg	30	80	84	83
% Moisture	1	%	35	52	36	32

Client Sample ID			**MGC1-SV69**	**MGC1-SV70**
Sample Matrix			**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-De00005**	**Z16-De00006**
Date Sampled			**Nov 30, 2016**	**Nov 30, 2016**
Test/Reference	LOR	Unit		
Metals M8 (NZ MfE)				
Arsenic	2	mg/kg	47	11
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	21	20
Copper	5	mg/kg	28	20
Lead	5	mg/kg	31	20
Mercury	0.1	mg/kg	0.3	0.3
Nickel	5	mg/kg	11	8.9
Zinc	5	mg/kg	110	73
% Moisture	1	%	38	32

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8 (NZ MfE)	Melbourne	Dec 01, 2016	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Dec 01, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

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2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 18217

Company Name: Soil & Rock Consultants
Address: Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Project Name: MGC STAGE 1
Project ID: 13065

Order No.:
Report #: 525792
Phone: 0011 64 9 835 1740
Fax: 0011 64 9 835 1847

Received: Nov 30, 2016 2:00 PM
Due: Dec 5, 2016
Priority: 3 Day
Contact Name: Garry Cepe

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 18217							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MGC1-SV65	Nov 30, 2016		Soil	Z16-De00001	X	X
2	MGC1-SV66	Nov 30, 2016		Soil	Z16-De00002	X	X
3	MGC1-SV67	Nov 30, 2016		Soil	Z16-De00003	X	X
4	MGC1-SV68	Nov 30, 2016		Soil	Z16-De00004	X	X
5	MGC1-SV69	Nov 30, 2016		Soil	Z16-De00005	X	X
6	MGC1-SV70	Nov 30, 2016		Soil	Z16-De00006	X	X
Test Counts						6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Metals M8 (NZ MfE)									
Arsenic			mg/kg	< 2			2	Pass	
Cadmium			mg/kg	< 0.4			0.4	Pass	
Chromium			mg/kg	< 5			5	Pass	
Copper			mg/kg	< 5			5	Pass	
Lead			mg/kg	< 5			5	Pass	
Nickel			mg/kg	< 5			5	Pass	
Zinc			mg/kg	< 5			5	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-De00002	CP	%	110			75-125	Pass	
Cadmium	Z16-De00002	CP	%	111			75-125	Pass	
Chromium	Z16-De00002	CP	%	108			75-125	Pass	
Lead	Z16-De00002	CP	%	105			75-125	Pass	
Mercury	Z16-De00002	CP	%	119			70-130	Pass	
Nickel	Z16-De00002	CP	%	102			75-125	Pass	
Zinc	Z16-De00002	CP	%	115			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-De00001	CP	mg/kg	6.2	5.2	17	30%	Pass	
Cadmium	Z16-De00001	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-De00001	CP	mg/kg	29	29	<1	30%	Pass	
Copper	Z16-De00001	CP	mg/kg	18	18	1.0	30%	Pass	
Lead	Z16-De00001	CP	mg/kg	21	21	<1	30%	Pass	
Mercury	Z16-De00001	CP	mg/kg	0.3	0.3	8.0	30%	Pass	
Nickel	Z16-De00001	CP	mg/kg	16	16	1.0	30%	Pass	
Zinc	Z16-De00001	CP	mg/kg	30	29	2.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	M16-De00122	NCP	%	14	14	<1	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-De00002	CP	mg/kg	3.5	4.5	25	30%	Pass	
Cadmium	Z16-De00002	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-De00002	CP	mg/kg	22	22	2.0	30%	Pass	
Copper	Z16-De00002	CP	mg/kg	23	23	1.0	30%	Pass	
Lead	Z16-De00002	CP	mg/kg	22	22	2.0	30%	Pass	
Mercury	Z16-De00002	CP	mg/kg	0.4	0.4	1.0	30%	Pass	
Nickel	Z16-De00002	CP	mg/kg	12	12	3.0	30%	Pass	
Zinc	Z16-De00002	CP	mg/kg	80	79	1.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **526670-S**
Project name MGC 1
Project ID 13065
Received Date Dec 07, 2016

Client Sample ID			**MGC1-SV71**	**MGC1-SV72**
Sample Matrix			**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z16-De06661**	**Z16-De06662**
Date Sampled			**Dec 06, 2016**	**Dec 06, 2016**
Test/Reference	LOR	Unit		
Metals M8 (NZ MfE)				
Arsenic	2	mg/kg	< 2	7.5
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	24	15
Copper	5	mg/kg	24	14
Lead	5	mg/kg	20	13
Mercury	0.1	mg/kg	0.3	< 0.1
Nickel	5	mg/kg	12	7.1
Zinc	5	mg/kg	69	47
% Moisture	1	%	38	30

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8 (NZ MfE)	Melbourne	Dec 09, 2016	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Dec 07, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

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Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Dec 7, 2016 3:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	526670	**Due:**	Dec 14, 2016
		Phone:	0011 64 9 835 1740	**Priority:**	5 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC 1				
Project ID:	13065				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 18217							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MGC1-SV71	Dec 06, 2016		Soil	Z16-De06661	X	X
2	MGC1-SV72	Dec 06, 2016		Soil	Z16-De06662	X	X
Test Counts						2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Metals M8 (NZ MfE)									
Arsenic			mg/kg	< 2			2	Pass	
Mercury			mg/kg	< 0.1			0.1	Pass	
LCS - % Recovery									
Metals M8 (NZ MfE)									
Arsenic			%	118			80-120	Pass	
Mercury			%	106			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z16-De06662	CP	%	122			75-125	Pass	
Cadmium	Z16-De06662	CP	%	103			75-125	Pass	
Lead	Z16-De06662	CP	%	115			75-125	Pass	
Mercury	Z16-De06662	CP	%	98			70-130	Pass	
Nickel	Z16-De06662	CP	%	111			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-De06661	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	Z16-De06661	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-De06661	CP	mg/kg	24	24	<1	30%	Pass	
Copper	Z16-De06661	CP	mg/kg	24	24	<1	30%	Pass	
Lead	Z16-De06661	CP	mg/kg	20	20	2.0	30%	Pass	
Mercury	Z16-De06661	CP	mg/kg	0.3	0.3	<1	30%	Pass	
Nickel	Z16-De06661	CP	mg/kg	12	12	1.0	30%	Pass	
Zinc	Z16-De06661	CP	mg/kg	69	70	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z16-De06663	NCP	%	29	29	2.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z16-De06662	CP	mg/kg	7.5	7.3	3.0	30%	Pass	
Cadmium	Z16-De06662	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z16-De06662	CP	mg/kg	15	15	3.0	30%	Pass	
Copper	Z16-De06662	CP	mg/kg	14	14	<1	30%	Pass	
Lead	Z16-De06662	CP	mg/kg	13	13	4.0	30%	Pass	
Mercury	Z16-De06662	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	Z16-De06662	CP	mg/kg	7.1	6.9	3.0	30%	Pass	
Zinc	Z16-De06662	CP	mg/kg	47	47	1.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **534000-S**
Project name MGC 1
Project ID 13065
Received Date Feb 14, 2017

Client Sample ID			**MGC-SV73**	**MGC-SV74**	**MGC-SV75**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Fe12504**	**Z17-Fe12505**	**Z17-Fe12506**
Date Sampled			**Feb 14, 2017**	**Feb 14, 2017**	**Feb 14, 2017**
Test/Reference	LOR	Unit			
Metals M8 (NZ MfE)					
Arsenic	2	mg/kg	< 2	< 2	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	15	25	26
Copper	5	mg/kg	9.4	23	22
Lead	5	mg/kg	13	20	20
Mercury	0.1	mg/kg	0.2	0.4	0.4
Nickel	5	mg/kg	6.3	11	13
Zinc	5	mg/kg	23	61	56
% Moisture	1	%	21	33	31

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8 (NZ MfE)	Melbourne	Feb 15, 2017	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Feb 14, 2017	14 Day
- Method: LTM-GEN-7080 Moisture			

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Site # 18217

Company Name: Soil & Rock Consultants
Address: Level 1, 131 Lincoln Rd Henderson
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Project Name: MGC 1
Project ID: 13065

Order No.:
Report #: 534000
Phone: 0011 64 9 835 1740
Fax: 0011 64 9 835 1847

Received: Feb 14, 2017 2:30 PM
Due: Feb 21, 2017
Priority: 5 Day
Contact Name: Garry Cepe

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 18217							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MGC-SV73	Feb 14, 2017		Soil	Z17-Fe12504	X	X
2	MGC-SV74	Feb 14, 2017		Soil	Z17-Fe12505	X	X
3	MGC-SV75	Feb 14, 2017		Soil	Z17-Fe12506	X	X
Test Counts						3	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Metals M8 (NZ MfE)									
Arsenic			mg/kg	< 2			2	Pass	
Cadmium			mg/kg	< 0.4			0.4	Pass	
Chromium			mg/kg	< 5			5	Pass	
Copper			mg/kg	< 5			5	Pass	
Lead			mg/kg	< 5			5	Pass	
Mercury			mg/kg	< 0.1			0.1	Pass	
Nickel			mg/kg	< 5			5	Pass	
Zinc			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Metals M8 (NZ MfE)									
Arsenic			%	84			80-120	Pass	
Cadmium			%	87			80-120	Pass	
Chromium			%	90			80-120	Pass	
Copper			%	93			80-120	Pass	
Lead			%	89			80-120	Pass	
Mercury			%	116			75-125	Pass	
Nickel			%	87			80-120	Pass	
Zinc			%	90			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z17-Fe11236	NCP	%	99			75-125	Pass	
Cadmium	Z17-Fe11236	NCP	%	114			75-125	Pass	
Chromium	Z17-Fe11236	NCP	%	102			75-125	Pass	
Copper	Z17-Fe11236	NCP	%	119			75-125	Pass	
Lead	Z17-Fe11236	NCP	%	93			75-125	Pass	
Mercury	Z17-Fe11236	NCP	%	104			70-130	Pass	
Nickel	Z17-Fe11236	NCP	%	96			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z17-Fe11235	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	Z17-Fe11235	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z17-Fe11235	NCP	mg/kg	13	14	8.0	30%	Pass	
Copper	Z17-Fe11235	NCP	mg/kg	5.1	5.5	8.0	30%	Pass	
Lead	Z17-Fe11235	NCP	mg/kg	10	10	4.0	30%	Pass	
Mercury	Z17-Fe11236	NCP	mg/kg	0.1	0.1	2.0	30%	Pass	
Nickel	Z17-Fe11235	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	Z17-Fe11235	NCP	mg/kg	9.3	10	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	M17-Fe12414	NCP	%	4.7	4.4	7.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **538138-S**
Project name MGC 1
Project ID 13065
Received Date Mar 16, 2017

Client Sample ID			**MGC1-SV76**	**MGC1-SV77**	**MGC1-SV78**	**MGC1-SV79**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Ma16748**	**Z17-Ma16749**	**Z17-Ma16750**	**Z17-Ma16751**
Date Sampled			**Mar 16, 2017**	**Mar 16, 2017**	**Mar 16, 2017**	**Mar 16, 2017**
Test/Reference	LOR	Unit				
Total Petroleum Hydrocarbons (NZ MfE 1999)						
TPH-SG C10-C14	10	mg/kg	< 10	< 10	< 10	< 10
TPH-SG C15-C36	20	mg/kg	< 20	< 20	< 20	< 20
TPH-SG C7-C36 (Total)	35	mg/kg	< 35	< 35	< 35	< 35
TPH-SG C7-C9	5	mg/kg	< 5	< 5	< 5	< 5
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	0.04	0.04	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08	0.08	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
p-Terphenyl-d14 (surr.)	1	%	54	57	75	52
2-Fluorobiphenyl (surr.)	1	%	65	63	90	66
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	14	6.3	8.7	4.2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	25	26	29	19
Copper	5	mg/kg	18	35	22	27
Lead	5	mg/kg	18	23	21	67
Mercury	0.1	mg/kg	0.2	0.4	0.4	0.2
Nickel	5	mg/kg	22	18	19	16
Zinc	5	mg/kg	37	50	50	82

Client Sample ID			**MGC1-SV76**	**MGC1-SV77**	**MGC1-SV78**	**MGC1-SV79**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Ma16748**	**Z17-Ma16749**	**Z17-Ma16750**	**Z17-Ma16751**
Date Sampled			**Mar 16, 2017**	**Mar 16, 2017**	**Mar 16, 2017**	**Mar 16, 2017**
Test/Reference	LOR	Unit				
% Moisture	1	%	30	33	37	46

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Petroleum Hydrocarbons (NZ MfE 1999)	Melbourne	Mar 17, 2017	14 Day
- Method: LTM-ORG-2010-R5			
Polycyclic Aromatic Hydrocarbons (NZ MfE)	Melbourne	Mar 17, 2017	14 Day
- Method: USEPA 8270 Polycyclic Aromatic Hydrocarbons			
Metals M8 (NZ MfE)	Melbourne	Mar 17, 2017	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Mar 16, 2017	14 Day
- Method: LTM-GEN-7080 Moisture			

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NATA # 1261
Site # 18217

Company Name: Soil & Rock Consultants
Address: Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Project Name: MGC 1
Project ID: 13065

Order No.:
Report #: 538138
Phone: 0011 64 9 835 1740
Fax: 0011 64 9 835 1847

Received: Mar 16, 2017 2:40 PM
Due: Mar 16, 2017
Priority: Same day
Contact Name: Garry Cepe

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Total Petroleum Hydrocarbons (NZ MfE 1999)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X
Sydney Laboratory - NATA Site # 18217									
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 18217									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	MGC1-SV76	Mar 16, 2017		Soil	Z17-Ma16748	X	X	X	X
2	MGC1-SV77	Mar 16, 2017		Soil	Z17-Ma16749	X	X	X	X
3	MGC1-SV78	Mar 16, 2017		Soil	Z17-Ma16750	X	X	X	X
4	MGC1-SV79	Mar 16, 2017		Soil	Z17-Ma16751	X	X	X	X
Test Counts						4	4	4	4

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Petroleum Hydrocarbons (NZ MfE 1999)							
TPH-SG C10-C14	mg/kg	< 10			10	Pass	
TPH-SG C15-C36	mg/kg	< 20			20	Pass	
TPH-SG C7-C9	mg/kg	< 5			5	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	mg/kg	< 0.03			0.03	Pass	
Acenaphthylene	mg/kg	< 0.03			0.03	Pass	
Anthracene	mg/kg	< 0.03			0.03	Pass	
Benz(a)anthracene	mg/kg	< 0.03			0.03	Pass	
Benzo(a)pyrene	mg/kg	< 0.03			0.03	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.03			0.03	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Chrysene	mg/kg	< 0.03			0.03	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.03			0.03	Pass	
Fluoranthene	mg/kg	< 0.03			0.03	Pass	
Fluorene	mg/kg	< 0.03			0.03	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.03			0.03	Pass	
Naphthalene	mg/kg	< 0.1			0.1	Pass	
Phenanthrene	mg/kg	< 0.03			0.03	Pass	
Pyrene	mg/kg	< 0.03			0.03	Pass	
Method Blank							
Metals M8 (NZ MfE)							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	%	82			70-130	Pass	
Acenaphthylene	%	79			70-130	Pass	
Anthracene	%	81			70-130	Pass	
Benz(a)anthracene	%	81			70-130	Pass	
Benzo(a)pyrene	%	80			70-130	Pass	
Benzo(b&j)fluoranthene	%	90			70-130	Pass	
Benzo(g.h.i)perylene	%	84			70-130	Pass	
Benzo(k)fluoranthene	%	74			70-130	Pass	
Chrysene	%	82			70-130	Pass	
Dibenz(a.h)anthracene	%	88			70-130	Pass	
Fluoranthene	%	81			70-130	Pass	
Fluorene	%	81			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	84			70-130	Pass	
Naphthalene	%	83			70-130	Pass	
Phenanthrene	%	84			70-130	Pass	
Pyrene	%	79			70-130	Pass	
LCS - % Recovery							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Metals M8 (NZ MfE)									
Arsenic			%	103			80-120	Pass	
Cadmium			%	106			80-120	Pass	
Chromium			%	108			80-120	Pass	
Copper			%	110			80-120	Pass	
Lead			%	108			80-120	Pass	
Mercury			%	109			75-125	Pass	
Nickel			%	106			80-120	Pass	
Zinc			%	108			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z17-Ma16749	CP	%	95			75-125	Pass	
Cadmium	Z17-Ma16749	CP	%	101			75-125	Pass	
Chromium	Z17-Ma16749	CP	%	99			75-125	Pass	
Copper	Z17-Ma16749	CP	%	116			75-125	Pass	
Lead	Z17-Ma16749	CP	%	96			75-125	Pass	
Mercury	Z17-Ma16749	CP	%	108			70-130	Pass	
Nickel	Z17-Ma16749	CP	%	94			75-125	Pass	
Zinc	Z17-Ma16749	CP	%	102			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z17-Ma16748	CP	mg/kg	14	19	32	30%	Fail	Q15
Cadmium	Z17-Ma16748	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z17-Ma16748	CP	mg/kg	25	27	7.0	30%	Pass	
Copper	Z17-Ma16748	CP	mg/kg	18	21	16	30%	Pass	
Lead	Z17-Ma16748	CP	mg/kg	18	18	3.0	30%	Pass	
Mercury	Z17-Ma16748	CP	mg/kg	0.2	0.2	8.0	30%	Pass	
Nickel	Z17-Ma16748	CP	mg/kg	22	29	25	30%	Pass	
Zinc	Z17-Ma16748	CP	mg/kg	37	38	4.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z17-Ma16749	CP	mg/kg	6.3	4.8	27	30%	Pass	
Cadmium	Z17-Ma16749	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z17-Ma16749	CP	mg/kg	26	27	3.0	30%	Pass	
Copper	Z17-Ma16749	CP	mg/kg	35	37	5.0	30%	Pass	
Lead	Z17-Ma16749	CP	mg/kg	23	24	4.0	30%	Pass	
Mercury	Z17-Ma16749	CP	mg/kg	0.4	0.4	11	30%	Pass	
Nickel	Z17-Ma16749	CP	mg/kg	18	18	3.0	30%	Pass	
Zinc	Z17-Ma16749	CP	mg/kg	50	52	3.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Attention: **Garry Cepe**

Report **538358-S**
Project name MGC 1
Received Date Mar 17, 2017

Client Sample ID **Sample Matrix** **Eurofins | mgt Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**MGC1-SV80** **Soil** **Z17-Ma18458** **Mar 17, 2017**	**MGC1-SV81** **Soil** **Z17-Ma18459** **Mar 17, 2017**
Total Petroleum Hydrocarbons (NZ MfE 1999)				
TPH-SG C10-C14	10	mg/kg	< 10	< 10
TPH-SG C15-C36	20	mg/kg	< 20	< 20
TPH-SG C7-C36 (Total)	35	mg/kg	< 35	< 35
TPH-SG C7-C9	5	mg/kg	< 5	< 5
Polycyclic Aromatic Hydrocarbons (NZ MfE)				
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03
Anthracene	0.03	mg/kg	< 0.03	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.05	< 0.05
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.03	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.03	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	< 0.03
Chrysene	0.03	mg/kg	< 0.03	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	0.03	mg/kg	< 0.03	< 0.03
Fluorene	0.03	mg/kg	< 0.03	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03
Pyrene	0.03	mg/kg	< 0.03	< 0.03
p-Terphenyl-d14 (surr.)	1	%	76	77
2-Fluorobiphenyl (surr.)	1	%	75	71
Metals M8 (NZ MfE)				
Arsenic	2	mg/kg	14	12
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	25	25
Copper	5	mg/kg	26	17
Lead	5	mg/kg	25	18
Mercury	0.1	mg/kg	0.1	0.1
Nickel	5	mg/kg	36	13
Zinc	5	mg/kg	47	46
% Moisture	1	%	27	28

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Petroleum Hydrocarbons (NZ MfE 1999)	Melbourne	Mar 20, 2017	14 Day
- Method: LTM-ORG-2010-R5			
Polycyclic Aromatic Hydrocarbons (NZ MfE)	Melbourne	Mar 20, 2017	14 Day
- Method: USEPA 8270 Polycyclic Aromatic Hydrocarbons			
Metals M8 (NZ MfE)	Melbourne	Mar 20, 2017	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Mar 17, 2017	14 Day
- Method: LTM-GEN-7080 Moisture			

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NATA # 1261 Site # 20794

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NATA # 1261
Site # 18217

Company Name:	Soil & Rock Consultants	**Order No.:**		**Received:**	Mar 17, 2017 3:00 PM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	**Report #:**	538358	**Due:**	Mar 21, 2017
		Phone:	0011 64 9 835 1740	**Priority:**	2 Day
		Fax:	0011 64 9 835 1847	**Contact Name:**	Garry Cepe
Project Name:	MGC 1				

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Moisture Set	Total Petroleum Hydrocarbons (NZ MfE 1999)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X
Sydney Laboratory - NATA Site # 18217									
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 18217									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	MGC1-SV80	Mar 17, 2017		Soil	Z17-Ma18458	X	X	X	X
2	MGC1-SV81	Mar 17, 2017		Soil	Z17-Ma18459	X	X	X	X
Test Counts						2	2	2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Petroleum Hydrocarbons (NZ MfE 1999)							
TPH-SG C10-C14	mg/kg	< 10			10	Pass	
TPH-SG C15-C36	mg/kg	< 20			20	Pass	
TPH-SG C7-C9	mg/kg	< 5			5	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	mg/kg	< 0.03			0.03	Pass	
Acenaphthylene	mg/kg	< 0.03			0.03	Pass	
Anthracene	mg/kg	< 0.03			0.03	Pass	
Benz(a)anthracene	mg/kg	< 0.03			0.03	Pass	
Benzo(a)pyrene	mg/kg	< 0.03			0.03	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.03			0.03	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Chrysene	mg/kg	< 0.03			0.03	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.03			0.03	Pass	
Fluoranthene	mg/kg	< 0.03			0.03	Pass	
Fluorene	mg/kg	< 0.03			0.03	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.03			0.03	Pass	
Naphthalene	mg/kg	< 0.1			0.1	Pass	
Phenanthrene	mg/kg	< 0.03			0.03	Pass	
Pyrene	mg/kg	< 0.03			0.03	Pass	
Method Blank							
Metals M8 (NZ MfE)							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	%	93			70-130	Pass	
Acenaphthylene	%	112			70-130	Pass	
Anthracene	%	103			70-130	Pass	
Benz(a)anthracene	%	129			70-130	Pass	
Benzo(a)pyrene	%	100			70-130	Pass	
Benzo(b&j)fluoranthene	%	113			70-130	Pass	
Benzo(g.h.i)perylene	%	130			70-130	Pass	
Benzo(k)fluoranthene	%	103			70-130	Pass	
Chrysene	%	112			70-130	Pass	
Dibenz(a.h)anthracene	%	124			70-130	Pass	
Fluoranthene	%	121			70-130	Pass	
Fluorene	%	98			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	120			70-130	Pass	
Naphthalene	%	90			70-130	Pass	
Phenanthrene	%	89			70-130	Pass	
Pyrene	%	120			70-130	Pass	
LCS - % Recovery							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Metals M8 (NZ MfE)									
Arsenic			%	101			80-120	Pass	
Cadmium			%	103			80-120	Pass	
Chromium			%	104			80-120	Pass	
Copper			%	105			80-120	Pass	
Lead			%	104			80-120	Pass	
Mercury			%	103			75-125	Pass	
Nickel			%	103			80-120	Pass	
Zinc			%	102			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Acenaphthene	Z17-Ma18217	NCP	%	92			70-130	Pass	
Acenaphthylene	Z17-Ma18217	NCP	%	109			70-130	Pass	
Anthracene	Z17-Ma18217	NCP	%	101			70-130	Pass	
Benz(a)anthracene	Z17-Ma18217	NCP	%	124			70-130	Pass	
Benzo(a)pyrene	Z17-Ma18217	NCP	%	96			70-130	Pass	
Benzo(b&j)fluoranthene	Z17-Ma18217	NCP	%	107			70-130	Pass	
Benzo(g.h.i)perylene	Z17-Ma18217	NCP	%	124			70-130	Pass	
Benzo(k)fluoranthene	Z17-Ma18217	NCP	%	101			70-130	Pass	
Chrysene	Z17-Ma18217	NCP	%	107			70-130	Pass	
Dibenz(a.h)anthracene	Z17-Ma18217	NCP	%	115			70-130	Pass	
Fluoranthene	Z17-Ma18217	NCP	%	118			70-130	Pass	
Fluorene	Z17-Ma18217	NCP	%	95			70-130	Pass	
Indeno(1.2.3-cd)pyrene	Z17-Ma18217	NCP	%	111			70-130	Pass	
Naphthalene	Z17-Ma18217	NCP	%	88			70-130	Pass	
Phenanthrene	Z17-Ma18217	NCP	%	87			70-130	Pass	
Pyrene	Z17-Ma18217	NCP	%	117			70-130	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	Z17-Ma18217	NCP	%	82			75-125	Pass	
Cadmium	Z17-Ma18217	NCP	%	98			75-125	Pass	
Chromium	Z17-Ma18217	NCP	%	97			75-125	Pass	
Copper	Z17-Ma18217	NCP	%	110			75-125	Pass	
Lead	Z17-Ma18217	NCP	%	81			75-125	Pass	
Nickel	Z17-Ma18217	NCP	%	90			75-125	Pass	
Zinc	Z17-Ma18217	NCP	%	94			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benz(a)anthracene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(a)pyrene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(b&j)fluoranthene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(g.h.i)perylene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(k)fluoranthene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Chrysene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Dibenz(a.h)anthracene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluoranthene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluorene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Naphthalene	Z17-Ma18216	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Pyrene	Z17-Ma18216	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	Z17-Ma18216	NCP	mg/kg	14	14	<1	30%	Pass	
Cadmium	Z17-Ma18216	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z17-Ma18216	NCP	mg/kg	5.9	6.8	15	30%	Pass	
Copper	Z17-Ma18216	NCP	mg/kg	24	26	5.0	30%	Pass	
Lead	Z17-Ma18216	NCP	mg/kg	25	26	3.0	30%	Pass	
Nickel	Z17-Ma18216	NCP	mg/kg	5.4	6.0	12	30%	Pass	
Zinc	Z17-Ma18216	NCP	mg/kg	31	34	8.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z17-Ma18463	NCP	%	41	41	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Appendix D

Asbestos/ACM Removal

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSON CONSULTANTS LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING.

NOTES

1. FOR SITE NOTES REFER DRAWING 129698-1-101.

APPROX. LOCATION OF ASBESTOS PIPE

HG
AUCKLAND AIRPORT OFFICE
LEVEL 4, QUAD 5 4 LEONARD ISITT DRIVE
MANUKAU AUCKLAND 2022
T +64 9 966 3388
W www.harrisongrierson.com

REF	REVISIONS	BY	DATE
C01	ISSUED FOR CONSTRUCTION	DCG	30.09.16

PROJECT:

FLETCHER RESIDENTIAL LIMITED
MANUKAU GOLF COURSE - STAGE 1
GREAT SOUTH ROAD, TAKANINI

TITLE:

EXISTING SITE PLAN
WITH AERIAL PHOTO
OVERALL SITE

ORIGINATOR: LCK	DATE: 05.2014	SIGNED:	PLOT BY: DCG
DRAWN: DCG	DATE: 30.09.16	SIGNED:	PLOT DATE: 28.09.16
CHECKED: LCK	DATE: 30.09.16	SIGNED:	SURVEY BY:
APPROVED: JCT	DATE: 30.09.16	SIGNED:	SURVEY DATE:

ISSUE STATUS: ISSUED FOR CONSTRUCTION

PROJECT No: 1050-129698-01	SCALES: 1:1000-A1 1:2000-A3	A1
DRAWING No: 129698-1-100		REV C01

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: WELLINGTON \\WELLINGTON1\JOBS\1050\129698_A_MANUKAU_GOLF\CAD\01-CAD-STAGE-1\129698-1-100.DWG

Charge Out Rates For Asbestos Work

						sumary	discount	cost
COC holder p/hour	$120.00	ziggy	8:00	16:00		7.5	25%	$ 675.00
Labour p/hour	$55.00	2 men	8:00	16:00		15	25%	$ 618.75
Negative air unit per day	$128.00							
Full face powered respirators p/day	$60.00	Power flow replacement filters per set			$ 85.00			
PPE p/man p/day	$60.00		Suits diposable		$ 8.00	3	0%	$ 180.00
PVA Sprayer per day (airless)	$50.00		Gloves		$ 4.00			
PVA Glue per ltr	$11.50		Boot covers		$ 4.00			
Hepa Vacuum per day	$55.00	Hepa vacuum bags each			$6.50			
Black Polythene 250mu per roll	$175.00	Black Polythene 120mu per roll			$ 120.00	2	0%	$ 350.00
Clear polythene 250mu per roll	$192.00	Clear Polythene 80mu per roll			$ 130.00			
Tape PVC p/roll	$6.50					2	0%	$ 13.00
Asbestos Bags each	$5.50					2	0%	$ 11.00
Decontamination chamber portable (per setup)	$395.00							
5 stage Decontamination chamber with showers and filters (per week)	$500.00							
5 stage Decontamination chamber with showers and filters (per day)	$90.00							
Decontamination Trailer (per day)	$250.00							
Decontamination Trailer (per week)	$700.00							
Disposal Asbestos p/ton	$250.00					2.44	20%	$ 488.00
Disposal Contaminated soil p/ton	$70.00							
Bin placement & Removal 8/w	$375.00							
Bin placement & Removal 4/w	$320.00					1	0%	$ 320.00
Air monitors p/day - each	$265.00							
Independent Validation / approx	$400.00							
ALL PRICES EXCLUDE GST								$ 2,655.75

9:09 a.m.28/11/2016

WARD DEMOLITION

ASBESTOS CHARGE SHEET

Rm

Date: 16/11/2016

Site : Golf course Manukau

Description	Quantity	Price
COC holder per hour:- Ziggy Tamati	0800 - 1600	
Negative air unit per day	—	
Labour/per hour:- 2x	0800 - 1600	
PVA Sprayer per day	—	
PVA Glue per litre	—	
Hepa vacuum per day	—	
Hepa Vacuum bags each	—	
PPE per man per day	x6	
Black Polythene roll per roll	x2	
Clear polythene per roll	—	
Tape PVC per roll	x2	
Asbestos Bags each	x2	
Decontamination chamber		
Disposal per ton		
Bin placement & Removal		
ALL PRICES EXCLUDE GST		

Prepared by: Ziggy Tamati

29189

EnviroWaste

Hampton Downs Landfill

Date:	18/11/2016
Customer No:	18223
Customer Name:	Ward Demolition Limited
Vehicle Registration:	WARD21
Time In:	08:13 a.m.
Time Out:	08:54 a.m.
Weighing Docket No:	WES0049047
Purchase Order:	
Weigh Comments:	Manukau Golf Course

Gross	Tare	Units
10.04	7.60	Tonnes

Product	Net	
Asbestos - Building Materials		
	2.44	Tonnes

TAX INVOICE WD5870

G.S.T No: 66-020-215

Ward Demolition Limited
P.O Box12-720
Penrose Auckland
Phone: +64 9 622 3111
Fax: +64 9 634 5128
Email: demo@ward-demolition.co.nz

Date:	28/11/2016
Page:	1
Customer No:	5382
Client Reference:	

Hick Bros Civil Construction Ltd.
PO Box 146
Silverdale
Auckland

Queries on this Job please contact:

Ward Demolition Limited
P.O Box12-720
Penrose Auckland
Telephone: +64 9 622 3111

Job 29189 Manukau Golf Course

	Quantity	Unit Price	Amount
asbestos pipe removal 16/11 costs per charge sheet attached.	1.00	2,655.75	2,655.75

(Payment due on 20th of the month following invoice date. The customer may be liable for all cost recovery and collection fees, which may include interest for late payment at a rate of 2.5% per month)

*******We Value Your Business******

**Ward Demolition Ltd Bank Account Details :
12-3237-0005620-00

Total Excl GST	$2,655.75
GST	$398.36
Total Incl GST	**$3,054.11**

DOWDELL ASSOCIATES LTD
OCCUPATIONAL HEALTH ANALYSTS CONSULTANTS
4 Cain Rd, Penrose, PO Box 112-017 Auckland 1642, Phone (09) 5260-246. Fax (09) 5795-389.

BULK SAMPLE IDENTIFICATION CERTIFICATE

Job Number:	17-034911	Certificate Issue Date:	13/04/2017

Date Samples Received:	12/04/2017
No of Samples:	2
Sampled By:	Client
Obtained:	Submitted by client
Date Analysed:	13/04/2017
Analyst:	Tong Tong Yu
Method:	AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples
Client:	Ward Demolition Ltd
Client Address:	PO Box 12 720, Penrose, Auckland 1642
Client Ref No:	D 25858
Contact:	Randal
Site Address:	Manukau Golf Course, Great South Road

We examined the following sample(s) using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including Dispersion Staining Techniques. The result(s) in this certificate relate(s) to the sample(s) as received.

GLOSSARY

CHRYSOTILE (WHITE ASBESTOS) - CROCIDOLITE (BLUE ASBESTOS) - AMOSITE (BROWN ASBESTOS) - TREMOLITE, ANTHOPHYLLITE & ACTINOLITE (LESS COMMON ASBESTOS FIBRE TYPES) - SMF (SYNTHETIC MINERAL FIBRE)

Where non-asbestos fibres and the product type are listed, this is to help in the interpretation of results and are the opinion of the analyst only. Where the sampling is not conducted by Dowdell & Associates Ltd, the information indicated is that supplied by the client. Dowdell & Associates Ltd cannot be held responsible for sampling errors where the sample is taken by others. In analyzing non-homogeneous Bulk Materials and Soils for the presence of Asbestos, inherent difficulties arise while using the 'standard' Stereomicroscopic / Polarised Light Microscope method in determining differences between those samples considered as containing 'No Asbestos', those containing 'Trace' asbestos and those samples considered as having asbestos present but in very low concentrations. 'Trace' Asbestos is defined in the 'AS 4964 (2004) – Method for the Qualitative Identification of Asbestos in Bulk Materials', which is the most current of methods available for this type of analysis. Dowdell & Associates Ltd, while making every effort to minimise such difficulties, takes no responsibility for the misidentification of such samples and the subsequent actions taken by the client as a result of such analyses.

NOTE: This report must not be altered, or reproduced except in full.

IANZ
ACCREDITED LABORATORY
ACCREDITATION Nº: 586

Analyst:	Name: Tong Tong Yu
Approved By:	KTP: Laura Sands

DOWDELL ASSOCIATES LTD
OCCUPATIONAL HEALTH ANALYSTS CONSULTANTS
4 Cain Rd, Penrose, PO Box 112-017 Auckland 1642, Phone (09) 5260-246. Fax (09) 5795-389.

DOWDELL & ASSOCIATES LTD

17-034911 Results

Laboratory Reference	Sample Ref / Description	Sample size as received	Sample Weight Analysed	Result	Comments
127670	1. Sample A Soil	16g	As Received	No Asbestos detected	Checked by AN
127671	2. Sample B Soil	56g	As Received	No Asbestos detected	Checked by AN

Appendix E

Photo Documentation

Photo Documentation

Remediation Area #02 (28 Oct 2016)

Remediation Area #01 (08 Nov 2016)

Remediation Area #03 (8 Nov 2016)

Photo Documentation

Remediation Area #04 (8 Nov 2016)

Remediation Area #05 (8 Nov 2016)

Remediation Area #06 (8 Nov 2016)

Remediation Area #08 (8 Nov 2016)

Remediation Area #07 (8 Nov 2016)

Remediation Area #09 (8 Nov 2016)

Remediation Area #14 (8 Nov 2016)

Remediation Area #11 (8 Nov 2016)

Remediation Area #15 (8 Nov 2016)

Remediation Area #16 (8 Nov 2016)

Remediation Area #01 (9 Nov 2016)

Photo Documentation

Topsoil Stockpile Area (16 Nov 2016)

Further Sampling, Remediation Area #7 (6 Dec 2016)

Remediation Area #10 (14 Feb 2017)

Remediation Area #13 (16-17 Mar 2017)