Site Validation Report

1 Sutherlands Road & 848 Cashmere Road, Halswell, Christchurch

Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3

Revision 1 - February 2022

QUALITY CONTROL AND CERTIFICATION SHEET

Client: Your Section QP Ltd

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Revisions: R1 –– Minor amendments to report to include planning status and inclusion of a Soil Disposal Location Plan

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APPENDICES

1 Executive Summary

The site involves two adjacent rural lots with street addresses 1 Sutherlands Road and 848 Cashmere Road, Halswell, Christchurch. The site is currently undergoing a subdivision development for residential use and as such has undergone an assessment under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS) is required. It is noted also that Momentum Environmental Ltd is obligated to consider the requirements of Section 10(4) of the Health and Safety at Work (Asbestos) Regulations 2016.

This Site Validation Report is for Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3 only. A separate Site Validation Report will be prepared for the remaining stages following the validation process.

A Preliminary Site Investigation (PSI) was undertaken by Malloch Environmental Ltd (now Momentum Environmental Ltd, MEL) in April 2019 and confirmed the site had been used predominantly for pastoral activities since the earliest available aerial photograph of 1941. A historical shed noted on the aerial photograph from 1941 posed a risk of contamination from the use of lead-based paints. Pre-purchase due diligence XRF screening showed arsenic exceeding the 'residential 10% produce' soil guideline values (SGV) present across the paddock areas. It was recommended that a Detailed Site Investigation (DSI) be undertaken to fully investigate the site.

As recommended by the PSI, Detailed Site Investigations (DSI) were undertaken by MEL. Sampling across the site was performed on 05 and 06 March 2019 and two reports were produced. The first focussed on the anthropogenic contamination risk areas and is dated April 2019. The lead and arsenic contaminated area identified within this report has been remediated and a separate Site Validation Report has been produced, dated April 2020. The second DSI report, dated May 2019, investigated the elevated arsenic within the paddocks of the site with no known anthropogenic source. It identified arsenic levels across the paddocks above the 'residential 10% produce' SGV use of 20mg/kg. Samples exceeding the residential SGV were found mostly across the south-western corner and the north-eastern corner of the site. Several factors indicated that the source of the arsenic was natural and as such there would be a likelihood that the bioavailability of the arsenic to humans would be low. A detailed assessment to determine the relative oral bioavailability (RBA) and derive a Tier 2 Site Specific Soil Guideline Value for the site was undertaken.

The bioavailability assessment showed that the relative oral bioavailability of the arsenic in the soils of the paddocks was low, with the calculated UCL_{95} for percentage bioavailability being 20.5%. This was applied to the derivation equation set out in the MfE Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health, to determine a site-specific soil guideline value (SGV) for the proposed residential use of the site. By applying the reduced bioavailability to the 'soil ingestion' pathway a site-specific soil guideline value of 60mg/kg was generated.

When the site specific SGV was compared with the measured arsenic levels across the paddocks, all but one location, SS66, was below the SGV. Therefore, except for SS66, the paddock areas with no known anthropogenic source were considered suitable for a residential use with no remediation required.

A Remediation Action Plan (RAP) for the balance of the site was not developed at the time as there was not considered to be any need for remediation due to the findings of the DSI. However, remediation was proposed for soils surrounding SS6 and several remediation options were considered, and off-site disposal was determined to be the most practical and cost-effective option for the site.

Prior to the planned remediation occurring, there was short notice of an increase in costs to dispose of soils at Burwood Landfill, and this along with the unknown market response to bioavailability assessments, meant the developer made a decision to remediate a much larger area of the wider site than originally intended.

The proposal was changed to excavate and dispose of soils at Burwood Landfill from large parts of the site where the higher arsenic levels were present, with the goal of having all sites meet the NESCS Soil Contaminant Standard of 20mg/kg. It was not intended to completely remediate only by excavation, but also to utilise mixing of remaining topsoil. Individual lot validation was proposed to occur after completion of each stage.

The construction, remediation and validation process took place over a period of approximately 18 months and consisted of the following steps:

- Excavation of large areas of topsoil with elevated arsenic
- XRF screening to confirm the remaining subsoil layer was clean
- Introduction of engineered fill material from another site
- Validation of the stockpiles of introduced material prior to spreading
- Spreading and compaction of engineered fill material
- Respreading of mixed topsoil
- Individual lot validation sampling

The initial lot validation sample results showed concentrations of arsenic above the 'residential 10% produce' SGV of 20mg/kg in eight samples from six separate lots. The above lots were reworked which involved stripping off the topsoil and sub-base layer, stockpiling each separately, remixing, relaying the material and compacting. Each lot was subsequently re-sampled, with all results showing arsenic concentrations below the 'residential 10% produce' SGV.

Based on the heavy metal results received for Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3, each individual lot within these stages is considered suitable for the proposed residential use with no further remediation required.

The final heavy metal concentrations were above expected background values for one or more analytes in 40 out of 63 lots tested as part of this stage of the site validation process. For the lots containing concentrations of contaminants above expected background levels, any material requiring off-site disposal from within these areas during the construction of the dwelling may not qualify for disposal as cleanfill material, however they can be disposed of at managed fill facilities dependant on those facilities' acceptance criteria. A Soil Disposal Location Plan is attached in **Appendix H,** highlighting potential disposal facilities for each applicable lot.

The NESCS Regulations 5(7) state that land is covered only if it has had or is more than likely to have had an activity or industry described in the Hazardous Activities and Industries List (HAIL) carried out on it. As no actual or potential HAIL activities have been carried out on the site the NESCS does not apply.

2 Objectives of the Investigation

This report has been prepared in general accordance with the Ministry for the Environment's (MfE) "Contaminated Land Management Guidelines No 1: Reporting on Contaminated Sites in New Zealand, revised 2021" (CLMG) and the "New Zealand Guidelines for Assessing and Managing Asbestos in Soils" (NZ GAMAS). This report includes all requirements for a Site Validation Report.

The objectives of this investigation are to:

- Describe project information and any physical and environmental features of the site.
- Summarise any relevant resource consent information, specifically consent condition requirements.
- Summarise previous contaminated land investigations, specifically remedial strategy and objectives of the remediation.
- Summarise remediation/management works undertaken.
- Describe the Site Validation Investigation including testing, sampling and inspections and summarise the results of the testing, sampling and inspections undertaken.
- Describe and attach any documentary evidence, such as waste disposal documentation.
- Provide an assessment of the effectiveness of the remediation against the remediation objectives and provide further recommendations such as long-term management controls.

3 Scope of Work Undertaken

This Site Validation Report is for Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3 only. A separate Site Validation Report will be prepared for the remaining stages following the validation process.

The scope of the work undertaken has included:

- Review of previous investigations undertaken at the site.
- Design and implement the Site Validation Investigation based on the remediation strategy and objectives and the remedial works undertaken.
- On site soil validation sampling and laboratory analysis.
- Analysis of results against applicable soil guidelines values (SGV).
- Preparation of report in accordance with MfE guidelines.

4 Site Identification

The site is located across two addresses, 1 Sutherlands Road and 848 Cashmere Road in Halswell, Christchurch, as shown in **Figure 1** below. The site is legally described as Part Lot 6 DP 2380 and Lot 7 DP 2380 and has a total area of 9.5308 ha.

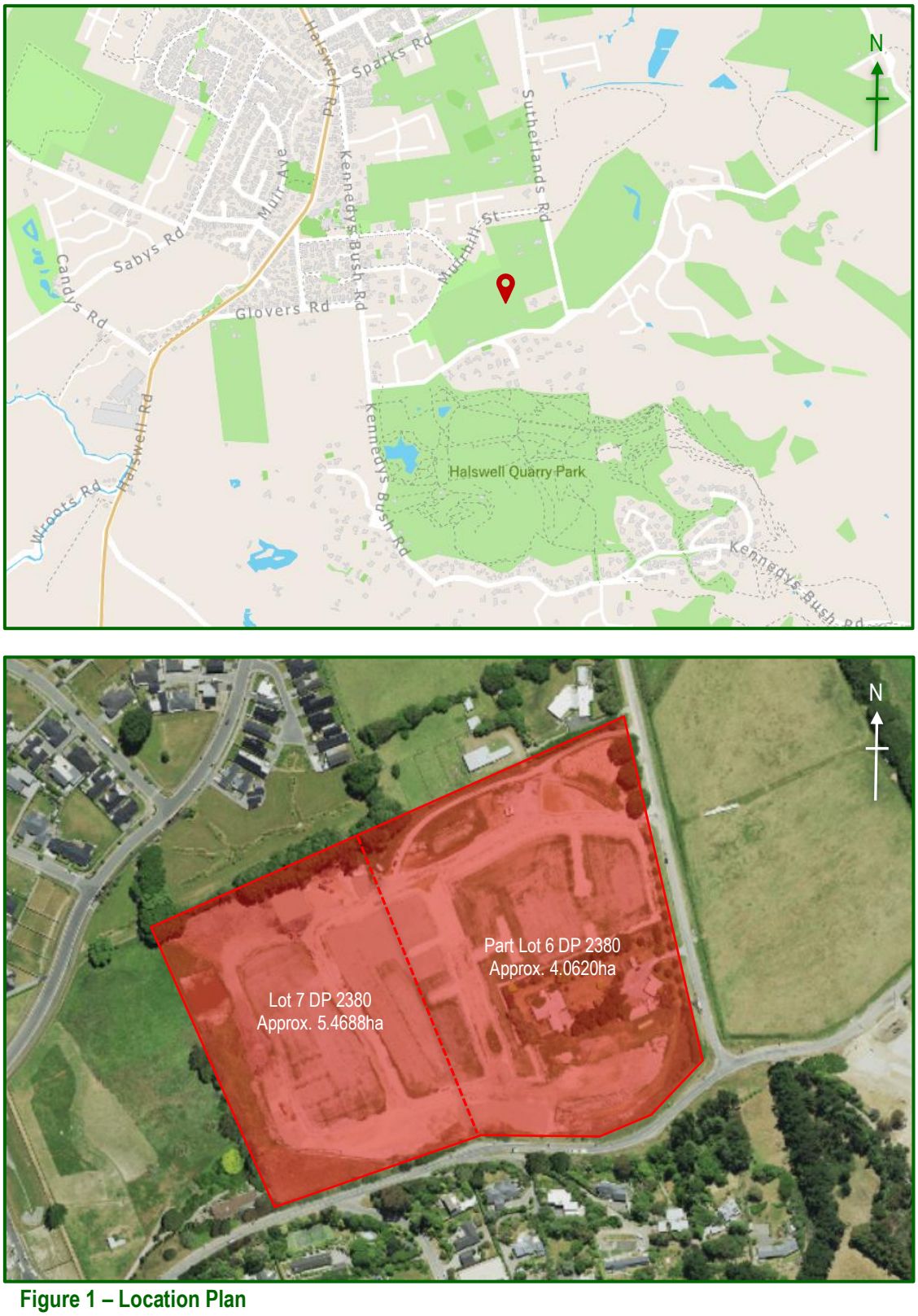


Figure 1 – Location Plan

5 Site Description

5.1 Environmental Setting

Table 1 – Environmental Setting

Topography	The site is generally flat land.
Geology	The ECan GIS database describes the soils at the site as a combination of the Taitapu deep silt, the Timaru shallow silt, the Timaru moderately deep silt and the Dukes deep silt. The published geology beneath most of the site is described by Forsyth et al (2008) as part of the Lyttelton volcanic group with basaltic to trachytic lava flows interbedded with breccia and tuff. The north-west corner is shown as being grey river alluvium beneath plains or low-level terraces on the north of the site. Nearby borelogs indicate that topsoils are underlain by layers of sandy silts and sandy gravels with some sand shown in some borelogs.
Soil Trace Elements	According to the ECan GIS database, natural concentrations of trace elements for the northern portion of the site are those of the 'Regional, Gley' soil group and 'Regional, Yellow Grey Earth' in the southern portion of the site.
Groundwater	The site lies over the coastal confined gravel aquifer system. Groundwater levels recorded on nearby bore logs are between 0.70m and 1.38m deep. The direction of groundwater flow is generally in a south-easterly direction.
Surface Water	Open drains run along the Sutherlands Road boundary of the site, between the two properties and along the northern boundary of 848 Cashmere Road. Cashmere Stream lies approximately 540m to the north of the site.

5.2 Site Layout and Current Site Uses

The majority of the site is currently undergoing earthworks as part of a residential subdivision. A dwelling and sheds are located on 1 Sutherlands Road and will be demolished in the final stages of the development. Prior to development the site was rural residential land. 848 Cashmere Road was in pasture and a shed was located in the south-eastern corner of the lot.

5.3 Surrounding Land Uses

The site is bound to the west, north and east by similar rural residential properties and to the south by residential properties. The Halswell shopping centre lies approximately 1.5km to the north-west of the site.

5.4 Geotechnical Investigations

At the time of writing no geotechnical investigations were available.

6 Proposed Site Use

The site is to be developed for higher density residential use. This will involve subdivision, change of use of the land, soil disturbance and disposal of soils off-site.

The subdivision has been divided into 16 separate stages, totalling 141 residential lots ranging in size from 359-958m². This Site Validation Report is for Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3 only.

A Subdivision Plan is attached in **Appendix A**.

7 Summary of Previous Investigations

7.1 Preliminary Site Investigation

Malloch Environmental Ltd (now Momentum Environmental Ltd, MEL) undertook a Preliminary Site Investigation (PSI) for the site in April 2019. It found the site had been used predominantly for pastoral activities since the earliest aerial photograph of 1941. Anecdotal history indicated the site was likely used for mainly cattle rearing and dairy prior to that, since the late 1800's. In more recent years the site has been used as a horse training facility.

A possible shed was noted in the middle of the site on the 1941 aerial but was removed by 1955. This posed a risk of contamination from lead-based paints. Knowledge of nearby site investigations identified a potential risk of naturally elevated arsenic being present. Pre-purchase due diligence XRF screening showed arsenic exceeding the residential soil guideline values was present across the paddock areas.

The PSI recommended that a Detailed Site Investigation, in terms of the Ministry for the Environments Contaminated Land Management Guidelines, be undertaken prior to any change of use or development.

7.2 Detailed Site Investigations

As recommended by the PSI, Detailed Site Investigations (DSI) were undertaken by MEL. Sampling across the site was performed on 05 and 06 March 2019 and two reports were produced:

- 'Detailed Site Investigation Report & Remediation Action Plan – Potential Anthropogenic Contamination Risk Areas - 1 Sutherlands Road & 848 Cashmere Road, Halswell, Christchurch', dated April 2019.
- 'Detailed Site Investigation Report – Paddocks, & Remediation Action Plan - 1 Sutherlands Road & 848 Cashmere Road, Halswell, Christchurch', dated May 2019.

The 'Anthropogenic Risk Areas' report detailed the investigations into an area of soil contamination likely associated with a historical burn pile and around the location of the historical shed noted on the 1941 aerial. Lead and arsenic contamination was identified adjacent to an existing shed located in the south-eastern corner of 848 Cashmere Road. It was recommended that this portion of the site be remediated by excavation and disposal of the contaminated soils to an approved facility. This area was successfully remediated, and a Site Validation Report issued in April 2020. No contamination was found in the location of the historical shed.

The 'Paddocks' report detailed the investigations into the balance of the site. Elevated arsenic levels were found to be above the 'residential 10% produce' soil guideline value (SGV) of 20mg/kg in approximately one third of the sample locations. Upon review of the desktop information, several factors indicated that the source of the arsenic may be natural and if that was the case there was every chance that the bioavailability of the arsenic to humans would be low. A detailed assessment to determine the relative oral bioavailability (RBA) and derive a Tier 2 Site Specific Soil Guideline Value for the site was undertaken.

A detailed bioavailability assessment was carried out by MEL as an adjunct report titled 'Arsenic Bioavailability Assessment and Derivation of Site Specific SGV'. The bioavailability assessment showed that the relative oral bioavailability of the arsenic in the soils of the paddocks was low, with the calculated UCL_{95} for percentage bioavailability being 20.5%. This was applied to the derivation equation set out in the MfE Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health, to determine a site-specific SGV for the proposed residential use of the site. By applying the reduced bioavailability to the 'soil ingestion' pathway a site-specific soil guideline value of 60mg/kg was generated.

When the site specific SGV was compared with the measured arsenic levels across the paddocks, all but one location, sample location SS66, was below the SGV. Therefore, except for SS66, the paddock areas with no known anthropogenic source were considered suitable for a residential use with no remediation required. It was noted that if any soils were to be removed from site, that the soils would not qualify for disposal at a clean fill facility and would need to be disposed of at Burwood Landfill.

For soils surrounding sample SS66, remediation would be required following delineation sampling. Viable remediation options discussed included mixing and diluting the soils, relocating the affected soils to a reserve area of the site or excavation and disposal to Burwood Landfill.

A copy of the DSI Sample Location Plan from the 'Paddocks' report is included in **Appendix B.** A full copy of the above-mentioned reports can be provided upon request.

8 Remediation

8.1 Soil Guideline Values

Human health soil contaminant standards for a group of 12 priority contaminants were derived under a set of five land-use scenarios and are legally binding under The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Health) Regulations 2011 (NESCS). These standards have been applied where applicable. The regulations describe these as Soil Contaminant Standards. For contaminants other than the 12 priority contaminants, the hierarchy as set out in the Ministry for the Environment Contaminated Land Management Guidelines No 2 has been followed. These are generally described as Soil Guideline Values. For simplicity, this report uses the terminology Soil Guideline Values (SGV) when referring to the appropriate soil contaminant standard or other derived value from the hierarchy. For soil, guideline values are predominantly risk based, in that they are typically derived using designated exposure scenarios that relate to different land uses. For each exposure scenario, selected pathways of exposure are used to derive guideline values. These pathways typically include soil ingestion, inhalation and dermal adsorption. The guideline values for the appropriate land use scenario relate to the most critical pathway.

The land-use scenarios applicable for this site are 'residential 10% produce' and 'commercial/industrial' as a proxy for construction workers disturbing soils.

The adopted trigger value used to determine need for assessment of ecological receptors, also referred to as Ecological Guideline Values (EGVs) is the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (online) – Sediment GV-high (ANZWQ).

Although the site consists of a combination of soils from the 'Regional, Gley' and 'Regional, Yellow Grey Earth' soil groups, heavy metal concentrations are also to be assessed against the expected background levels for 'Regional, Recent' soils as published in Background Concentrations in Canterbury Soils,

Tonkin and Taylor, July 2007. These background levels are considered most relevant since at this validation stage, whether or not the results exceed background levels impacts whether the remaining soils can be considered suitable for cleanfill disposal and does not impact the risk to human health/the environment or resource consent requirements. For cleanfill disposal, most facilities will accept soils up to 'Regional, Recent' levels.

8.2 Quality Assurance and Quality Control

Field quality assurance measures as described in Section 4.3.1 of the "Contaminated Land Management Guidelines No 5: Site Investigation and Analysis of Soils, revised 2021" (CLMG) are to be followed. These include using trained staff, choosing appropriate sample containers, accurate and individual labelling and recording of locations, completing appropriate laboratory chain of custody forms, chilling of samples as appropriate and timely delivery to laboratories. All non-disposable sampling equipment should be decontaminated between samples using Decon 90 and rinsed with tap water. All samples are to be submitted to IANZ accredited laboratories. Quality control to ensure freedom from sample cross-contamination is to be measured by the appropriate use of duplicate and rinsate blank samples.

8.3 Initial Proposed Remediation Action Plan

A Remediation Action Plan (RAP) for the balance of the site was not developed at the time of the DSI report as the findings of the DSI indicated there was no need for remediation. However, remediation was proposed for soils surrounding SS66 and several remediation options were considered. These included leaving the soils in-situ, soil mixing, relocating the soils to an alternative location on-site and off-site disposal. Off-site disposal was determined to be the most practical and cost-effective option for the site.

The remediation goals were to:

- Ensure that the soils remaining in the remediated areas have arsenic levels below the 'residential 10% produce' SGV of 20 mg/kg.
- Ensure that any contaminated soils removed off-site was disposed of to an approved facility.

The affected area was not fully delineated at the time, however given the results of adjacent samples it was unlikely to exceed 3,500m^2. It was also considered likely that the contamination was restricted to the top 300mm layer of soil. Soil validation samples were to be taken following remediation of the contaminated area.

The remainder of the site was considered to be suitable for residential use without remediation based on the bioavailability assessment which derived a site specific SGV of 60mg/kg.

8.4 Revised Remediation Action Plan

Prior to the planned remediation occurring, there was short notice of an increase in costs to dispose of soils at Burwood Landfill, and this along with the unknown market response to bioavailability assessments, meant the developer made a decision to remediate a much larger area of the wider site than originally intended.

The proposal was changed to excavate and dispose of soils at Burwood Landfill from large parts of the site where the higher arsenic levels were present. It was not intended to completely remediate only by excavation, but also to utilise mixing of remaining soils. Following removal of the worst affected soils, the normal subdivision earthworks process would take place. This would involve stripping back all

remaining topsoil, introducing clean silts for engineering fill, shaping of sections and finally respreading topsoil. It was expected that the stripping, stockpiling and relaying of the topsoil would sufficiently mix to ensure arsenic levels would comply with the NESCS soil contaminant standard of 20mg/kg.

See Revised Remediation Plan Attached in **Appendix B** showing the wider areas to be excavated.

The validation process for the revised remediation measures was to include:

- Use of XRF as a screening tool to indicate that the appropriate depth of material had been excavated.
- Testing as required of any introduced fill material to the site.
- Final validation of all residential lots when finished, involving a single test per lot at surface and 250-300mm depth, for 7 heavy metals.

8.5 Summary of Remedial Works

The development of the site took place in stages, over a number of months, with many delays due to weather and availability of resources. As planned, soils with higher arsenic levels were excavated down to the subsoil layer which was at a depth of approximately 300mm, with a deeper cut at the edge of the slope within the southern portion of the site. Throughout the process, XRF screening was carried out to show that the soils with elevated arsenic had been removed successfully. The subsoil layer was easily visually identified and the XRF screening showed that the subsoil layer had arsenic concentrations generally below 10mg/kg. This was consistent with the lab results of the subsoil layer during the DSI investigation stage.

The remediation of the shed area occurred at the same time as the remediation for the balance of the site. Lead was also a contaminant of concern in this area and was also completely removed by the excavation to the subsoil layer. Waste disposal dockets for Burwood Landfill are attached in **Appendix C** and include soils removed from all remediation areas.

9 Summary of Site Validation Investigation

9.1 Imported Fill Validation Investigation

Following removal of contaminated soils, and stripping back of remining topsoil, it was necessary to import fill onto the bulk of the site to use as sub-base material and raise the final finished site levels. The client imported a significant volume of fill material from a separate site on Central Avenue in Prebbleton. Limited investigation of some parts of the Central Avenue site have previously been carried out by Malloch Environmental Ltd (now Momentum Environmental Ltd, MEL) in relation to soil contamination due to uncontrolled filling and historical railway yards. Subsequent remediation at that site has occurred. Those investigations indicated that the subsoil layer of material from the wider Central Avenue site was likely to be clean material.

In order to confirm that this was the case, the imported fill material from Central Avenue in Prebbleton, was stockpiled on the subject site prior to respreading and testing was undertaken. Due to the size of the stockpile, testing of the material was undertaken on two occasions. Initially in-field composite samples were taken from the material that was accessible, this was generally material on the outsides of the stockpile. As the excavator dug away at the stockpile more sampling was undertaken in the centre of the material. There was no visual evidence of contamination identified during sampling of the stockpile.

9.2 Lot Validation Investigation

As the development progressed in stages MEL staff attended site on several occasions over a period of approximately 18 months. Samples were collected from the surface soils which represented the mixed topsoil material and from approximately 300-400mm depth which represented the interface between the topsoil and the sub-base layer, which included imported sub-base material from Central Avenue in Prebbleton. On most occasions there was a clear colour change between the topsoil and sub-base layer and this occurred at varying depths between 200-500mm below ground level.

Table 3 below summarises the relevant information regarding the lot validation investigation undertaken for Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3. A Lot Sample Location Plan is attached in **Appendix D**.

Table 3 – Lot Validation Investigation

Date	Location of Samples	Sampling Undertaken	Comments
30/07/2020	• Stage 2; Lot 19-20	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Due to wet weather sampling had been delayed several weeks until the water had subsided. • Soils on site consisted of topsoils underlain by a sandy silt, with some minor gravels present. • Refer to **Photo 1** below.
15/10/2020	• Stage 1; Lot 6-13 • Stage 2; Lot 14-18 • Stage 2; Lot 65-68 • Stage 2; Lot 81-88 • Stage 2; Lot 21-22 • Stage 3; Lot 78-80 • Stage 3; Lot 23-26	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Soils on the site consisted of topsoils underlain by compact silt, sand and some minor gravels. • Refer to **Photo 2** and **Photo 3** below.
29/10/2020	• Stage 1; Lot 1-5 • Stage 1; Lot 43-46	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Soils on the site consisted of topsoils underlain by compact silt, sand and some minor gravels.
10/06/2021	• Stage 1; Lot 46-47 • Stage 1B; Lot 137-141 • Stage 3; Lot 25 following reworking • Stage 3; Lot 56-57	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Soils on the site consisted of topsoils underlain by compact silt, sand and some minor gravels.

30/11/2021	• Stage1A; Lot 132-136 • Stage 1B; Lot 139 following reworking • Stage 2A; Lot 124-129	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Soils on the site consisted of topsoils underlain by compact silt, sand and some minor gravels. • Refer to **Photo 4** and **Photo 5**.
20/01/2022	• Lot 132-136 following reworking • Lot 124-126 following reworking	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Soils on the site consisted of topsoils underlain by compact silt, sand and some minor gravels. • Refer to **Photo 6** and **Photo 7**.

Photo 1 – 30/07/2020; Lot 19 looking north

Photo 2 – 15/10/2020; Lot 65 looking south

Photo 3 – 15/10/2020; topsoil and sub-base layer

Photo 4 – 30/11/2021; wider site

Photo 5 – 30/11/2021; wider site

Photo 6 – Lots 132-136 following reworking

Photo 7 – 20/01/2022; wider site

9.3 Evaluation of Results

The stockpile validation sample results showed all heavy metals concentrations below the 'residential 10% produce' soil guideline value (SGV). The majority of sample results were also below expected background values, except for samples SP7 and SP8 which contained chromium, copper and nickel concentrations above expected background values. Nickel also exceeded the ecological guideline value in these samples. As this material was mixed during respreading on site as the subsurface layer and was subsequently retested as part of the lot validation works this is not considered to pose a risk to the environment. The initial validation sample results showed concentrations of arsenic above the 'residential 10% produce' of 20mg/kg in the following locations, as shown in **Table 4** below:

Table 4 – Summary of Exceedances

Stage	Lot	Depth	Arsenic Result
Stage 1A	Lot 136	250mm	22.5mg/kg
Stage 1B	Lot 139	0-50mm	24.7mg/kg
Stage 1B	Lot 139	250mm	22mg/kg
Stage 2A	Lot 124	0-50mm	21.5mg/kg
Stage 2A	Lot 124	250mm	22.3mg/kg
Stage 2A	Lot 125	250mm	47.3mg/kg
Stage 2A	Lot 126	0-50mm	21.6mg/kg
Stage 3	Lot 25	300mm	24.7mg/kg

The above lots were reworked which involved stripping off the topsoil and sub-base layer, stockpiling each separately, remixing, relaying the material and compacting. Each lot was subsequently re-sampled, with all results showing arsenic concentrations below the 'residential 10% produce' SGV.

Three lots contained concentrations of arsenic marginally above the 'residential 10% produce' SGV however when taking into account the laboratory uncertainty of measurement these results are considered to be at the guideline value. The three lots include Lot 140 at a depth of 150mm, Lot 127 at a depth of 250mm and Lot 124 at a depth of 0-50mm. The arsenic concentrations at these locations are 20.2mg/kg, 20.7mg/kg and 20.2mg/kg respectively. Excluding the initial arsenic exceedances, the arsenic concentrations across the 63 lots reported in this SVR ranged from 3.7-20.7mg/kg.

There were no other exceedances of the 'residential 10% produce' SGV.

The final heavy metal concentrations were above expected background values for one or more analytes in 40 out of 63 lots.

A Table of Laboratory Stockpile Validation Results is included in **Appendix E,** a Table of Laboratory Lot Validation Results is included in **Appendix F** and Laboratory Reports are attached in **Appendix G**.

9.4 Results of Field & Laboratory Quality Assurance and Quality Control

No quality control issues were identified during sampling. All laboratory tested samples were submitted to Analytica Laboratories in Christchurch and Hamilton for analysis. Analytica holds IANZ accreditation. As part of holding accreditation the laboratory follows appropriate testing and quality control procedures. No quality control issues were identified.

10 Summary of Resource Consent and Conditions

Resource consents (RMA/2019/1733 and RMA/2020/47) were obtained from Christchurch City Council for the residential subdivision, general earthworks and remediation of contaminated soils. The resource consent contained several conditions relating to the testing of stockpiled material sourced from Prebbleton, remediation of contaminated soils if identified and remediation of soils around SS66, disposal of soil to an approved disposal facility and disposal documents to be included in a Site Validation Report which shall be submitted to Christchurch City Council following completion of the remediation process.

In order to comply with condition 19.1 of RMA/2019/1733, a letter dated 29 October 2020 was sent to Christchurch City Council outlining the results of the stockpile sampling.

In order to comply with condition 19.6 and 19.7, remediation of soils surrounding sample location SS66 was undertaken in conjunction with the wider remediation. Therefore, exact disposal volumes in relation to this specific area cannot be provided. Waste disposal dockets for Burwood Landfill are attached in **Appendix C** and include soils removed from the entire site. In terms of soil validation sampling, lot samples from Stage 1A and Stage 1B are in the general location of sample location SS66 and are considered to be suitable for use as validation samples. Heavy metal concentrations across these two stages are below the 'residential 10% produce' SGV.

This Site Validation Report has been prepared in general accordance with the "Contaminated Land Management Guidelines No 1: Reporting on Contaminated Sites in New Zealand, revised 2021" and is considered to have met the remaining conditions of consent.

A second Site Validation Report will be produced for Stage 1C, Stage 4, Stage 5, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9 and Stage 10 following completion of earthworks and sampling.

11 Planning Status

The NESCS Regulations 5(7) state that land is covered only if it has had or is more than likely to have had an activity or industry described in the Hazardous Activities and Industries List (HAIL) carried out on it. As no actual or potential HAIL activities have been carried out on the site the NESCS does not apply.

12 Conclusion

Momentum Environmental Ltd attended site on several occasions over approximately 18 months to undertake XRF testing of the remediated soils, stockpile testing and final lot validation.

The final heavy metal concentrations for each individual lot for Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3 showed concentrations of contaminants below the 'residential 10% produce' SGV. Therefore, these stages are considered suitable for the proposed residential use with no further remediation required.

Heavy metal concentrations were above expected background values for one or more analytes in 40 out of 63 lots. While the concentrations in these 40 lots may be above expected background levels, they are below the 'residential 10% produce' SGV and are suitable for residential use. For the lots containing concentrations of contaminants above expected background levels, any material requiring off-site disposal from within these areas during the construction of the dwelling may not qualify for disposal as clean fill material, however they can be disposed of at managed fill facilities dependant on those facilities' acceptance criteria. A Soil Disposal Location Plan is attached in **Appendix H,** highlighting potential disposal facilities for each applicable lot.

13 Limitations

Momentum Environmental Limited has performed services for this project in accordance with current professional standards for environmental site assessments, and in terms of the client's financial and technical brief for the work. Any reliance on this report by other parties shall be at such party's own risk. It does not purport to completely describe all the site characteristics and properties. Where data is supplied by the client or any third party, it has been assumed that the information is correct, unless otherwise stated. Momentum Environmental Limited accepts no responsibility for errors or omissions in the information provided. Should further information become available regarding the conditions at the site, Momentum Environmental Limited reserves the right to review the report in the context of the additional information.

Opinions and judgments expressed in this report are based on an understanding and interpretation of regulatory standards at the time of writing and should not be construed as legal opinions. As regulatory standards are constantly changing, conclusions and recommendations considered to be acceptable at the time of writing, may in the future become subject to different regulatory standards which cause them to become unacceptable. This may require further assessment and/or remediation of the site to be suitable for the existing or proposed land use activities. There is no investigation that is thorough enough to preclude the presence of materials at the site that presently or in the future may be considered hazardous.

Appendix A – Subdivision Plan

AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION
R1	16.4.19	LAYOUT UPDATED
R2	09.5.19	LAYOUT UPDATED
R3	15.5.19	LAYOUT UPDATED
R4	23.7.19	LAYOUT UPDATED
R5	29.8.19	LAYOUT UPDATED STAGE 1B
R6	03.9.19	LAYOUT UPDATED NORTHERN BOUNDARY
R7	13.2.20	STAGING UPDATED,LOTS 58, 59, 116-121,139-140 & 227 AMENDED, 201, 207 & 208 ADDED, 228 REM, LOTS 61-63 & 113-116 AMENDED
R8	06.8.20	LOT 207 SPLIT INTO LOTS 207A & 207B.
R9	08.9.20	SW EASEMENT AMENDED

NOTES :

1. Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
2. Service easements to be created as required.
3. This plan has been prepared for consent purposes only. No liability is accepted if the plan is used for any other purposes.
4. Road details are indicative only.
5. The Stormwater Easement, along the northern boundary of Lots 114-129, 131-136, 138 & 139 is indicative only, width is subject to survey and is to be measured at 4m from the south bank of the waterway, measured at the waterline.

AMALGAMATION CONDITIONS

That Lot 224 hereon (Access Lot) be held as to 5 undivided one fifth shares by the owners of Lots 4-8.

That Lot 225 hereon (Access Lot) be held as to 4 undivided one fourth shares by the owners of Lots 17-20 .

That Lot 226 hereon (Access Lot) be held as to 5 undivided one fifth shares by the owners of Lots 38-42.

That Lot 227 hereon (Access Lot) be held as to 4 undivided one fourth shares by the owners of Lots 32-35.

SCHEDULE OF AREAS

Description	Area
Residential Lots - (Lots 1 -141) Nett area	7.1854ha
Right of Ways and Access	489m²
Access Lots - (Lots 224, 225, 226 & 227)	1388m²
Road to vest in CCC (Lots 202-205, 208 & 210-221)	2.0716ha
Recreation Reserve to vest in CCC (Lot 201)	327m²
Local purpose (Utility)Reserve to vest in CCC (Lots 206 & 231)	403m²
Local Purpose (Pedestrian) Reserve to vest in CCC (Lot 232)	86m²

Total Area : 9.5263ha (RT 9.5308ha)

Comprised in: RT's CB11K/1284 & CB7D/169

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING
116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:

Quarry Paddocks Sutherlands Road

SHEET TITLE:

Proposed Subdivision of Lot 7 & Pt Lot 6 DP 2380

DRAWING STATUS

Application for Subdivision Consent

SCALE : 1:750@A1 1:1500@A3

DATE : September 2020

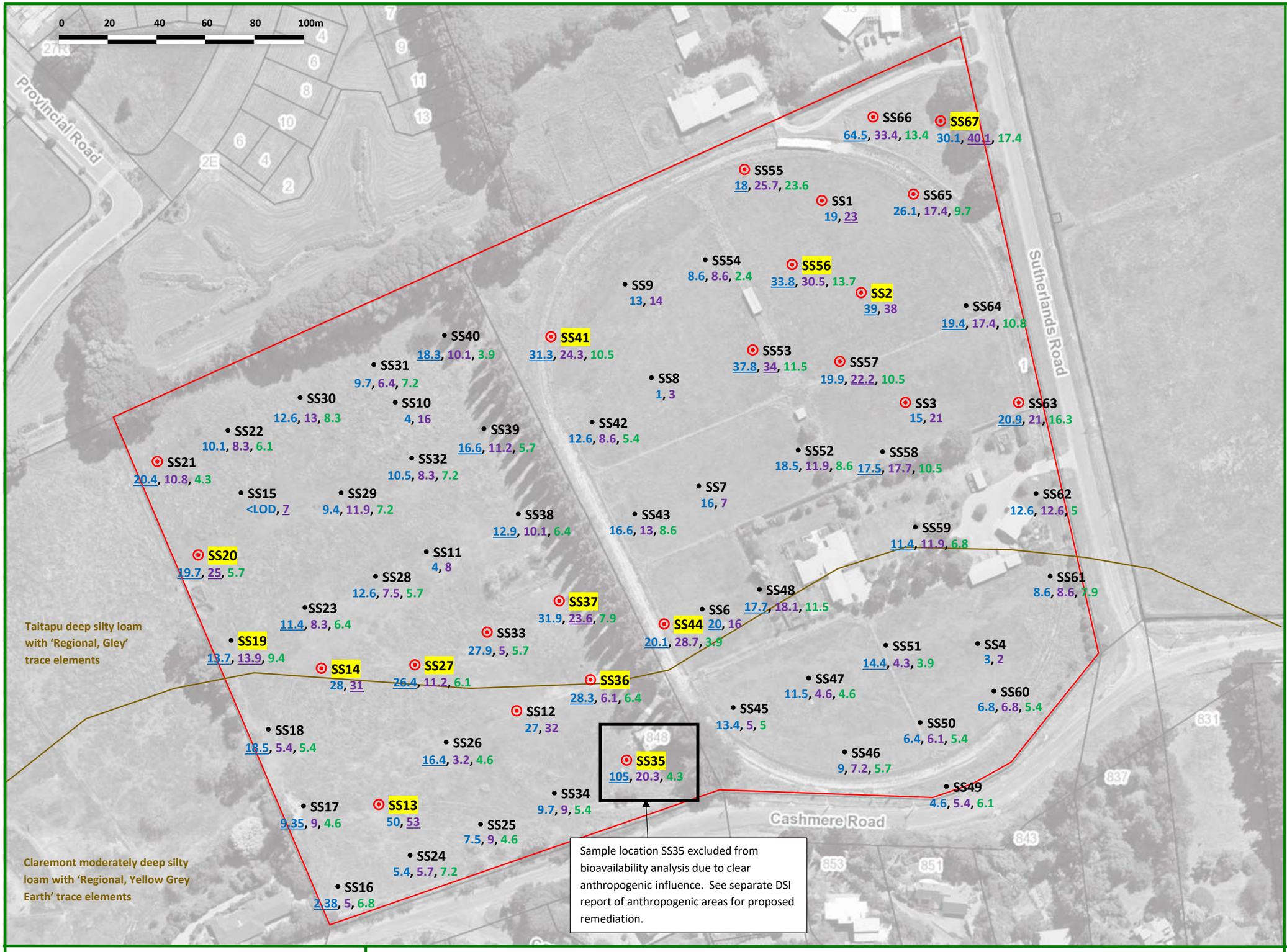
CAD FILE : J:\19812\C\19812 Concept_R9.dwg

REVISION : R9

DRAWING No : C.19812

SHEET No: 1 OF 1

Appendix B – DSI Sample Location Plan



Notes:

1. This plan has been prepared for soil contamination risk assessment purposes only. No liability is accepted if the plan is used for any other purposes.
2. Any measurements taken from this plan which are not dimensioned on the electronic copy are at the risk of the user.
3. Soil sample locations are approximate only.
4. XRF result derived by averaging the readings at each sample location and depth then applying the regression equation.
5. For locations with a laboratory duplicate the highest result is shown.

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
RD1, Christchurch 7671
021 132 0321
www.mallochenviro.co.nz

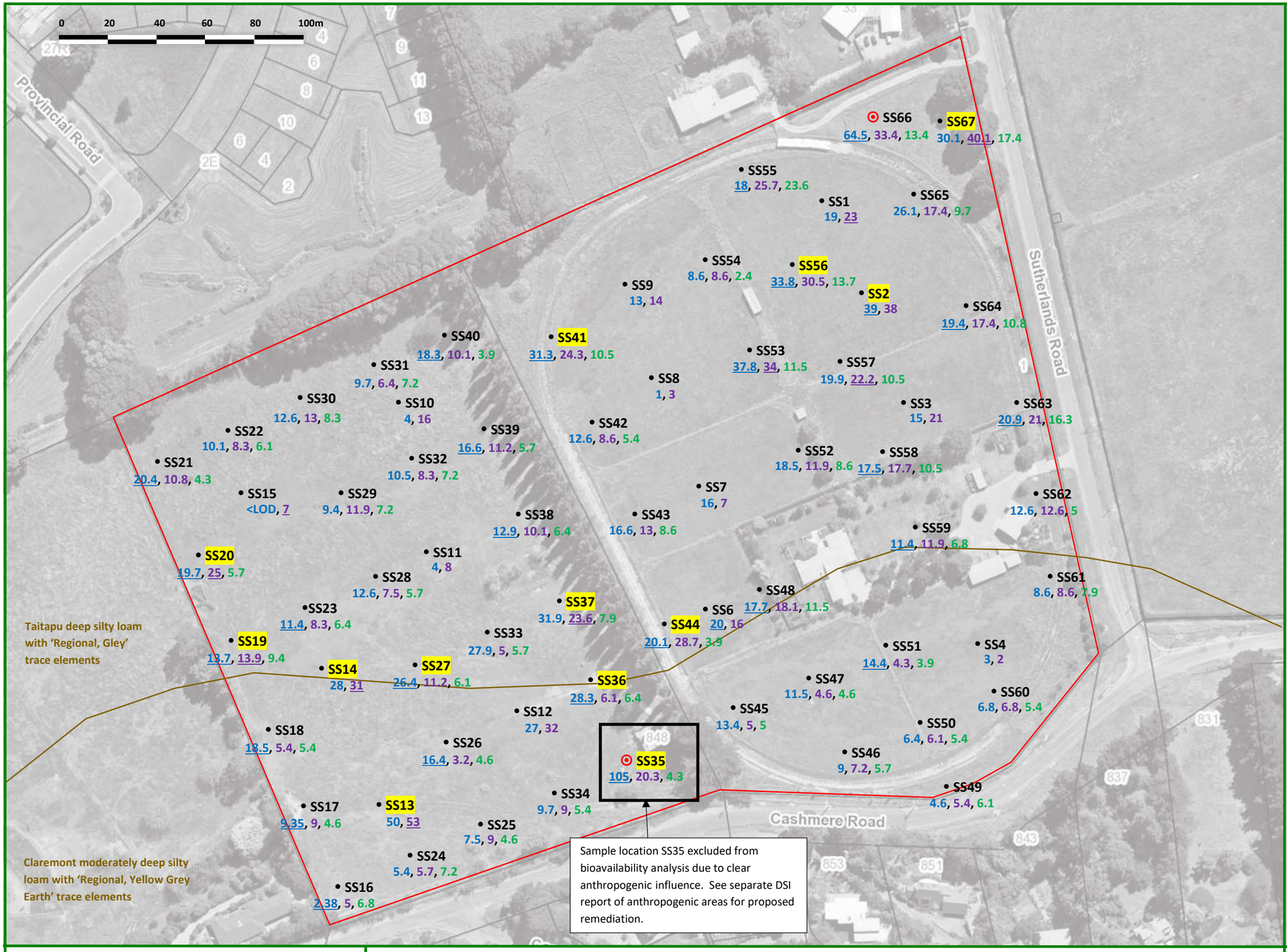
Sampling Location Plan – Showing exceedences PRIOR to bioavailability assessments

1 Sutherlands Rd & 848 Cashmere Rd, Christchurch

Scale: NTS

Date: 15 May 2019

Drawing No: 01363/2



Notes:

1. This plan has been prepared for soil contamination risk assessment purposes only. No liability is accepted if the plan is used for any other purposes.
2. Any measurements taken from this plan which are not dimensioned on the electronic copy are at the risk of the user.
3. Soil sample locations are approximate only.
4. XRF result derived by averaging the readings at each sample location and depth then applying the regression equation.
5. For locations with a laboratory duplicate the highest result is shown.

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
RD1, Christchurch 7671
021 132 0321
www.mallochenviro.co.nz

Sampling Location Plan - Showing exceedences AFTER to bioavailability assessments

1 Sutherlands Rd & 848 Cashmere Rd, Christchurch

Scale: NTS

Date: 16 May 2019

Drawing No: 01363/3

Appendix C – Disposal Documentation

Job Transaction - Frews

Frews

Periods: From 2019 / 09 To 2019 / 09

Filter: Start Year/Period = '2019/09' and End Year/Period = '2019/09' and Job = '33183 : 1 Sutherland Rd'

Job Code: 33183 - 1 Sutherland Rd
Client: Yoursection Ltd
Profit Centre: Contracting
Job Manager: Jasper Manuntag

Work Centre	Activity	Tran Date	Period	Reference	Description	Batch No	Inv No	Quantity
	ECCONT - CCC - Contaminated Hardfill							
		02-Dec-2019	*2019 / 9*	*DN:438621*		4190017	0	10.04
		02-Dec-2019	*2019 / 9*	*DN:438622*		4190017	0	14.08
		02-Dec-2019	*2019 / 9*	*DN:438579*		4190017	0	9.96
		02-Dec-2019	*2019 / 9*	*DN:438580*		4190017	0	16.36
		02-Dec-2019	*2019 / 9*	*DN:438549*		4190017	0	14.60
		02-Dec-2019	*2019 / 9*	*DN:438550*		4190017	0	19.94
		02-Dec-2019	*2019 / 9*	*DN:438507*		4190017	0	8.60
		02-Dec-2019	*2019 / 9*	*DN:438508*		4190017	0	8.60
		02-Dec-2019	*2019 / 9*	*DN:438504*		4190017	0	9.20
		02-Dec-2019	*2019 / 9*	*DN:438505*		4190017	0	12.92
		02-Dec-2019	*2019 / 9*	*DN:438547*		4190017	0	17.08
		02-Dec-2019	*2019 / 9*	*DN:438548*		4190017	0	19.62
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		02-Dec-2019	*2019 / 9*	*DN:438578*		4190017	0	14.94
		02-Dec-2019	*2019 / 9*	*DN:438605*		4190017	0	10.08
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	02-Dec-2019	*2019 / 9*	*DN:438565*	4190017	0	16.12
	02-Dec-2019	*2019 / 9*	*DN:438592*	4190017	0	9.96
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	02-Dec-2019	*2019 / 9*	*DN:438630*	4190017	0	12.32
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	04-Dec-2019	*2019 / 9*	*DN:439026*	4190017	0	10.84
	04-Dec-2019	*2019 / 9*	*DN:439027*	4190017	0	19.54
	05-Dec-2019	*2019 / 9*	*DN:439244*	4190017	0	8.82
	05-Dec-2019	*2019 / 9*	*DN:439245*	4190017	0	15.02
	05-Dec-2019	*2019 / 9*	*DN:439210*	4190017	0	9.34
	05-Dec-2019	*2019 / 9*	*DN:439211*	4190017	0	16.02
	05-Dec-2019	*2019 / 9*	*DN:439179*	4190017	0	9.50
	05-Dec-2019	*2019 / 9*	*DN:439180*	4190017	0	13.18
	05-Dec-2019	*2019 / 9*	*DN:439143*	4190017	0	11.12

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05-Dec-2019	2019 / 9	DN:439203	4190017	0	11.44
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05-Dec-2019	2019 / 9	DN:439172	4190017	0	14.60
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05-Dec-2019	2019 / 9	DN:439106	4190017	0	13.74
05-Dec-2019	2019 / 9	DN:439135	4190017	0	10.68
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05-Dec-2019	2019 / 9	DN:439146	4190017	0	15.40
05-Dec-2019	2019 / 9	DN:439119	4190017	0	9.88
05-Dec-2019	2019 / 9	DN:439120	4190017	0	14.44

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	05-Dec-2019	2019 / 9	DN:439241	4190017	0	13.58
	05-Dec-2019	2019 / 9	DN:439205	4190017	0	8.98
	05-Dec-2019	2019 / 9	DN:439206	4190017	0	14.82
	05-Dec-2019	2019 / 9	DN:439175	4190017	0	10.50
	05-Dec-2019	2019 / 9	DN:439176	4190017	0	14.94
	05-Dec-2019	2019 / 9	DN:439107	4190017	0	9.16
	05-Dec-2019	2019 / 9	DN:439108	4190017	0	14.50
	05-Dec-2019	2019 / 9	DN:439138	4190017	0	10.62
	05-Dec-2019	2019 / 9	DN:439139	4190017	0	14.50
	06-Dec-2019	2019 / 9	DN:439267	4190017	0	10.20
	06-Dec-2019	2019 / 9	DN:439268	4190017	0	13.34
	06-Dec-2019	2019 / 9	DN:439283	4190017	0	8.94
	06-Dec-2019	2019 / 9	DN:439284	4190017	0	14.68
	06-Dec-2019	2019 / 9	DN:439306	4190017	0	10.68
	06-Dec-2019	2019 / 9	DN:439307	4190017	0	18.80
	06-Dec-2019	2019 / 9	DN:439341	4190017	0	10.42
	06-Dec-2019	2019 / 9	DN:439342	4190017	0	18.64
	06-Dec-2019	2019 / 9	DN:439368	4190017	0	9.26
	06-Dec-2019	2019 / 9	DN:439369	4190017	0	17.06

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06-Dec-2019	*2019 / 9*	*DN:439266*	4190017	0	13.48
06-Dec-2019	*2019 / 9*	*DN:439278*	4190017	0	10.08
06-Dec-2019	*2019 / 9*	*DN:439279*	4190017	0	15.68
06-Dec-2019	*2019 / 9*	*DN:439304*	4190017	0	11.20
06-Dec-2019	*2019 / 9*	*DN:439305*	4190017	0	15.80
06-Dec-2019	*2019 / 9*	*DN:439325*	4190017	0	10.86
06-Dec-2019	*2019 / 9*	*DN:439326*	4190017	0	16.76
06-Dec-2019	*2019 / 9*	*DN:439360*	4190017	0	9.70
06-Dec-2019	*2019 / 9*	*DN:439361*	4190017	0	16.20
06-Dec-2019	*2019 / 9*	*DN:439287*	4190017	0	12.76
06-Dec-2019	*2019 / 9*	*DN:439288*	4190017	0	17.36
06-Dec-2019	*2019 / 9*	*DN:439315*	4190017	0	14.92
06-Dec-2019	*2019 / 9*	*DN:439316*	4190017	0	20.22
06-Dec-2019	*2019 / 9*	*DN:439337*	4190017	0	11.42
06-Dec-2019	*2019 / 9*	*DN:439338*	4190017	0	14.90
06-Dec-2019	*2019 / 9*	*DN:439377*	4190017	0	11.56
06-Dec-2019	*2019 / 9*	*DN:439378*	4190017	0	14.14
06-Dec-2019	*2019 / 9*	*DN:439329*	4190017	0	14.16
06-Dec-2019	*2019 / 9*	*DN:439330*	4190017	0	18.98
06-Dec-2019	*2019 / 9*	*DN:439370*	4190017	0	12.00

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	06-Dec-2019	2019 / 9	DN:439323	4190017	0	22.34
	06-Dec-2019	2019 / 9	DN:439322	4190017	0	15.90
	06-Dec-2019	2019 / 9	DN:439344	4190017	0	12.62
	06-Dec-2019	2019 / 9	DN:439345	4190017	0	16.68
	06-Dec-2019	2019 / 9	DN:439373	4190017	0	9.40
	06-Dec-2019	2019 / 9	DN:439374	4190017	0	15.22
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	07-Dec-2019	2019 / 9	DN:439401	4190017	0	14.88
	07-Dec-2019	2019 / 9	DN:439389	4190017	0	9.74
	07-Dec-2019	2019 / 9	DN:439390	4190017	0	16.22
	07-Dec-2019	2019 / 9	DN:439383	4190017	0	11.98
	07-Dec-2019	2019 / 9	DN:439384	4190017	0	16.26
	07-Dec-2019	2019 / 9	DN:439396	4190017	0	13.08
	07-Dec-2019	2019 / 9	DN:439397	4190017	0	15.32
	07-Dec-2019	2019 / 9	DN:439404	4190017	0	10.98
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	07-Dec-2019	2019 / 9	DN:439385	4190017	0	9.10
	07-Dec-2019	2019 / 9	DN:439386	4190017	0	15.56

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07-Dec-2019	*2019 / 9*	*DN:439399*		4190017	0	13.72
07-Dec-2019	*2019 / 9*	*DN:439406*		4190017	0	10.92
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07-Dec-2019	*2019 / 9*	*DN:439381*		4190017	0	9.36
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09-Dec-2019	*2019 / 9*	*DN:439460*		4190017	0	11.22
09-Dec-2019	*2019 / 9*	*DN:439461*		4190017	0	17.28
09-Dec-2019	*2019 / 9*	*DN:439515*		4190017	0	11.56
09-Dec-2019	*2019 / 9*	*DN:439516*		4190017	0	16.36
09-Dec-2019	*2019 / 9*	*DN:439554*		4190017	0	9.54

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	09-Dec-2019	2019 / 9	DN:439623	4190017	0	10.68
	09-Dec-2019	2019 / 9	DN:439624	4190017	0	16.82
	09-Dec-2019	2019 / 9	DN:439413	4190017	0	12.98
	09-Dec-2019	2019 / 9	DN:439414	4190017	0	16.00
	09-Dec-2019	2019 / 9	DN:439452	4190017	0	9.54
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	09-Dec-2019	2019 / 9	DN:439416	4190017	0	8.56
	09-Dec-2019	2019 / 9	DN:439417	4190017	0	14.50
	09-Dec-2019	2019 / 9	DN:439455	4190017	0	10.70
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	09-Dec-2019	2019 / 9	DN:439437	4190017	0	9.54
	09-Dec-2019	2019 / 9	DN:439438	4190017	0	15.54
	09-Dec-2019	2019 / 9	DN:439497	4190017	0	10.26
	09-Dec-2019	2019 / 9	DN:439498	4190017	0	16.44
	09-Dec-2019	2019 / 9	DN:439541	4190017	0	8.82
	09-Dec-2019	2019 / 9	DN:439542	4190017	0	13.56
	09-Dec-2019	2019 / 9	DN:439609	4190017	0	10.34
	09-Dec-2019	2019 / 9	DN:439610	4190017	0	16.00
	09-Dec-2019	2019 / 9	DN:439411	4190017	0	11.62

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	09-Dec-2019	2019 / 9	DN:439441	4190017	0	8.62
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	09-Dec-2019	2019 / 9	DN:439450	4190017	0	8.32
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	09-Dec-2019	2019 / 9	DN:439545	4190017	0	7.42
	09-Dec-2019	2019 / 9	DN:439546	4190017	0	11.84
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	10-Dec-2019	2019 / 9	DN:439659	4190017	0	10.28
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	10-Dec-2019	2019 / 9	DN:439707	4190017	0	11.94
	10-Dec-2019	2019 / 9	DN:439708	4190017	0	17.22
	10-Dec-2019	2019 / 9	DN:439744	4190017	0	10.10
	10-Dec-2019	2019 / 9	DN:439745	4190017	0	16.44
	10-Dec-2019	2019 / 9	DN:439783	4190017	0	13.06

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10-Dec-2019	2019 / 9	DN:439640	4190017	0	11.84
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10-Dec-2019	2019 / 9	DN:439722	4190017	0	12.08
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10-Dec-2019	2019 / 9	DN:439820	4190017	0	15.20
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10-Dec-2019	2019 / 9	DN:439648	4190017	0	17.44
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	10-Dec-2019	2019 / 9	DN:439808	4190017	0	12.56
	10-Dec-2019	2019 / 9	DN:439809	4190017	0	14.24
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	10-Dec-2019	2019 / 9	DN:439799	4190017	0	9.22
	10-Dec-2019	2019 / 9	DN:439749	4190017	0	10.24
	10-Dec-2019	2019 / 9	DN:439750	4190017	0	14.48
	10-Dec-2019	2019 / 9	DN:439665	4190017	0	8.26
	10-Dec-2019	2019 / 9	DN:439666	4190017	0	11.90
	10-Dec-2019	2019 / 9	DN:439711	4190017	0	12.56
	10-Dec-2019	2019 / 9	DN:439710	4190017	0	9.66
	10-Dec-2019	2019 / 9	DN:439633	4190017	0	8.30
	10-Dec-2019	2019 / 9	DN:439634	4190017	0	12.30
	10-Dec-2019	2019 / 9	DN:439714	4190017	0	8.16
	10-Dec-2019	2019 / 9	DN:439715	4190017	0	14.30
	10-Dec-2019	2019 / 9	DN:439669	4190017	0	8.42
	10-Dec-2019	2019 / 9	DN:439670	4190017	0	12.82
	10-Dec-2019	2019 / 9	DN:439631	4190017	0	8.84
	10-Dec-2019	2019 / 9	DN:439632	4190017	0	13.38
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	11-Dec-2019	*2019 / 9*	*DN:439995*	4190017	0	14.30
	11-Dec-2019	*2019 / 9*	*DN:440034*	4190017	0	13.22
	11-Dec-2019	*2019 / 9*	*DN:440035*	4190017	0	14.40
	11-Dec-2019	*2019 / 9*	*DN:439868*	4190017	0	9.44
	11-Dec-2019	*2019 / 9*	*DN:439869*	4190017	0	15.44
	11-Dec-2019	*2019 / 9*	*DN:439951*	4190017	0	11.26
	11-Dec-2019	*2019 / 9*	*DN:439952*	4190017	0	15.34
	11-Dec-2019	*2019 / 9*	*DN:439990*	4190017	0	12.40
	11-Dec-2019	*2019 / 9*	*DN:439991*	4190017	0	12.94
	11-Dec-2019	*2019 / 9*	*DN:440041*	4190017	0	8.72
	11-Dec-2019	*2019 / 9*	*DN:440042*	4190017	0	13.78
	11-Dec-2019	*2019 / 9*	*DN:439857*	4190017	0	12.52
	11-Dec-2019	*2019 / 9*	*DN:439858*	4190017	0	15.90
	11-Dec-2019	*2019 / 9*	*DN:439908*	4190017	0	11.92
	11-Dec-2019	*2019 / 9*	*DN:439909*	4190017	0	15.22
	11-Dec-2019	*2019 / 9*	*DN:439963*	4190017	0	14.18
	11-Dec-2019	*2019 / 9*	*DN:439964*	4190017	0	16.80
	11-Dec-2019	*2019 / 9*	*DN:440002*	4190017	0	14.14

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12-Dec-2019	2019 / 9	DN:440144	4190017	0	11.78
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12-Dec-2019	2019 / 9	DN:440234	4190017	0	15.16
12-Dec-2019	2019 / 9	DN:440235	4190017	0	18.98
12-Dec-2019	2019 / 9	DN:440062	4190017	0	13.64

	12-Dec-2019	*2019 / 9*	*DN:440063*	4190017	0	13.56
	12-Dec-2019	*2019 / 9*	*DN:440101*	4190017	0	12.36
	12-Dec-2019	*2019 / 9*	*DN:440102*	4190017	0	19.20
	12-Dec-2019	*2019 / 9*	*DN:440152*	4190017	0	13.74
	12-Dec-2019	*2019 / 9*	*DN:440153*	4190017	0	18.58
	12-Dec-2019	*2019 / 9*	*DN:440200*	4190017	0	12.42
	12-Dec-2019	*2019 / 9*	*DN:440201*	4190017	0	18.26
	12-Dec-2019	*2019 / 9*	*DN:440060*	4190017	0	10.56
	12-Dec-2019	*2019 / 9*	*DN:440061*	4190017	0	14.50
	12-Dec-2019	*2019 / 9*	*DN:440104*	4190017	0	10.92
	12-Dec-2019	*2019 / 9*	*DN:440105*	4190017	0	15.88
	12-Dec-2019	*2019 / 9*	*DN:440160*	4190017	0	12.76
	12-Dec-2019	*2019 / 9*	*DN:440161*	4190017	0	18.02
	12-Dec-2019	*2019 / 9*	*DN:440076*	4190017	0	12.44
	12-Dec-2019	*2019 / 9*	*DN:440077*	4190017	0	16.12
	12-Dec-2019	*2019 / 9*	*DN:440133*	4190017	0	11.66
	12-Dec-2019	*2019 / 9*	*DN:440134*	4190017	0	17.80
	12-Dec-2019	*2019 / 9*	*DN:440180*	4190017	0	11.78
	12-Dec-2019	*2019 / 9*	*DN:440181*	4190017	0	17.80
	12-Dec-2019	*2019 / 9*	*DN:440232*	4190017	0	12.64
	12-Dec-2019	*2019 / 9*	*DN:440233*	4190017	0	16.28

	12-Dec-2019	*2019 / 9*	*DN:440081*	4190017	0	12.24
	12-Dec-2019	*2019 / 9*	*DN:440082*	4190017	0	19.04
	12-Dec-2019	*2019 / 9*	*DN:440136*	4190017	0	11.84
	12-Dec-2019	*2019 / 9*	*DN:440137*	4190017	0	20.54
	12-Dec-2019	*2019 / 9*	*DN:440183*	4190017	0	8.68
	12-Dec-2019	*2019 / 9*	*DN:440184*	4190017	0	17.78
	12-Dec-2019	*2019 / 9*	*DN:440236*	4190017	0	12.28
	12-Dec-2019	*2019 / 9*	*DN:440237*	4190017	0	19.10
	12-Dec-2019	*2019 / 9*	*DN:440189*	4190017	0	9.44
	12-Dec-2019	*2019 / 9*	*DN:440190*	4190017	0	14.20
	12-Dec-2019	*2019 / 9*	*DN:440240*	4190017	0	9.60
	12-Dec-2019	*2019 / 9*	*DN:440241*	4190017	0	15.62
	12-Dec-2019	*2019 / 9*	*DN:440089*	4190017	0	17.54
	12-Dec-2019	*2019 / 9*	*DN:440088*	4190017	0	11.10
	12-Dec-2019	*2019 / 9*	*DN:440141*	4190017	0	16.18
	12-Dec-2019	*2019 / 9*	*DN:440140*	4190017	0	9.58
	12-Dec-2019	*2019 / 9*	*DN:440238*	4190017	0	10.24
	12-Dec-2019	*2019 / 9*	*DN:440239*	4190017	0	15.64
	12-Dec-2019	*2019 / 9*	*DN:440049*	4190017	0	8.96
	12-Dec-2019	*2019 / 9*	*DN:440050*	4190017	0	15.46

12-Dec-2019	*2019 / 9*	*DN:440143*		4190017	0	17.14
12-Dec-2019	*2019 / 9*	*DN:440142*		4190017	0	9.52
12-Dec-2019	*2019 / 9*	*DN:440194*		4190017	0	14.10
12-Dec-2019	*2019 / 9*	*DN:440193*		4190017	0	10.00
12-Dec-2019	*2019 / 9*	*DN:440052*		4190017	0	11.66
12-Dec-2019	*2019 / 9*	*DN:440051*		4190017	0	8.82
12-Dec-2019	*2019 / 9*	*DN:440099*		4190017	0	11.52
12-Dec-2019	*2019 / 9*	*DN:440100*		4190017	0	15.32
13-Dec-2019	*2019 / 9*	*DN:440383*		4190017	0	11.36
13-Dec-2019	*2019 / 9*	*DN:440384*		4190017	0	18.12
13-Dec-2019	*2019 / 9*	*DN:440311*		4190017	0	12.64
13-Dec-2019	*2019 / 9*	*DN:440312*		4190017	0	15.58
13-Dec-2019	*2019 / 9*	*DN:440349*		4190017	0	12.90
13-Dec-2019	*2019 / 9*	*DN:440350*		4190017	0	16.58
13-Dec-2019	*2019 / 9*	*DN:440391*		4190017	0	12.58
13-Dec-2019	*2019 / 9*	*DN:440392*		4190017	0	18.72
13-Dec-2019	*2019 / 9*	*DN:440367*		4190017	0	9.76
13-Dec-2019	*2019 / 9*	*DN:440368*		4190017	0	18.10
13-Dec-2019	*2019 / 9*	*DN:440365*		4190017	0	13.42
13-Dec-2019	*2019 / 9*	*DN:440366*		4190017	0	16.18
13-Dec-2019	*2019 / 9*	*DN:440394*		4190017	0	11.42

13-Dec-2019	2019 / 9	DN:440395	4190017	0	18.66
13-Dec-2019	2019 / 9	DN:440296	4190017	0	12.28
13-Dec-2019	2019 / 9	DN:440297	4190017	0	14.96
13-Dec-2019	2019 / 9	DN:440331	4190017	0	14.46
13-Dec-2019	2019 / 9	DN:440332	4190017	0	17.02
13-Dec-2019	2019 / 9	DN:440369	4190017	0	11.46
13-Dec-2019	2019 / 9	DN:440370	4190017	0	11.46
13-Dec-2019	2019 / 9	DN:440263	4190017	0	12.22
13-Dec-2019	2019 / 9	DN:440264	4190017	0	19.38
13-Dec-2019	2019 / 9	DN:440284	4190017	0	11.84
13-Dec-2019	2019 / 9	DN:440285	4190017	0	16.84
13-Dec-2019	2019 / 9	DN:440319	4190017	0	11.76
13-Dec-2019	2019 / 9	DN:440320	4190017	0	18.44
13-Dec-2019	2019 / 9	DN:440357	4190017	0	11.64
13-Dec-2019	2019 / 9	DN:440358	4190017	0	18.42
13-Dec-2019	2019 / 9	DN:440385	4190017	0	11.48
13-Dec-2019	2019 / 9	DN:440386	4190017	0	18.02
13-Dec-2019	2019 / 9	DN:440328	4190017	0	11.99
13-Dec-2019	2019 / 9	DN:440330	4190017	0	16.60
13-Dec-2019	2019 / 9	DN:440371	4190017	0	11.95

	13-Dec-2019	2019 / 9	DN:440372	4190017	0	15.94
	13-Dec-2019	2019 / 9	DN:440313	4190017	0	9.78
	13-Dec-2019	2019 / 9	DN:440315	4190017	0	16.42
	13-Dec-2019	2019 / 9	DN:440324	4190017	0	19.12
	13-Dec-2019	2019 / 9	DN:440323	4190017	0	9.58
	13-Dec-2019	2019 / 9	DN:440269	4190017	0	11.14
	13-Dec-2019	2019 / 9	DN:440270	4190017	0	20.66
	13-Dec-2019	2019 / 9	DN:440362	4190017	0	13.82
	13-Dec-2019	2019 / 9	DN:440361	4190017	0	8.96
	13-Dec-2019	2019 / 9	DN:440390	4190017	0	15.38
	13-Dec-2019	2019 / 9	DN:440389	4190017	0	9.66
	13-Dec-2019	2019 / 9	DN:440347	4190017	0	10.38
	13-Dec-2019	2019 / 9	DN:440348	4190017	0	15.36
	13-Dec-2019	2019 / 9	DN:440259	4190017	0	11.26
	13-Dec-2019	2019 / 9	DN:440260	4190017	0	17.30
	13-Dec-2019	2019 / 9	DN:440261	4190017	0	11.06
	13-Dec-2019	2019 / 9	DN:440262	4190017	0	15.14
	13-Dec-2019	2019 / 9	DN:440262	4190017	0	15.14
	13-Dec-2019	2019 / 9	DN:440281	4190017	0	10.12
	13-Dec-2019	2019 / 9	DN:440282	4190017	0	16.36
	13-Dec-2019	2019 / 9	DN:440287	4190017	0	10.20

	13-Dec-2019	2019 / 9	DN:440288	4190017	0	15.26
	13-Dec-2019	2019 / 9	DN:440317	4190017	0	11.02
	13-Dec-2019	2019 / 9	DN:440318	4190017	0	15.78
	13-Dec-2019	2019 / 9	DN:440321	4190017	0	8.94
	13-Dec-2019	2019 / 9	DN:440322	4190017	0	13.02
	13-Dec-2019	2019 / 9	DN:440351	4190017	0	10.86
	13-Dec-2019	2019 / 9	DN:440352	4190017	0	16.78
	13-Dec-2019	2019 / 9	DN:440353	4190017	0	11.14
	13-Dec-2019	2019 / 9	DN:440354	4190017	0	15.40
	13-Dec-2019	2019 / 9	DN:440381	4190017	0	10.76
	13-Dec-2019	2019 / 9	DN:440382	4190017	0	15.98
	13-Dec-2019	2019 / 9	DN:440387	4190017	0	10.70
	13-Dec-2019	2019 / 9	DN:440388	4190017	0	14.16
	14-Dec-2019	2019 / 9	DN:440398	4190017	0	12.76
	14-Dec-2019	2019 / 9	DN:440399	4190017	0	17.62
	14-Dec-2019	2019 / 9	DN:440410	4190017	0	12.50
	14-Dec-2019	2019 / 9	DN:440411	4190017	0	16.96
	14-Dec-2019	2019 / 9	DN:440408	4190017	0	10.58
	14-Dec-2019	2019 / 9	DN:440409	4190017	0	16.38
	14-Dec-2019	2019 / 9	DN:440404	4190017	0	11.48

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14-Dec-2019	*2019 / 9*	*DN:440412*		4190017	0	11.52
14-Dec-2019	*2019 / 9*	*DN:440413*		4190017	0	18.78
14-Dec-2019	*2019 / 9*	*DN:440415*		4190017	0	12.32
14-Dec-2019	*2019 / 9*	*DN:440416*		4190017	0	20.78
16-Dec-2019	*2019 / 9*	*DN:440490*		4190017	0	12.28
16-Dec-2019	*2019 / 9*	*DN:440492*		4190017	0	16.34
16-Dec-2019	*2019 / 9*	*DN:440547*		4190017	0	14.14
16-Dec-2019	*2019 / 9*	*DN:440548*		4190017	0	20.02
16-Dec-2019	*2019 / 9*	*DN:440597*		4190017	0	11.90
16-Dec-2019	*2019 / 9*	*DN:440598*		4190017	0	16.52
16-Dec-2019	*2019 / 9*	*DN:440658*		4190017	0	13.84
16-Dec-2019	*2019 / 9*	*DN:440659*		4190017	0	17.32
16-Dec-2019	*2019 / 9*	*DN:440505*		4190017	0	10.80
16-Dec-2019	*2019 / 9*	*DN:440506*		4190017	0	16.38
16-Dec-2019	*2019 / 9*	*DN:440561*		4190017	0	12.04
16-Dec-2019	*2019 / 9*	*DN:440562*		4190017	0	18.40
16-Dec-2019	*2019 / 9*	*DN:440606*		4190017	0	9.64
16-Dec-2019	*2019 / 9*	*DN:440607*		4190017	0	17.12
16-Dec-2019	*2019 / 9*	*DN:440496*		4190017	0	11.14
16-Dec-2019	*2019 / 9*	*DN:440497*		4190017	0	16.98

	16-Dec-2019	2019 / 9	DN:440553		4190017	0	13.18
	16-Dec-2019	2019 / 9	DN:440554		4190017	0	19.44
	16-Dec-2019	2019 / 9	DN:440600		4190017	0	12.50
	16-Dec-2019	2019 / 9	DN:440601		4190017	0	16.86
	16-Dec-2019	2019 / 9	DN:440654		4190017	0	14.28
	16-Dec-2019	2019 / 9	DN:440655		4190017	0	14.66
	16-Dec-2019	2019 / 9	DN:440557		4190017	0	13.07
	16-Dec-2019	2019 / 9	DN:440558		4190017	0	16.80
	16-Dec-2019	2019 / 9	DN:440602		4190017	0	11.93
	16-Dec-2019	2019 / 9	DN:440603		4190017	0	16.06
	16-Dec-2019	2019 / 9	DN:440661		4190017	0	16.09
	16-Dec-2019	2019 / 9	DN:440662		4190017	0	10.78
	16-Dec-2019	2019 / 9	DN:440425		4190017	0	7.70
	16-Dec-2019	2019 / 9	DN:440426		4190017	0	16.74
	16-Dec-2019	2019 / 9	DN:440462		4190017	0	11.86
	16-Dec-2019	2019 / 9	DN:440463		4190017	0	18.00
	16-Dec-2019	2019 / 9	DN:440502		4190017	0	10.44
	16-Dec-2019	2019 / 9	DN:440503		4190017	0	19.92
	16-Dec-2019	2019 / 9	DN:440564		4190017	0	10.80
	16-Dec-2019	2019 / 9	DN:440565		4190017	0	20.00

	16-Dec-2019	*2019 / 9*	*DN:440609*	4190017	0	11.06
	16-Dec-2019	*2019 / 9*	*DN:440610*	4190017	0	17.24
	16-Dec-2019	*2019 / 9*	*DN:440439*	4190017	0	10.86
	16-Dec-2019	*2019 / 9*	*DN:440440*	4190017	0	15.68
	16-Dec-2019	*2019 / 9*	*DN:440479*	4190017	0	9.24
	16-Dec-2019	*2019 / 9*	*DN:440480*	4190017	0	16.58
	16-Dec-2019	*2019 / 9*	*DN:440519*	4190017	0	6.84
	16-Dec-2019	*2019 / 9*	*DN:440520*	4190017	0	17.80
	16-Dec-2019	*2019 / 9*	*DN:440570*	4190017	0	11.32
	16-Dec-2019	*2019 / 9*	*DN:440571*	4190017	0	20.02
	16-Dec-2019	*2019 / 9*	*DN:440614*	4190017	0	9.88
	16-Dec-2019	*2019 / 9*	*DN:440615*	4190017	0	15.50
	16-Dec-2019	*2019 / 9*	*DN:440647*	4190017	0	6.08
	16-Dec-2019	*2019 / 9*	*DN:440648*	4190017	0	14.22
	16-Dec-2019	*2019 / 9*	*DN:440626*	4190017	0	7.18
	16-Dec-2019	*2019 / 9*	*DN:440627*	4190017	0	10.46
	16-Dec-2019	*2019 / 9*	*DN:440577*	4190017	0	10.86
	16-Dec-2019	*2019 / 9*	*DN:440578*	4190017	0	16.08
	16-Dec-2019	*2019 / 9*	*DN:440529*	4190017	0	17.50
	16-Dec-2019	*2019 / 9*	*DN:440528*	4190017	0	10.36
	16-Dec-2019	*2019 / 9*	*DN:440484*	4190017	0	14.26

	16-Dec-2019	*2019 / 9*	*DN:440483*	4190017	0	10.72
	16-Dec-2019	*2019 / 9*	*DN:440445*	4190017	0	10.70
	16-Dec-2019	*2019 / 9*	*DN:440446*	4190017	0	15.00
	16-Dec-2019	*2019 / 9*	*DN:440514*	4190017	0	10.18
	16-Dec-2019	*2019 / 9*	*DN:440515*	4190017	0	16.86
	16-Dec-2019	*2019 / 9*	*DN:440467*	4190017	0	11.22
	16-Dec-2019	*2019 / 9*	*DN:440468*	4190017	0	16.06
	16-Dec-2019	*2019 / 9*	*DN:440433*	4190017	0	10.98
	16-Dec-2019	*2019 / 9*	*DN:440434*	4190017	0	16.18
	16-Dec-2019	*2019 / 9*	*DN:440432*	4190017	0	15.32
	16-Dec-2019	*2019 / 9*	*DN:440431*	4190017	0	10.38
	16-Dec-2019	*2019 / 9*	*DN:440466*	4190017	0	14.58
	16-Dec-2019	*2019 / 9*	*DN:440465*	4190017	0	10.98
	16-Dec-2019	*2019 / 9*	*DN:440512*	4190017	0	13.76
	16-Dec-2019	*2019 / 9*	*DN:440511*	4190017	0	10.42
	16-Dec-2019	*2019 / 9*	*DN:440567*	4190017	0	14.32
	16-Dec-2019	*2019 / 9*	*DN:440566*	4190017	0	10.08
	16-Dec-2019	*2019 / 9*	*DN:440633*	4190017	0	13.00
	16-Dec-2019	*2019 / 9*	*DN:440632*	4190017	0	10.50
	16-Dec-2019	*2019 / 9*	*DN:440635*	4190017	0	11.06

16-Dec-2019	*2019 / 9*	*DN:440636*		4190017	0	12.98
16-Dec-2019	*2019 / 9*	*DN:440572*		4190017	0	9.70
16-Dec-2019	*2019 / 9*	*DN:440573*		4190017	0	16.38
16-Dec-2019	*2019 / 9*	*DN:440625*		4190017	0	12.48
16-Dec-2019	*2019 / 9*	*DN:440624*		4190017	0	7.42
16-Dec-2019	*2019 / 9*	*DN:440663*		4190017	0	8.36
16-Dec-2019	*2019 / 9*	*DN:440664*		4190017	0	13.32
16-Dec-2019	*2019 / 9*	*DN:440437*		4190017	0	10.42
16-Dec-2019	*2019 / 9*	*DN:440438*		4190017	0	16.20
16-Dec-2019	*2019 / 9*	*DN:440478*		4190017	0	16.04
16-Dec-2019	*2019 / 9*	*DN:440477*		4190017	0	10.40
16-Dec-2019	*2019 / 9*	*DN:440580*		4190017	0	17.08
16-Dec-2019	*2019 / 9*	*DN:440579*		4190017	0	11.18
16-Dec-2019	*2019 / 9*	*DN:440563*		4190017	0	17.50
16-Dec-2019	*2019 / 9*	*DN:440526*		4190017	0	11.16
16-Dec-2019	*2019 / 9*	*DN:440653*		4190017	0	1.94
17-Dec-2019	*2019 / 9*	*DN:440669*		4190017	0	10.74
17-Dec-2019	*2019 / 9*	*DN:440670*		4190017	0	17.78

610000000217/DN:4390

ECCONT Total 9,752.24

Job Transaction - Frews

Frews

Periods: From 2019 / 10 To 2019 / 10

Filter: Start Year/Period = '2019/10' and End Year/Period = '2019/10' and Job = '33183 : 1 Sutherland Rd'

Job Code: 33183 - 1 Sutherland Rd
Client: Yoursection Ltd
Profit Centre: Contaminated Site Remediation
Job Manager: Tom Clark

Work Centre	Activity	Tran Date	Period	Reference	Description	Batch No	Inv No	Quantity
Mat - Material								
	ECCONT - CCC - Contaminated Hardfill							
		06-Jan-2020	*2019 / 10*	*DN:441357*		4190018	0	10.68
		06-Jan-2020	*2019 / 10*	*DN:441358*		4190018	0	17.32
		06-Jan-2020	*2019 / 10*	*DN:441383*		4190018	0	10.66
		06-Jan-2020	*2019 / 10*	*DN:441384*		4190018	0	16.06
		06-Jan-2020	*2019 / 10*	*DN:441403*		4190018	0	11.12
		06-Jan-2020	*2019 / 10*	*DN:441404*		4190018	0	15.94
		06-Jan-2020	*2019 / 10*	*DN:441431*		4190018	0	12.72
		06-Jan-2020	*2019 / 10*	*DN:441432*		4190018	0	17.92
		06-Jan-2020	*2019 / 10*	*DN:441334*		4190018	0	18.02
		06-Jan-2020	*2019 / 10*	*DN:441335*		4190018	0	21.18
		06-Jan-2020	*2019 / 10*	*DN:441391*		4190018	0	16.88
		06-Jan-2020	*2019 / 10*	*DN:441392*		4190018	0	18.94
		06-Jan-2020	*2019 / 10*	*DN:441368*		4190018	0	14.90
		06-Jan-2020	*2019 / 10*	*DN:441369*		4190018	0	17.54
		06-Jan-2020	*2019 / 10*	*DN:441416*		4190018	0	17.30
		06-Jan-2020	*2019 / 10*	*DN:441417*		4190018	0	20.36
		06-Jan-2020	*2019 / 10*	*DN:441459*		4190018	0	18.00

06-Jan-2020	2019 / 10	DN:441460	4190018	0	21.02
06-Jan-2020	2019 / 10	DN:441338	4190018	0	10.88
06-Jan-2020	2019 / 10	DN:441339	4190018	0	16.88
06-Jan-2020	2019 / 10	DN:441366	4190018	0	9.50
06-Jan-2020	2019 / 10	DN:441367	4190018	0	17.02
06-Jan-2020	2019 / 10	DN:441389	4190018	0	11.12
06-Jan-2020	2019 / 10	DN:441390	4190018	0	17.42
06-Jan-2020	2019 / 10	DN:441410	4190018	0	11.84
06-Jan-2020	2019 / 10	DN:441411	4190018	0	17.20
06-Jan-2020	2019 / 10	DN:441438	4190018	0	11.18
06-Jan-2020	2019 / 10	DN:441439	4190018	0	16.78
06-Jan-2020	2019 / 10	DN:441350	4190018	0	16.82
06-Jan-2020	2019 / 10	DN:441352	4190018	0	16.64
06-Jan-2020	2019 / 10	DN:441379	4190018	0	15.76
06-Jan-2020	2019 / 10	DN:441380	4190018	0	15.36
06-Jan-2020	2019 / 10	DN:441399	4190018	0	16.40
06-Jan-2020	2019 / 10	DN:441400	4190018	0	14.64
06-Jan-2020	2019 / 10	DN:441421	4190018	0	17.94
06-Jan-2020	2019 / 10	DN:441422	4190018	0	16.88
06-Jan-2020	2019 / 10	DN:441457	4190018	0	17.18

06-Jan-2020	2019 / 10	DN:441458		4190018	0	16.02
06-Jan-2020	2019 / 10	DN:441346		4190018	0	11.00
06-Jan-2020	2019 / 10	DN:441347		4190018	0	13.76
06-Jan-2020	2019 / 10	DN:441381		4190018	0	10.62
06-Jan-2020	2019 / 10	DN:441382		4190018	0	12.44
06-Jan-2020	2019 / 10	DN:441401		4190018	0	12.74
06-Jan-2020	2019 / 10	DN:441402		4190018	0	12.22
06-Jan-2020	2019 / 10	DN:441429		4190018	0	11.24
06-Jan-2020	2019 / 10	DN:441430		4190018	0	14.04
06-Jan-2020	2019 / 10	DN:441342		4190018	0	9.78
06-Jan-2020	2019 / 10	DN:441343		4190018	0	14.10
06-Jan-2020	2019 / 10	DN:441370		4190018	0	9.16
06-Jan-2020	2019 / 10	DN:441371		4190018	0	13.82
06-Jan-2020	2019 / 10	DN:441395		4190018	0	9.92
06-Jan-2020	2019 / 10	DN:441396		4190018	0	14.92
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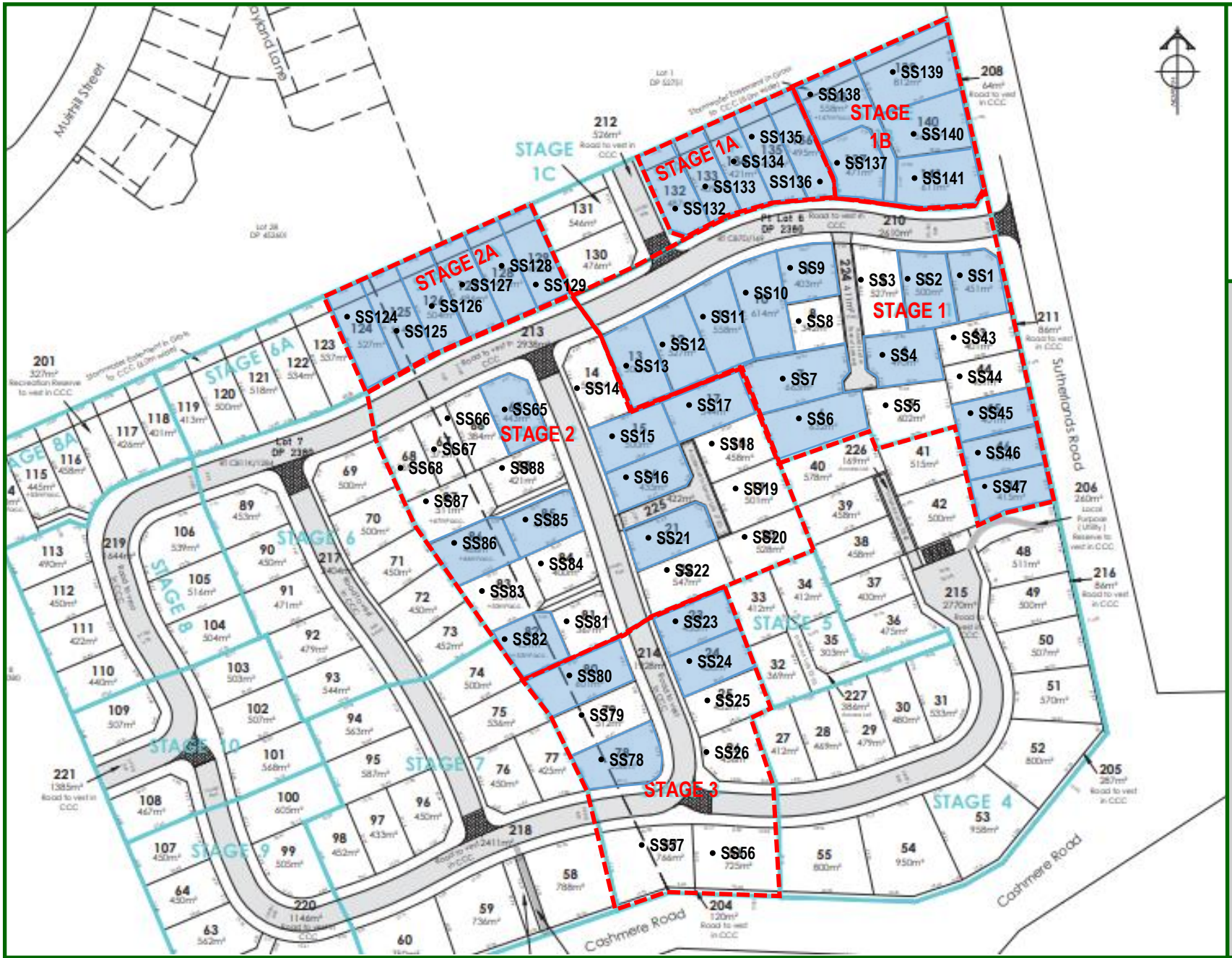
20-Feb-2020	*2019 / 11*	*DN:443954*	4190019	0	16.96
20-Feb-2020	*2019 / 11*	*DN:443819*	4190019	0	9.18
20-Feb-2020	*2019 / 11*	*DN:443820*	4190019	0	15.06
20-Feb-2020	*2019 / 11*	*DN:443858*	4190019	0	9.02
20-Feb-2020	*2019 / 11*	*DN:443859*	4190019	0	14.80
20-Feb-2020	*2019 / 11*	*DN:443901*	4190019	0	10.40
20-Feb-2020	*2019 / 11*	*DN:443902*	4190019	0	14.62
20-Feb-2020	*2019 / 11*	*DN:443925*	4190019	0	10.60
20-Feb-2020	*2019 / 11*	*DN:443926*	4190019	0	14.62
20-Feb-2020	*2019 / 11*	*DN:443950*	4190019	0	8.44
20-Feb-2020	*2019 / 11*	*DN:443951*	4190019	0	15.18
20-Feb-2020	*2019 / 11*	*DN:443962*	4190019	0	9.88
20-Feb-2020	*2019 / 11*	*DN:443963*	4190019	0	13.44
20-Feb-2020	*2019 / 11*	*DN:443915*	4190019	0	15.18
20-Feb-2020	*2019 / 11*	*DN:443914*	4190019	0	11.46
20-Feb-2020	*2019 / 11*	*DN:443940*	4190019	0	10.94
20-Feb-2020	*2019 / 11*	*DN:443941*	4190019	0	15.50
20-Feb-2020	*2019 / 11*	*DN:443880*	4190019	0	10.64
20-Feb-2020	*2019 / 11*	*DN:443881*	4190019	0	17.84
20-Feb-2020	*2019 / 11*	*DN:443844*	4190019	0	10.66

20-Feb-2020	*2019 / 11*	*DN:443845*	4190019	0	18.60
20-Feb-2020	*2019 / 11*	*DN:443841*	4190019	0	11.61
20-Feb-2020	*2019 / 11*	*DN:443842*	4190019	0	14.40
20-Feb-2020	*2019 / 11*	*DN:443889*	4190019	0	11.77
20-Feb-2020	*2019 / 11*	*DN:443890*	4190019	0	13.00
20-Feb-2020	*2019 / 11*	*DN:443916*	4190019	0	14.85
20-Feb-2020	*2019 / 11*	*DN:443917*	4190019	0	12.26
20-Feb-2020	*2019 / 11*	*DN:443949*	4190019	0	13.26
20-Feb-2020	*2019 / 11*	*DN:443948*	4190019	0	12.13
20-Feb-2020	*2019 / 11*	*DN:443962*	4190019	0	9.88
20-Feb-2020	*2019 / 11*	*DN:443963*	4190019	0	13.44
21-Feb-2020	*2019 / 11*	*DN:443971*	4190019	0	17.02
21-Feb-2020	*2019 / 11*	*DN:443977*	4190019	0	10.14
21-Feb-2020	*2019 / 11*	*DN:443978*	4190019	0	14.26
21-Feb-2020	*2019 / 11*	*DN:443983*	4190019	0	12.17
21-Feb-2020	*2019 / 11*	*DN:443984*	4190019	0	13.06
				ECCONT Total	2,117.02
					Mat Total
					33183 Total
					Report Total

ır (total cartage in that day by Frews Transport)

Appendix D – Lot Sample Location Plan



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LEGEND

- • SS — Validation Sample Location
- Concentration of contaminants above background levels, below residential SGV
- Concentrations of contaminants below expected background concentrations (Regional, Recent)

PLAN MUST BE PRINTED IN COLOUR

Graphic scale is approximate only

0 5 10 15m

Date: 02 February 2022 **Drawing No:** 1363/5

Lot Validation Sample Location Plan

1 Sutherlands Rd & 848 Cashmere Rd, Christchurch

Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3

Notes:

1. This plan has been prepared for soil contamination risk assessment purposes only. No liability is accepted if the plan is used for any other purposes.
2. Any measurements taken from this plan which are not dimensioned on the electronic copy are at the risk of the user.
3. Soil sample locations are approximate only

Appendix E – Table of Laboratory Stockpile Validation Results

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch - Stockpile Sampling

Soil Results	Sample Name:	SP1	SP2	SP3	SP4	SP-5	SP6	Soil Guideline Values				
	Lab Number:	20-31430-1	20-31430-2	20-31430-3	20-31430-4	20-31430-5	20-31430-6	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	26/08/2020	26/08/2020	26/08/2020	26/08/2020	26/08/2020	26/08/2020					
Heavy Metals												
Arsenic	mg/kg dry wt	4.4	4.1	3.8	4.5	4.1	4.1	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.034	0.03	0.033	0.028	0.029	0.03	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15.5	15.3	14	15.5	14.8	14.3	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	7.2	7.1	5.6	7.4	7.1	7	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	13.6	12.5	13.3	13.8	13	12.3	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	11.8	12	10.9	12	11.8	11.9	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	47.2	43.2	45	46.5	46.6	43.9	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SP7	SP8	SP9	SP10	SP11	SP12	Soil Guideline Values				
	Lab Number:	20-38986-31	20-38986-32	20-38986-33	20-38986-34	20-38986-35	20-38986-36	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020					
Heavy Metals												
Arsenic	mg/kg dry wt	1.7	1.7	3.2	3	4.6	5.2	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.064	0.05	0.032	0.032	0.047	0.027	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	30.4	29.4	12	14.8	16.4	15.6	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	45.5	39.4	7.52	10.3	12.5	7.92	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	9.16	7.89	12.6	13.9	15.5	17.4	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	*62.9*	*56.5*	11.6	16.3	18.9	12.7	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	62.4	58	38.9	44.3	49.9	53.1	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

NES - National Environmental Standard for Assessing and Managing Contaminants in Soils, MfE
NEPM - National Environmental Protection Measures 2013, Formerly NEPC, Australia
ANZWQ - Australian and New Zealand - Guidelines for Fresh and Marine Water Quality (online) - Sediment GV-high
[1] Concentrations for "Regional, Recent" soil group from Background concentrations of selected Level 1 trace elements in Canterbury soils, Tonkin and Taylor, July 2007

Appendix F – Table of Laboratory Lot Validation Results

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch - Lot Sampling

Stage 1

Soil Results	Sample Name:	SS1.1	SS1.2	SS2.1	SS2.2	SS3.1	SS3.2	SS4.1	SS4.2	Soil Guideline Values				
	Lab Number:	20-41020-1	20-41020-2	20-41020-3	20-41020-4	20-41020-5	20-41020-6	20-41020-7	20-41020-8	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020					
	Depth (mm):	0-50	300	0-50	300	0-50	350	0-50	350					
Heavy Metals														
Arsenic	mg/kg dry wt	13.3	4.9	18.1	4.7	9.1	4.3	15	5.3	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.082	0.032	0.071	0.029	0.096	0.029	0.11	0.026	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	16.3	16	16.1	15.7	17.1	14.5	16.5	15.1	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	8.26	6.7	7.96	6.4	10	6.2	10.5	7.66	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	17.1	15.3	17.7	14.6	18.2	14	18.2	16.6	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	12.8	11.7	12.7	11.3	14.3	11	13.6	11.8	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	58.8	48.4	66	46.2	60.2	43.5	63.8	50.4	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS5.1	SS5.3	SS6.1	SS6.2	SS7.1	SS7.3	SS8.1	SS8.2	Soil Guideline Values				
	Lab Number:	20-41020-9	20-41020-11	20-38986-37	20-38986-38	20-38986-41	20-38986-43	20-38986-46	20-38986-47	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	29/10/2020	29/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020					
	Depth (mm):	0-50	350	0-50	300	0-50	300	0-50	400					
Heavy Metals														
Arsenic	mg/kg dry wt	10	5.5	9.6	13.5	12	13.1	10	6.8	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.092	0.04	0.066	0.1	0.06	0.079	0.062	0.032	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	16.3	15.4	15.8	16.4	13.9	15.1	14.8	14.9	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	8.92	6.2	7.4	9.48	6	8.39	7.2	6.9	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	17.3	14.2	18.8	18.3	14.3	16.9	15	14	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.4	11.4	12.5	12.8	10.9	11.6	12.3	10.8	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	55.2	48.4	53.9	58.9	47.3	56.1	53.9	44.7	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS9.1	SS9.2	SS10.1	SS10.2	SS11.1	SS11.2	Soil Guideline Values				
	Lab Number:	20-38986-48	20-38986-49	20-38986-55	20-38986-56	20-38986-59	20-38986-60	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020					
	Depth (mm):	0-50	400	0-50	400	0-50	400					
Heavy Metals												
Arsenic	mg/kg dry wt	15.2	4.4	14.8	5.6	18.3	5.2	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.088	0.03	0.074	0.03	0.057	0.037	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	16.1	13.2	16.3	13.4	14.9	13	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	9.11	6.8	7.88	7.1	7.1	6.7	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	18.4	12.6	16.8	14.3	14.8	12.2	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	12.9	10.1	12.5	10.1	11.3	12	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	60.2	39.8	56.9	43.8	47.1	39.8	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

NES - National Environmental Standard for Assessing and Managing Contaminants in Soils, MfE
NEPM - National Environmental Protection Measures 2013, Formerly NEPC, Australia
ANZWQ - Australian and New Zealand - Guidelines for Fresh and Marine Water Quality (online) - Sediment GV-high
* Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch - Lot Sampling

Stage 1 cont'd

Soil Results	Sample Name:	SS12.1	SS12.2	SS13.1	SS13.2	SS43.1	SS43.2	SS44.1	Soil Guideline Values				
	Lab Number:	20-38986-63	20-38986-64	20-38986-69	20-38986-70	20-41020-12	20-41020-13	20-41020-14	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	29/10/2020	29/10/2020	29/10/2020					
	Depth (mm):	0-50	400	0-50	500	0-50	350	0-50					
Heavy Metals													
Arsenic	mg/kg dry wt	15.8	6.4	19.1	7.2	12	4.6	12.5	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.092	0.024	0.092	0.046	0.081	0.028	0.086	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	14.5	13.6	15	15.4	15.3	14.5	16.4	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	8.43	7.1	8.7	7.4	8.31	6.8	8.54	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	16.7	12.4	16.2	16.7	16.8	13.3	17.7	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	12.4	11.3	12.5	12	12.4	10.8	13.1	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	52.6	38.4	53.4	51.8	56.9	44.7	59.7	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS44.2	SS45.1	SS45.2	SS46.1	SS46.2	SS47.1	SS47.2	Soil Guideline Values				
	Lab Number:	20-41020-15	20-41020-16	20-41020-17	21-26606-3	21-26606-4	21-26606-5	21-26606-6	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	29/10/2020	29/10/2020	29/10/2020	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
	Depth (mm):	350	0-50	350	0-50	300	0-50	300					
Heavy Metals													
Arsenic	mg/kg dry wt	5.6	14.2	5.6	15.1	13.5	14.2	10	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.037	0.081	0.033	0.14	0.15	0.15	0.083	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15.5	16.4	14.4	17.2	16.7	16.6	16.8	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	7.4	8.23	9.43	11.8	11.2	11.1	10.8	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	13.9	17.8	17.9	20.3	18.9	19.3	19.8	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	11.8	13	11.6	14.6	13.7	14.4	14.1	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	46.1	58.7	50.8	56.6	58.1	54.1	52.5	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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NEPM - National Environmental Protection Measures 2013, Formerly NEPC, Australia
ANZWQ - Australian and New Zealand - Guidelines for Fresh and Marine Water Quality (online) - Sediment GV-high
* Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch - Lot Sampling

Stage 1A

Soil Results	Sample Name:	SS132.1 $_1$	SS132.2 $_1$	SS133.1 $_1$	SS133.2 $_1$	SS134.1 $_1$	SS134.2 $_1$	SS135.1 $_1$	SS135.2 $_1$	Soil Guideline Values				
	Lab Number:	21-49953-4	21-49953-5	21-49953-6	21-49953-7	21-49953-8	21-49953-9	21-49953-10	21-49953-11	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021					
	Depth (mm):	0-50	300	0-50	300	0-50	300	0-50	300					
Heavy Metals														
Arsenic	mg/kg dry wt	12	8	14.3	8.5	13.5	13.4	15.3	18.6	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.058	0.051	0.066	0.046	0.058	0.067	0.058	0.08	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15.9	17.4	15.8	16.3	16.5	16	16.4	16.2	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10	9.63	9.93	9.2	10.1	10.2	9.77	9.71	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	17.9	17.9	17.4	18.2	18.2	17.7	18.1	18.2	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.2	13.9	12.5	13.3	12.9	13.1	12.4	12.1	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	57.8	55.8	57.2	54.8	60.2	58	59.7	61.5	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS136.1 $_1$	SS136.2 $_1$	SS132.1 $_2$	SS132.3 $_2$	SS133.1 $_2$	SS133.2 $_2$	SS134.1 $_2$	SS134.2 $_2$	Soil Guideline Values				
	Lab Number:	21-49953-12	21-49953-13	22-02095-1	22-02095-3	22-02095-4	22-02095-5	22-02095-6	22-02095-7	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	30/11/2021	30/11/2021	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022					
	Depth (mm):	0-50	250	0-50	250	0-50	300	0-50	300					
Heavy Metals														
Arsenic	mg/kg dry wt	16.7	**22.5**	17.5	12	13.7	3.7	13.8	15	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.073	0.068	0.089	0.077	0.067	0.032	0.071	0.082	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	17.4	19.5	18.4	19	18.1	16.8	17.8	22.9	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10.7	11.4	11.7	10.5	11	9.03	10.5	13.2	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	19.4	21.4	19.9	19.2	19.4	15.9	18.9	24.3	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.8	15	14.6	14.3	14.4	13.8	13.7	16.4	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	61.2	68.2	62.8	60.6	62.1	51.2	65.8	65.6	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS135.1 $_2$	SS135.2 $_2$	SS136.1 $_2$	SS136.2 $_2$	Soil Guideline Values				
	Lab Number:	22-02095-8	22-02095-9	22-02095-10	22-02095-11	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	20/01/2022	20/01/2022	20/01/2022	20/01/2022					
	Depth (mm):	0-50	300	0-50	250					
Heavy Metals										
Arsenic	mg/kg dry wt	13.5	15.8	12.7	18.1	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.076	0.08	0.076	0.11	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	17	20.8	16.9	19.7	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10.1	13.4	11.9	14.3	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	19.1	21.6	23	23.2	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	12.7	14.6	13.9	14.6	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	60.8	63.9	64.2	67.6	7,400	NEPM	410	ANZWQ	93.94

$_1$ denotes lot to be reworked following this first result

$_2$ denotes lot result following further mixing of soils

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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NEPM - National Environmental Protection Measures 2013, Formerly NEPC, Australia
ANZWQ - Australian and New Zealand - Guidelines for Fresh and Marine Water Quality (online) - Sediment GV-high
* Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch - Lot Sampling

Stage 1B

Soil Results	Sample Name:	SS137.1	SS137.2	SS138.1	SS138.2	SS139.1 [1]	SS139.2 [1]	SS139.1 [2]	SS139.3 [2]	Soil Guideline Values				
	Lab Number:	21-26606-30	21-26606-31	21-26606-26	21-26606-27	21-26606-28	21-26606-29	21-49953-1	21-49953-3	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	30/11/2021	30/11/2021					
	Depth (mm):	0-50	250	0-50	200	0-50	250	0-50	300					
Heavy Metals														
Arsenic	mg/kg dry wt	14.3	14.7	16.6	17.2	**24.7**	**22**	18.2	11	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.068	0.074	0.064	0.12	0.074	0.068	0.094	0.078	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15.1	16.4	16	24.8	17.3	16.6	18.2	18.9	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10.1	10.6	10.4	19.9	11.2	10.5	12.3	11.5	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	19.3	19.8	18.5	45.7	20.2	19.5	20	27.9	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	12.7	13.1	13.5	15.7	15	14.4	13.7	14	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	57.3	59	51.9	79.3	58.1	54.9	61.6	72.1	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS140.1	SS140.2	SS141.1	SS141.3	Soil Guideline Values				
	Lab Number:	21-26606-18	21-26606-19	21-26606-14	21-26606-16	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
	Depth (mm):	0-50	150	0-50	150					
Heavy Metals										
Arsenic	mg/kg dry wt	14.9	20.2	8.8	13.8	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.071	0.07	0.052	0.079	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	16.3	18.2	14.9	17.6	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	11.2	11.2	8.83	11.6	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	17.9	20.5	16.3	22.6	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	14.1	16	13.1	16	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	52.1	60.4	45.5	58	7,400	NEPM	410	ANZWQ	93.94

[1] denotes lot to be reworked following this first result

[2] denotes lot result following further mixing of soils

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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* Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch - Lot Sampling

Stage 2

Soil Results	Sample Name:	SS14.1	SS14.2	SS15.1	SS15.2	SS16.1	SS16.2	SS17.1	Soil Guideline Values				
	Lab Number:	20-38986-71	20-38986-72	20-38986-67	20-38986-68	20-38986-65	20-38986-66	20-38986-73	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020					
	Depth (mm):	0-50	500	0-50	500	0-50	300	0-50					
Heavy Metals													
Arsenic	mg/kg dry wt	12	6.1	14	15	14.5	18.8	12.8	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.097	0.049	0.069	0.083	0.074	0.086	0.069	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	16.3	14.2	16.1	16.9	17	15.9	16.7	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10	6.2	8.9	8.44	8.04	7.55	8.2	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	19.8	14.4	17.3	18	16.8	17.2	17.5	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.2	10.3	12.1	13.1	13	11.9	13.4	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	55.3	43.5	53.9	61.2	55.9	56.2	60.9	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS17.2	SS18.1	SS18.2	SS19.1	SS19.2	SS20.1	SS20.2	Soil Guideline Values				
	Lab Number:	20-38986-74	20-38986-75	20-38986-76	20-08163-3	20-08163-4	20-08163-1	20-08163-2	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020					
	Depth (mm):	350	0-50	300	0-50	250	0-50	250					
Heavy Metals													
Arsenic	mg/kg dry wt	10	11	5.6	4.4	4.2	4.5	4.7	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.058	0.086	0.05	0.04	0.024	0.034	0.037	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	17.5	17.1	15.7	15.2	15.9	15.2	16.5	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	7.78	8.51	8.82	6.9	6.1	6.6	6.5	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	17.5	17.6	14.7	14.8	14	17.1	18.6	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.1	12.9	12.2	11.6	11.1	11.6	12	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	56.3	57.4	46.8	52.3	50.2	57.1	54.2	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS21.1	SS21.2	SS22.1	SS22.2	SS65.1	SS65.2	SS66.1	Soil Guideline Values				
	Lab Number:	20-38986-61	20-38986-62	20-38986-57	20-38986-58	20-38986-1	20-38986-2	20-38986-3	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020					
	Depth (mm):	0-50	300	0-50	300	0-50	250	0-50					
Heavy Metals													
Arsenic	mg/kg dry wt	14.9	14.5	11	7.5	13.6	10	11	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.079	0.087	0.08	0.051	0.075	0.063	0.075	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	14.9	16.4	15.5	14.4	17.3	17.1	16.1	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	8.76	8.71	8.23	7.3	11.4	10.2	10.3	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	16.7	17.6	16.6	15.3	19.8	18.5	18.2	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	12.3	13.3	12.4	10.6	13.9	13.7	12.3	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	56.3	60.4	60.2	50.4	65	60.5	64.2	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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* Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch - Lot Sampling

Stage 2 cont'd

Soil Results	Sample Name:	SS66.2	SS67.1	SS67.2	SS68.1	SS68.2	SS81.1	SS81.2	Soil Guideline Values				
	Lab Number:	20-38986-4	20-38986-5	20-38986-6	20-38986-7	20-38986-8	20-38986-21	20-38986-22	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020					
	Depth (mm):	250	0-50	350	0-50	300	0-50	350					
Heavy Metals													
Arsenic	mg/kg dry wt	11	12	4.1	11	4.7	11	6.3	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.089	0.058	0.027	0.065	0.032	0.08	0.046	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15.9	15.1	14.5	15.2	14.8	14.9	14.7	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	12.7	9.34	6.7	9.33	7.2	9.18	8.78	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	20.5	16.8	12.9	17.6	13.6	17.9	16	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	11.8	12	10.4	12	10.7	11.8	11.8	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	63.2	60	44.4	60	47.2	55.8	50.1	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS82.1	SS82.2	SS83.1	SS83.2	SS84.1	SS84.2	SS85.1	Soil Guideline Values				
	Lab Number:	20-38986-23	20-38986-24	20-38986-19	20-38986-20	20-38986-17	20-38986-18	20-38986-13	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020					
	Depth (mm):	0-50	450	0-50	400	0-50	300	0-50					
Heavy Metals													
Arsenic	mg/kg dry wt	4.5	5.6	6.7	6.3	11	5.9	15.3	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.071	0.038	0.059	0.05	0.078	0.044	0.12	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	24.4	15	16.1	14.7	15.1	14.3	16.9	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	24.5	8.34	9.18	7.2	9.51	8.6	13.9	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	18.3	14.4	15.9	14.6	18.1	15.2	21.1	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	36.3	12.6	14.4	12	12	11.3	14	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	66.7	46.8	53.2	47.9	56.1	48.2	59.4	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS85.2	SS86.1	SS86.2	SS87.1	SS87.2	SS88.1	SS88.2	Soil Guideline Values				
	Lab Number:	20-38986-14	20-38986-15	20-38986-16	20-38986-9	20-38986-10	20-38986-11	20-38986-12	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020					
	Depth (mm):	300	0-50	350	0-50	500	0-50	300					
Heavy Metals													
Arsenic	mg/kg dry wt	4.5	7.4	17.3	9.2	4.1	12	8.8	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.036	0.081	0.08	0.064	0.041	0.071	0.068	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	14.9	18.9	15.3	14.4	13.4	14.5	16.1	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	6.5	13.3	8.9	9.2	6.7	9.33	10.3	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	14.9	20.3	16.3	18.4	14.4	16.6	18.3	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	11.8	18.9	12.5	10.7	9.61	11.7	13.1	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	47.6	59.9	53.1	69.1	50.5	57.2	56.2	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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* Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch - Lot Sampling

Stage 2A

Soil Results	Sample Name:	SS124.1 $_1$	SS124.2 $_1$	SS125.1 $_1$	SS125.2 $_1$	SS126.1 $_1$	SS126.2 $_1$	SS127.1	SS127.2	SS128.1	Soil Guideline Values				
	Lab Number:	21-49953-25	21-49953-26	21-49953-14	21-49953-15	21-49953-16	21-49953-17	21-49953-18	21-49953-19	21-49953-20	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021					
	Depth (mm):	0-50	250	0-50	250	0-50	250	0-50	250	0-50					
Heavy Metals															
Arsenic	mg/kg dry wt	**21.5**	**22.3**	18.6	**47.3**	**21.6**	16.1	19.2	20.7	17	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.094	0.065	0.072	0.097	0.073	0.091	0.076	0.098	0.083	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	21.5	22.4	19.1	29.5	20.7	21.7	19.3	18.7	19.4	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	16.9	18.7	13.8	31.9	16.2	12.8	13.2	13.1	12.7	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	24.4	22.7	22.1	32.2	23.5	22.4	25	23.4	22	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	15.1	13.8	15	12.8	14.3	14.2	14.7	14.3	15.5	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	71.9	67.5	66.4	74.3	68.4	62.5	67.7	66.6	65.6	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS128.2	SS129.1	SS129.3	SS124.1 $_2$	SS124.2 $_2$	SS125.1 $_2$	SS125.2 $_2$	SS126.1 $_2$	SS126.2 $_2$	Soil Guideline Values				
	Lab Number:	21-49953-21	21-49953-22	21-49953-24	22-02095-12	22-02095-13	22-02095-14	22-02095-15	22-02095-16	22-02095-17	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	30/11/2021	30/11/2021	30/11/2021	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022					
	Depth (mm):	250	0-50	250	0-50	250	0-50	300	0-50	300					
Heavy Metals															
Arsenic	mg/kg dry wt	16.5	16.3	18.9	20.2	17.2	16.8	12.8	16.3	9.4	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.092	0.095	0.11	0.11	0.1	0.095	0.061	0.11	0.061	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	18.4	19.1	17.8	21.8	19.1	21.2	18.6	22.3	19.7	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	12.4	12.5	13	14.7	14.7	15.3	12.6	14.4	11.1	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	21.2	21.9	21.2	26	23	23.1	24.4	23.9	20.4	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	15	15	15.2	15.5	14.6	15	14.7	16	14.3	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	63.3	67.3	64.6	68.2	66.9	67.3	70.9	68.8	63.8	7,400	NEPM	410	ANZWQ	93.94

$_1$ denotes lot to be reworked following this first result

$_2$ denotes lot result following further mixing of soils

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch - Lot Sampling

Stage 3

Soil Results	Sample Name:	SS23.1	SS23.2	SS24.1	SS24.2	SS25.1 $_1$	SS25.2 $_1$	SS25.1 $_2$	Soil Guideline Values				
	Lab Number:	20-38986-53	20-38986-54	20-38986-51	20-38986-52	20-38986-44	20-38986-45	21-26606-22	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	10/06/2021					
	Depth (mm):	0-50	300	0-50	250	0-50	300	0-50					
Heavy Metals													
Arsenic	mg/kg dry wt	19.7	19.6	17.7	18.9	13.9	**24.7**	11	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.085	0.064	0.068	0.041	0.078	0.055	0.071	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	14.7	15.1	14.7	15.5	14.2	14.3	14.6	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	8.95	7.59	8.8	6.8	8.61	8.63	8.57	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	17.6	16.1	17.1	13	16.3	14.5	14.4	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	12.2	11.3	12	10.8	11.6	11.2	12.3	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	49.9	45.5	54.7	46.3	50.9	47.5	46.1	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS25.2 $_2$	SS26.1	SS26.2	SS56.1	SS56.2	SS57.1	SS57.2	Soil Guideline Values				
	Lab Number:	21-26606-23	20-38986-39	20-38986-40	21-26606-1	21-26606-2	21-26606-7	21-26606-8	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	10/06/2021	15/10/2020	15/10/2020	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
	Depth (mm):	250	0-50	300	50	250	50	500					
Heavy Metals													
Arsenic	mg/kg dry wt	12	11	9.1	6.6	4.6	12	5.5	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.063	0.06	0.058	0.05	0.025	0.083	0.041	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15.7	13.8	13.3	14.9	14.8	17.6	15.7	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	8.73	7.71	7	8.9	8.98	11.4	7.61	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	16.4	14.5	13.3	15.7	13.7	19.8	15.9	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	12.5	11.4	10.9	12.4	12.6	14.6	13.1	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	45.8	48.8	44.7	46.7	41.8	59.3	44.1	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS78.1	SS78.2	SS79.1	SS79.2	SS80.1	SS80.2	Soil Guideline Values				
	Lab Number:	20-38986-29	20-38986-30	20-38986-27	20-38986-28	20-38986-25	20-38986-26	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background *
	Date Sampled:	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020					
	Depth (mm):	0-50	350	0-50	300	0-50	300					
Heavy Metals												
Arsenic	mg/kg dry wt	13.3	13.1	11	12	14.3	5.2	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.064	0.074	0.097	0.1	0.1	0.04	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	14.9	15.7	15	12	15.6	14.1	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	8.58	7.51	10.3	11.8	10.7	7.69	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	16.2	16.7	18.3	14.8	19.2	13.2	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.3	11.9	11.8	9.83	12.4	11.3	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	54.3	57	54.9	37.4	57.5	44.2	7,400	NEPM	410	ANZWQ	93.94

$_1$ denotes lot to be reworked following this first result

$_2$ denotes lot result following further mixing of soils

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

NES - National Environmental Standard for Assessing and Managing Contaminants in Soils, MfE
NEPM - National Environmental Protection Measures 2013, Formerly NEPC, Australia
ANZWQ - Australian and New Zealand - Guidelines for Fresh and Marine Water Quality (online) - Sediment GV-high
* Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Appendix G – Laboratory Reports

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Certificate of Analysis

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
Christchurch 7671

Attention: Nicola Peacock
Phone: 0275134057
Email: hollie@mallochenviro.co.nz

Lab Reference: 20-27886
Submitted by: Hollie Griffith
Date Received: 31/07/2020
Testing Initiated: 31/07/2020
Date Completed: 4/08/2020
Order Number: N/A
Reference: N/A

Sampling Site: 1 Sutherlands Rd, Halswell, Chch

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

	Client Sample ID		SS41.1 0-50	SS41.2 250	SS42.1 0-50	SS42.2 250	SS40.1 0-50
	Date Sampled		30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Analyte	Unit	*Reporting Limit*	20-27886-1	20-27886-2	20-27886-3	20-27886-4	20-27886-5
Arsenic	mg/kg dry wt	*0.125*	3.8	4.6	4.1	4.5	4.5
Cadmium	mg/kg dry wt	*0.005*	0.041	0.021	0.040	0.034	0.031
Chromium	mg/kg dry wt	*0.125*	14.4	15.6	15.2	16.2	15.6
Copper	mg/kg dry wt	*0.075*	5.1	6.7	6.3	6.8	6.1
Lead	mg/kg dry wt	*0.25*	13.2	15.1	18.0	16.3	14.7
Nickel	mg/kg dry wt	*0.05*	10.7	12.1	11.1	12.4	11.6
Zinc	mg/kg dry wt	*0.05*	47.7	47.7	58.4	55.9	49.2

Heavy Metals in Soil

	Client Sample ID		SS40.2 250	SS39.1 0-50	SS39.2 250	SS20.1 0-50	SS20.2 250
	Date Sampled		30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Analyte	Unit	*Reporting Limit*	20-27886-6	20-27886-7	20-27886-8	20-27886-9	20-27886-10
Arsenic	mg/kg dry wt	*0.125*	4.3	4.4	4.1	4.5	4.7
Cadmium	mg/kg dry wt	*0.005*	0.027	0.046	0.065	0.034	0.037
Chromium	mg/kg dry wt	*0.125*	15.2	15.4	15.0	15.2	16.5
Copper	mg/kg dry wt	*0.075*	6.8	6.4	7.2	6.6	6.5
Lead	mg/kg dry wt	*0.25*	14.0	20.9	19.7	17.1	18.6
Nickel	mg/kg dry wt	*0.05*	11.6	11.8	11.3	11.6	12.0
Zinc	mg/kg dry wt	*0.05*	44.4	66.5	61.2	57.1	54.2

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation, with the exception of tests marked *, which are not accredited.

Heavy Metals in Soil

			Client Sample ID	SS19.1 0-50	SS19.2 250
			Date Sampled	30/07/2020	30/07/2020
Analyte		Unit	*Reporting Limit*	20-27886-11	20-27886-12
Arsenic		mg/kg dry wt	*0.125*	4.4	4.2
Cadmium		mg/kg dry wt	*0.005*	0.040	0.024
Chromium		mg/kg dry wt	*0.125*	15.2	15.9
Copper		mg/kg dry wt	*0.075*	6.9	6.1
Lead		mg/kg dry wt	*0.25*	14.8	14.0
Nickel		mg/kg dry wt	*0.05*	11.6	11.1
Zinc		mg/kg dry wt	*0.05*	52.3	50.2

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Emily Hanna, B.Sc.
Trace Elements Team Leader

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Certificate of Analysis

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
Christchurch 7671

Attention: Nicola Peacock
Phone: 027 513 4057
Email: hollie@mallochenviro.co.nz

Lab Reference: 20-31430
Submitted by: Hollie Griffith
Date Received: 27/08/2020
Testing Initiated: 27/08/2020
Date Completed: 31/08/2020
Order Number:
Reference:

Sampling Site: 1 Sutherlands Rd, Halswell

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

		Client Sample ID	SP-1 Stockpile	SP-2 Stockpile	SP-3 Stockpile	SP-4 Stockpile	SP-5 Stockpile
		Date Sampled	26/08/2020	26/08/2020	26/08/2020	26/08/2020	26/08/2020
Analyte	Unit	*Reporting Limit*	20-31430-1	20-31430-2	20-31430-3	20-31430-4	20-31430-5
Arsenic	mg/kg dry wt	*0.125*	4.4	4.1	3.8	4.5	4.1
Cadmium	mg/kg dry wt	*0.005*	0.034	0.030	0.033	0.028	0.029
Chromium	mg/kg dry wt	*0.125*	15.5	15.3	14.0	15.5	14.8
Copper	mg/kg dry wt	*0.075*	7.2	7.1	5.6	7.4	7.1
Lead	mg/kg dry wt	*0.25*	13.6	12.5	13.3	13.8	13.0
Nickel	mg/kg dry wt	*0.05*	11.8	12.0	10.9	12.0	11.8
Zinc	mg/kg dry wt	*0.05*	47.2	43.2	45.0	46.5	46.6

Heavy Metals in Soil

		Client Sample ID	SP-6 Stockpile
		Date Sampled	26/08/2020
Analyte	Unit	*Reporting Limit*	20-31430-6
Arsenic	mg/kg dry wt	*0.125*	4.1
Cadmium	mg/kg dry wt	*0.005*	0.030
Chromium	mg/kg dry wt	*0.125*	14.3
Copper	mg/kg dry wt	*0.075*	7.0
Lead	mg/kg dry wt	*0.25*	12.3
Nickel	mg/kg dry wt	*0.05*	11.9
Zinc	mg/kg dry wt	*0.05*	43.9

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation, with the exception of tests marked *, which are not accredited.

Method Summary

Elements in Soil	Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Emily Hanna, B.Sc.
Trace Elements Team Leader

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Certificate of Analysis

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
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Attention: Nicola Peacock
Phone: 027 513 4057
Email: hollie@mallochenviro.co.nz

Lab Reference: 20-38986
Submitted by: Hollie Griffith
Date Received: 16/10/2020
Testing Initiated: 16/10/2020
Date Completed: 21/10/2020
Order Number:
Reference:

Sampling Site: 1 Sutherlands Road, Halswell

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

	Client Sample ID		SS65.1 0-50	SS65.2 250	SS66.1 0-50	SS66.2 250	SS67.1 0-50
	Date Sampled		15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-1	20-38986-2	20-38986-3	20-38986-4	20-38986-5
Arsenic	mg/kg dry wt	*0.125*	13.6	10	11	11	12
Cadmium	mg/kg dry wt	*0.005*	0.075	0.063	0.075	0.089	0.058
Chromium	mg/kg dry wt	*0.125*	17.3	17.1	16.1	15.9	15.1
Copper	mg/kg dry wt	*0.075*	11.4	10.2	10.3	12.7	9.34
Lead	mg/kg dry wt	*0.25*	19.8	18.5	18.2	20.5	16.8
Nickel	mg/kg dry wt	*0.05*	13.9	13.7	12.3	11.8	12.0
Zinc	mg/kg dry wt	*0.05*	65.0	60.5	64.2	63.2	60.0

Heavy Metals in Soil

	Client Sample ID		SS67.2 350	SS68.1 0-50	SS68.2 300	SS87.1 0-50	SS87.2 500
	Date Sampled		15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-6	20-38986-7	20-38986-8	20-38986-9	20-38986-10
Arsenic	mg/kg dry wt	*0.125*	4.1	11	4.7	9.2	4.1
Cadmium	mg/kg dry wt	*0.005*	0.027	0.065	0.032	0.064	0.041
Chromium	mg/kg dry wt	*0.125*	14.5	15.2	14.8	14.4	13.4
Copper	mg/kg dry wt	*0.075*	6.7	9.33	7.2	9.20	6.7
Lead	mg/kg dry wt	*0.25*	12.9	17.6	13.6	18.4	14.4
Nickel	mg/kg dry wt	*0.05*	10.4	12.0	10.7	10.7	9.61
Zinc	mg/kg dry wt	*0.05*	44.4	60.0	47.2	69.1	50.5

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation, with the exception of tests marked *, which are not accredited.

Heavy Metals in Soil

Client Sample ID			SS88.1 0-50	SS88.2 300	SS85.1 0-50	SS85.2 300	SS86.1 0-50
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-11	20-38986-12	20-38986-13	20-38986-14	20-38986-15
Arsenic	mg/kg dry wt	*0.125*	12	8.8	15.3	4.5	7.4
Cadmium	mg/kg dry wt	*0.005*	0.071	0.068	0.12	0.036	0.081
Chromium	mg/kg dry wt	*0.125*	14.5	16.1	16.9	14.9	18.9
Copper	mg/kg dry wt	*0.075*	9.33	10.3	13.9	6.5	13.3
Lead	mg/kg dry wt	*0.25*	16.6	18.3	21.1	14.9	20.3
Nickel	mg/kg dry wt	*0.05*	11.7	13.1	14.0	11.8	18.9
Zinc	mg/kg dry wt	*0.05*	57.2	56.2	59.4	47.6	59.9

Heavy Metals in Soil

Client Sample ID			SS86.2 350	SS84.1 0-50	SS84.2 300	SS83.1 0-50	SS83.2 400
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-16	20-38986-17	20-38986-18	20-38986-19	20-38986-20
Arsenic	mg/kg dry wt	*0.125*	17.3	11	5.9	6.7	6.3
Cadmium	mg/kg dry wt	*0.005*	0.080	0.078	0.044	0.059	0.050
Chromium	mg/kg dry wt	*0.125*	15.3	15.1	14.3	16.1	14.7
Copper	mg/kg dry wt	*0.075*	8.90	9.51	8.60	9.18	7.2
Lead	mg/kg dry wt	*0.25*	16.3	18.1	15.2	15.9	14.6
Nickel	mg/kg dry wt	*0.05*	12.5	12.0	11.3	14.4	12.0
Zinc	mg/kg dry wt	*0.05*	53.1	56.1	48.2	53.2	47.9

Heavy Metals in Soil

Client Sample ID			SS81.1 0-50	SS81.2 350	SS82.1 0-50	SS82.2 450	SS80.1 0-50
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-21	20-38986-22	20-38986-23	20-38986-24	20-38986-25
Arsenic	mg/kg dry wt	*0.125*	11	6.3	4.5	5.6	14.3
Cadmium	mg/kg dry wt	*0.005*	0.080	0.046	0.071	0.038	0.10
Chromium	mg/kg dry wt	*0.125*	14.9	14.7	24.4	15.0	15.6
Copper	mg/kg dry wt	*0.075*	9.18	8.78	24.5	8.34	10.7
Lead	mg/kg dry wt	*0.25*	17.9	16.0	18.3	14.4	19.2
Nickel	mg/kg dry wt	*0.05*	11.8	11.8	36.3	12.6	12.4
Zinc	mg/kg dry wt	*0.05*	55.8	50.1	66.7	46.8	57.5

Heavy Metals in Soil

Client Sample ID			SS80.2 300	SS79.1 0-50	SS79.2 300	SS78.1 0-50	SS78.2 300
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-26	20-38986-27	20-38986-28	20-38986-29	20-38986-30
Arsenic	mg/kg dry wt	*0.125*	5.2	11	12	13.3	13.1
Cadmium	mg/kg dry wt	*0.005*	0.040	0.097	0.10	0.064	0.074
Chromium	mg/kg dry wt	*0.125*	14.1	15.0	12	14.9	15.7
Copper	mg/kg dry wt	*0.075*	7.69	10.3	11.8	8.58	7.51
Lead	mg/kg dry wt	*0.25*	13.2	18.3	14.8	16.2	16.7
Nickel	mg/kg dry wt	*0.05*	11.3	11.8	9.83	13.3	11.9
Zinc	mg/kg dry wt	*0.05*	44.2	54.9	37.4	54.3	57.0

Heavy Metals in Soil

Client Sample ID			SP7 Stockpile	SP8 Stockpile	SP9 Stockpile	SP10 Stockpile	SP11 Stockpile
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-31	20-38986-32	20-38986-33	20-38986-34	20-38986-35
Arsenic	mg/kg dry wt	*0.125*	1.7	1.7	3.2	3.0	4.6
Cadmium	mg/kg dry wt	*0.005*	0.064	0.050	0.032	0.032	0.047
Chromium	mg/kg dry wt	*0.125*	30.4	29.4	12	14.8	16.4
Copper	mg/kg dry wt	*0.075*	45.5	39.4	7.52	10.3	12.5
Lead	mg/kg dry wt	*0.25*	9.16	7.89	12.6	13.9	15.5
Nickel	mg/kg dry wt	*0.05*	62.9	56.5	11.6	16.3	18.9
Zinc	mg/kg dry wt	*0.05*	62.4	58.0	38.9	44.3	49.9

Heavy Metals in Soil

Client Sample ID			SP12 Stockpile	SS6.1 0-50	SS6.2 300	SS26.1 0-50	SS26.2 300
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-36	20-38986-37	20-38986-38	20-38986-39	20-38986-40
Arsenic	mg/kg dry wt	*0.125*	5.2	9.6	13.5	11	9.1
Cadmium	mg/kg dry wt	*0.005*	0.027	0.066	0.10	0.060	0.058
Chromium	mg/kg dry wt	*0.125*	15.6	15.8	16.4	13.8	13.3
Copper	mg/kg dry wt	*0.075*	7.92	7.4	9.48	7.71	7.0
Lead	mg/kg dry wt	*0.25*	17.4	18.8	18.3	14.5	13.3
Nickel	mg/kg dry wt	*0.05*	12.7	12.5	12.8	11.4	10.9
Zinc	mg/kg dry wt	*0.05*	53.1	53.9	58.9	48.8	44.7

Heavy Metals in Soil

Client Sample ID			SS7.1 0-50	SS7.2 0-50	SS7.3 300	SS25.1 0-50	SS25.2 300
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-41	20-38986-42	20-38986-43	20-38986-44	20-38986-45
Arsenic	mg/kg dry wt	*0.125*	12	12	13.1	13.9	24.7
Cadmium	mg/kg dry wt	*0.005*	0.060	0.064	0.079	0.078	0.055
Chromium	mg/kg dry wt	*0.125*	13.9	14.4	15.1	14.2	14.3
Copper	mg/kg dry wt	*0.075*	6.0	6.0	8.39	8.61	8.63
Lead	mg/kg dry wt	*0.25*	14.3	14.4	16.9	16.3	14.5
Nickel	mg/kg dry wt	*0.05*	10.9	11.3	11.6	11.6	11.2
Zinc	mg/kg dry wt	*0.05*	47.3	49.0	56.1	50.9	47.5

Heavy Metals in Soil

Client Sample ID			SS8.1 0-50	SS8.2 400	SS9.1 0-50	SS9.2 400	SS9.3 400
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-46	20-38986-47	20-38986-48	20-38986-49	20-38986-50
Arsenic	mg/kg dry wt	*0.125*	10	6.8	15.2	4.4	4.6
Cadmium	mg/kg dry wt	*0.005*	0.062	0.032	0.088	0.030	0.031
Chromium	mg/kg dry wt	*0.125*	14.8	14.9	16.1	13.2	12
Copper	mg/kg dry wt	*0.075*	7.2	6.9	9.11	6.8	7.1
Lead	mg/kg dry wt	*0.25*	15.0	14.0	18.4	12.6	12.2
Nickel	mg/kg dry wt	*0.05*	12.3	10.8	12.9	10.1	9.81
Zinc	mg/kg dry wt	*0.05*	53.9	44.7	60.2	39.8	36.7

Heavy Metals in Soil

Client Sample ID			SS24.1 0-50	SS24.2 250	SS23.1 0-50	SS23.2 300	SS10.1 0-50
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-51	20-38986-52	20-38986-53	20-38986-54	20-38986-55
Arsenic	mg/kg dry wt	*0.125*	17.7	18.9	19.7	19.6	14.8
Cadmium	mg/kg dry wt	*0.005*	0.068	0.041	0.085	0.064	0.074
Chromium	mg/kg dry wt	*0.125*	14.7	15.5	14.7	15.1	16.3
Copper	mg/kg dry wt	*0.075*	8.80	6.8	8.95	7.59	7.88
Lead	mg/kg dry wt	*0.25*	17.1	13.0	17.6	16.1	16.8
Nickel	mg/kg dry wt	*0.05*	12.0	10.8	12.2	11.3	12.5
Zinc	mg/kg dry wt	*0.05*	54.7	46.3	49.9	45.5	56.9

Heavy Metals in Soil

Client Sample ID			SS10.2 400	SS22.1 0-50	SS22.2 300	SS11.1 0-50	SS11.2 400
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-56	20-38986-57	20-38986-58	20-38986-59	20-38986-60
Arsenic	mg/kg dry wt	*0.125*	5.6	11	7.5	18.3	5.2
Cadmium	mg/kg dry wt	*0.005*	0.030	0.080	0.051	0.057	0.037
Chromium	mg/kg dry wt	*0.125*	13.4	15.5	14.4	14.9	13.0
Copper	mg/kg dry wt	*0.075*	7.1	8.23	7.3	7.1	6.7
Lead	mg/kg dry wt	*0.25*	14.3	16.6	15.3	14.8	12.2
Nickel	mg/kg dry wt	*0.05*	10.1	12.4	10.6	11.3	12.0
Zinc	mg/kg dry wt	*0.05*	43.8	60.2	50.4	47.1	39.8

Heavy Metals in Soil

Client Sample ID			SS21.1 0-50	SS21.2 300	SS12.1 0-50	SS12.2 400	SS16.1 0-50
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-61	20-38986-62	20-38986-63	20-38986-64	20-38986-65
Arsenic	mg/kg dry wt	*0.125*	14.9	14.5	15.8	6.4	14.5
Cadmium	mg/kg dry wt	*0.005*	0.079	0.087	0.092	0.024	0.074
Chromium	mg/kg dry wt	*0.125*	14.9	16.4	14.5	13.6	17.0
Copper	mg/kg dry wt	*0.075*	8.76	8.71	8.43	7.1	8.04
Lead	mg/kg dry wt	*0.25*	16.7	17.6	16.7	12.4	16.8
Nickel	mg/kg dry wt	*0.05*	12.3	13.3	12.4	11.3	13.0
Zinc	mg/kg dry wt	*0.05*	56.3	60.4	52.6	38.4	55.9

Heavy Metals in Soil

Client Sample ID			SS16.2 300	SS15.1 0-50	SS15.2 500	SS13.1 0-50	SS13.2 500
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-66	20-38986-67	20-38986-68	20-38986-69	20-38986-70
Arsenic	mg/kg dry wt	*0.125*	18.8	14.0	15.0	19.1	7.2
Cadmium	mg/kg dry wt	*0.005*	0.086	0.069	0.083	0.092	0.046
Chromium	mg/kg dry wt	*0.125*	15.9	16.1	16.9	15.0	15.4
Copper	mg/kg dry wt	*0.075*	7.55	8.90	8.44	8.70	7.4
Lead	mg/kg dry wt	*0.25*	17.2	17.3	18.0	16.2	16.7
Nickel	mg/kg dry wt	*0.05*	11.9	12.1	13.1	12.5	12.0
Zinc	mg/kg dry wt	*0.05*	56.2	53.9	61.2	53.4	51.8

Heavy Metals in Soil

Client Sample ID			SS14.1 0-50	SS14.2 500	SS17.1 0-50	SS17.2 350	SS18.1 0-50
Date Sampled			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-71	20-38986-72	20-38986-73	20-38986-74	20-38986-75
Arsenic	mg/kg dry wt	*0.125*	12	6.1	12.8	10	11
Cadmium	mg/kg dry wt	*0.005*	0.097	0.049	0.069	0.058	0.086
Chromium	mg/kg dry wt	*0.125*	16.3	14.2	16.7	17.5	17.1
Copper	mg/kg dry wt	*0.075*	10.0	6.2	8.20	7.78	8.51
Lead	mg/kg dry wt	*0.25*	19.8	14.4	17.5	17.5	17.6
Nickel	mg/kg dry wt	*0.05*	13.2	10.3	13.4	13.1	12.9
Zinc	mg/kg dry wt	*0.05*	55.3	43.5	60.9	56.3	57.4

Heavy Metals in Soil

Client Sample ID			SS18.2 300
Date Sampled			15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-76
Arsenic	mg/kg dry wt	*0.125*	5.6
Cadmium	mg/kg dry wt	*0.005*	0.050
Chromium	mg/kg dry wt	*0.125*	15.7
Copper	mg/kg dry wt	*0.075*	8.82
Lead	mg/kg dry wt	*0.25*	14.7
Nickel	mg/kg dry wt	*0.05*	12.2
Zinc	mg/kg dry wt	*0.05*	46.8

Total Heavy Metals in Water

Client Sample ID			RW1 -
Date Sampled			15/10/2020
Analyte	Unit	*Reporting Limit*	20-38986-77
Arsenic	g/m^3	*0.0005*	0.00090
Cadmium	g/m^3	*0.00002*	0.000022
Chromium	g/m^3	*0.0002*	0.0018
Copper	g/m^3	*0.0002*	0.0282
Lead	g/m^3	*0.00005*	0.00532
Nickel	g/m^3	*0.0002*	0.0011
Zinc	g/m^3	*0.003*	0.029

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Recoverable Trace Elements Samples were analysed as received by the laboratory using ICP-MS following an acid digestion. In house procedure based on US EPA method 200.8.

Emily Hanna, B.Sc.
Trace Elements Team Leader

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Certificate of Analysis

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
Christchurch

Attention: Nicola Peacock
Phone: 027 513 4057
Email: hollie@mallochenviro.co.nz

Lab Reference: 20-41020
Submitted by: Hollie Griffith
Date Received: 30/10/2020
Testing Initiated: 30/10/2020
Date Completed: 3/11/2020
Order Number:
Reference:

Sampling Site: 1 Sutherlands Road, Halswell

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

	Client Sample ID		SS1.1 0-50	SS1.2 300	SS2.1 0-50	SS2.2 300	SS3.1 0-50
	Date Sampled		29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
Analyte	Unit	*Reporting Limit*	20-41020-1	20-41020-2	20-41020-3	20-41020-4	20-41020-5
Arsenic	mg/kg dry wt	*0.125*	13.3	4.9	18.1	4.7	9.1
Cadmium	mg/kg dry wt	*0.005*	0.082	0.032	0.071	0.029	0.096
Chromium	mg/kg dry wt	*0.125*	16.3	16.0	16.1	15.7	17.1
Copper	mg/kg dry wt	*0.075*	8.26	6.7	7.96	6.4	10.0
Lead	mg/kg dry wt	*0.25*	17.1	15.3	17.7	14.6	18.2
Nickel	mg/kg dry wt	*0.05*	12.8	11.7	12.7	11.3	14.3
Zinc	mg/kg dry wt	*0.05*	58.8	48.4	66.0	46.2	60.2

Heavy Metals in Soil

	Client Sample ID		SS3.2 350	SS4.1 0-50	SS4.2 350	SS5.1 0-50	SS5.2 0-50
	Date Sampled		29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
Analyte	Unit	*Reporting Limit*	20-41020-6	20-41020-7	20-41020-8	20-41020-9	20-41020-10
Arsenic	mg/kg dry wt	*0.125*	4.3	15.0	5.3	10	10
Cadmium	mg/kg dry wt	*0.005*	0.029	0.11	0.026	0.092	0.086
Chromium	mg/kg dry wt	*0.125*	14.5	16.5	15.1	16.3	15.4
Copper	mg/kg dry wt	*0.075*	6.2	10.5	7.66	8.92	8.78
Lead	mg/kg dry wt	*0.25*	14.0	18.2	16.6	17.3	16.9
Nickel	mg/kg dry wt	*0.05*	11.0	13.6	11.8	13.4	12.6
Zinc	mg/kg dry wt	*0.05*	43.5	63.8	50.4	55.2	54.5

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation, with the exception of tests marked *, which are not accredited.

Heavy Metals in Soil

	Client Sample ID		SS5.3 350	SS43.1 0-50	SS43.2 350	SS44.1 0-50	SS44.2 350
	Date Sampled		29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
Analyte	Unit	*Reporting Limit*	20-41020-11	20-41020-12	20-41020-13	20-41020-14	20-41020-15
Arsenic	mg/kg dry wt	*0.125*	5.5	12	4.6	12.5	5.6
Cadmium	mg/kg dry wt	*0.005*	0.040	0.081	0.028	0.086	0.037
Chromium	mg/kg dry wt	*0.125*	15.4	15.3	14.5	16.4	15.5
Copper	mg/kg dry wt	*0.075*	6.2	8.31	6.8	8.54	7.4
Lead	mg/kg dry wt	*0.25*	14.2	16.8	13.3	17.7	13.9
Nickel	mg/kg dry wt	*0.05*	11.4	12.4	10.8	13.1	11.8
Zinc	mg/kg dry wt	*0.05*	48.4	56.9	44.7	59.7	46.1

Heavy Metals in Soil

	Client Sample ID		SS45.1 0-50	SS45.2 350
	Date Sampled		29/10/2020	29/10/2020
Analyte	Unit	*Reporting Limit*	20-41020-16	20-41020-17
Arsenic	mg/kg dry wt	*0.125*	14.2	5.6
Cadmium	mg/kg dry wt	*0.005*	0.081	0.033
Chromium	mg/kg dry wt	*0.125*	16.4	14.4
Copper	mg/kg dry wt	*0.075*	8.23	9.43
Lead	mg/kg dry wt	*0.25*	17.8	17.9
Nickel	mg/kg dry wt	*0.05*	13.0	11.6
Zinc	mg/kg dry wt	*0.05*	58.7	50.8

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Sharelle Frank, B.Sc. (Tech)
Technologist

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Certificate of Analysis

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Christchurch 7671

Attention: Nicola Peacock
Phone: 027 513 4057
Email: hollie@mallochenviro.co.nz

Sampling Site: 1 Sutherlands Road

Lab Reference: 21-26606
Submitted by: Hollie Griffith
Date Received: 14/06/2021
Testing Initiated: 14/06/2021
Date Completed: 17/06/2021
Order Number:
Reference:

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

			Client Sample ID	SS56.1 50	SS56.2 250	SS46.1 0-50	SS46.2 300	SS47.1 0-50
			Date Sampled	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*		21-26606-1	21-26606-2	21-26606-3	21-26606-4	21-26606-5
Arsenic	mg/kg dry wt	*0.125*		6.6	4.6	15.1	13.5	14.2
Cadmium	mg/kg dry wt	*0.005*		0.050	0.025	0.14	0.15	0.15
Chromium	mg/kg dry wt	*0.125*		14.9	14.8	17.2	16.7	16.6
Copper	mg/kg dry wt	*0.075*		8.90	8.98	11.8	11.2	11.1
Lead	mg/kg dry wt	*0.25*		15.7	13.7	20.3	18.9	19.3
Nickel	mg/kg dry wt	*0.05*		12.4	12.6	14.6	13.7	14.4
Zinc	mg/kg dry wt	*0.05*		46.7	41.8	56.6	58.1	54.1

Heavy Metals in Soil

			Client Sample ID	SS47.2 30	SS57.1 50	SS57.2 500	SS21.1 0-50	SS21.2 300
			Date Sampled	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*		21-26606-6	21-26606-7	21-26606-8	21-26606-9	21-26606-10
Arsenic	mg/kg dry wt	*0.125*		10	12	5.5	13.9	13.0
Cadmium	mg/kg dry wt	*0.005*		0.083	0.083	0.041	0.076	0.072
Chromium	mg/kg dry wt	*0.125*		16.8	17.6	15.7	15.7	15.6
Copper	mg/kg dry wt	*0.075*		10.8	11.4	7.61	9.30	8.64
Lead	mg/kg dry wt	*0.25*		19.8	19.8	15.9	17.2	17.4
Nickel	mg/kg dry wt	*0.05*		14.1	14.6	13.1	13.4	13.2
Zinc	mg/kg dry wt	*0.05*		52.5	59.3	44.1	52.0	49.8

Heavy Metals in Soil

Client Sample ID			SS22.1 050	SS22.2 350	SS23.1 0-50	SS23.2 500	SS141.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-11	21-26606-12	21-26606-13	21-26606-14	21-26606-15
Arsenic	mg/kg dry wt	*0.125*	16.1	6.7	13.9	8.8	14.9
Cadmium	mg/kg dry wt	*0.005*	0.079	0.048	0.058	0.052	0.076
Chromium	mg/kg dry wt	*0.125*	17.3	16.3	15.7	14.9	17.6
Copper	mg/kg dry wt	*0.075*	9.93	7.5	9.07	8.83	12.2
Lead	mg/kg dry wt	*0.25*	18.6	16.2	17.2	16.3	21.4
Nickel	mg/kg dry wt	*0.05*	14.3	12.6	13.1	13.1	14.9
Zinc	mg/kg dry wt	*0.05*	58.8	44.6	49.0	45.5	58.2

Heavy Metals in Soil

Client Sample ID			SS141.2 0-50	SS141.3 150	SS140.1 0-50	SS140.2 150	SS24.1 50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-16	21-26606-17	21-26606-18	21-26606-19	21-26606-20
Arsenic	mg/kg dry wt	*0.125*	13.9	13.8	14.9	20.2	15.4
Cadmium	mg/kg dry wt	*0.005*	0.076	0.079	0.071	0.070	0.074
Chromium	mg/kg dry wt	*0.125*	16.0	17.6	16.3	18.2	15.9
Copper	mg/kg dry wt	*0.075*	11.7	11.6	11.2	11.2	9.77
Lead	mg/kg dry wt	*0.25*	20.3	22.6	17.9	20.5	16.7
Nickel	mg/kg dry wt	*0.05*	13.2	16.0	14.1	16.0	13.3
Zinc	mg/kg dry wt	*0.05*	51.4	58.0	52.1	60.4	52.4

Heavy Metals in Soil

Client Sample ID			SS24.2 500	SS25.1 0-50	SS25.2 250	SS26.1 50	SS26.2 250
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-21	21-26606-22	21-26606-23	21-26606-24	21-26606-25
Arsenic	mg/kg dry wt	*0.125*	9.7	11	12	12	12
Cadmium	mg/kg dry wt	*0.005*	0.053	0.071	0.063	0.062	0.066
Chromium	mg/kg dry wt	*0.125*	16.1	14.6	15.7	14.3	15.2
Copper	mg/kg dry wt	*0.075*	9.18	8.57	8.73	7.85	8.73
Lead	mg/kg dry wt	*0.25*	19.4	14.4	16.4	14.7	15.5
Nickel	mg/kg dry wt	*0.05*	13.2	12.3	12.5	11.7	12.9
Zinc	mg/kg dry wt	*0.05*	49.4	46.1	45.8	42.3	46.2

Heavy Metals in Soil

Client Sample ID			SS138.1 0-50	SS138.2 200	SS139.1 0-50	SS139.2 250	SS137.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-26	21-26606-27	21-26606-28	21-26606-29	21-26606-30
Arsenic	mg/kg dry wt	*0.125*	16.6	17.2	24.7	22.0	14.3
Cadmium	mg/kg dry wt	*0.005*	0.064	0.12	0.074	0.068	0.068
Chromium	mg/kg dry wt	*0.125*	16.0	24.8	17.3	16.6	15.1
Copper	mg/kg dry wt	*0.075*	10.4	19.9	11.2	10.5	10.1
Lead	mg/kg dry wt	*0.25*	18.5	45.7	20.2	19.5	19.3
Nickel	mg/kg dry wt	*0.05*	13.5	15.7	15.0	14.4	12.7
Zinc	mg/kg dry wt	*0.05*	51.9	79.3	58.1	54.9	57.3

Heavy Metals in Soil

Client Sample ID			SS137.2 250	SS62.1 50	SS62.2 250	SS63.1 0-50	SS63.2 250
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-31	21-26606-32	21-26606-33	21-26606-34	21-26606-35
Arsenic	mg/kg dry wt	*0.125*	14.7	2.7	2.7	9.1	13.1
Cadmium	mg/kg dry wt	*0.005*	0.074	0.028	0.021	0.062	0.071
Chromium	mg/kg dry wt	*0.125*	16.4	9.9	11	14.1	14.6
Copper	mg/kg dry wt	*0.075*	10.6	4.9	3.5	7.62	8.73
Lead	mg/kg dry wt	*0.25*	19.8	10.2	8.88	15.8	17.1
Nickel	mg/kg dry wt	*0.05*	13.1	5.97	6.12	9.97	11.0
Zinc	mg/kg dry wt	*0.05*	59.0	33.2	28.1	57.6	56.7

Heavy Metals in Soil

Client Sample ID			SS109.1 0-50	SS109.2 200	SS64.1 0-50	SS64.2 250	SS110.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-36	21-26606-37	21-26606-38	21-26606-39	21-26606-40
Arsenic	mg/kg dry wt	*0.125*	13.7	12.8	9.1	4.8	13.4
Cadmium	mg/kg dry wt	*0.005*	0.076	0.083	0.050	0.052	0.096
Chromium	mg/kg dry wt	*0.125*	16.2	16.6	12.8	15.0	15.4
Copper	mg/kg dry wt	*0.075*	10.5	11.4	6.8	8.21	10.7
Lead	mg/kg dry wt	*0.25*	20.4	21.2	14.6	15.7	19.6
Nickel	mg/kg dry wt	*0.05*	12.3	13.1	8.82	11.7	12.0
Zinc	mg/kg dry wt	*0.05*	58.8	56.3	48.8	52.7	57.4

Heavy Metals in Soil

Client Sample ID			SS110.2 250	SS111.1 0-50	SS111.2 250	SS107.1 50	SS107.2 250
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-41	21-26606-42	21-26606-43	21-26606-44	21-26606-45
Arsenic	mg/kg dry wt	*0.125*	16.6	15.7	18.4	12.8	6.7
Cadmium	mg/kg dry wt	*0.005*	0.096	0.081	0.076	0.065	0.037
Chromium	mg/kg dry wt	*0.125*	17.9	18.0	17.3	14.0	16.1
Copper	mg/kg dry wt	*0.075*	12.4	12.6	11.3	8.08	8.69
Lead	mg/kg dry wt	*0.25*	21.2	20.6	20.9	16.8	17.5
Nickel	mg/kg dry wt	*0.05*	14.3	15.2	13.9	9.89	12.3
Zinc	mg/kg dry wt	*0.05*	66.3	63.8	61.0	54.8	54.2

Heavy Metals in Soil

Client Sample ID			SS108.1 50	SS108.2 250	SS112.1 0-50	SS112.2 250	SS113.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-46	21-26606-47	21-26606-48	21-26606-49	21-26606-50
Arsenic	mg/kg dry wt	*0.125*	12.8	15.1	11	13.0	12
Cadmium	mg/kg dry wt	*0.005*	0.050	0.061	0.080	0.091	0.11
Chromium	mg/kg dry wt	*0.125*	15.4	16.2	17.3	16.1	17.4
Copper	mg/kg dry wt	*0.075*	8.22	9.18	12.2	11.2	11.5
Lead	mg/kg dry wt	*0.25*	16.6	19.4	20.8	20.3	22.1
Nickel	mg/kg dry wt	*0.05*	12.0	11.8	13.5	12.7	13.5
Zinc	mg/kg dry wt	*0.05*	55.5	56.1	61.4	56.0	63.4

Heavy Metals in Soil

Client Sample ID			SS113.2 250	SS114.1 0-50	SS114.2 250	SS115.1 0-50	SS115.2 250
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-51	21-26606-52	21-26606-53	21-26606-54	21-26606-55
Arsenic	mg/kg dry wt	*0.125*	14.3	12	19.0	11	17.5
Cadmium	mg/kg dry wt	*0.005*	0.40	0.082	0.12	0.096	0.080
Chromium	mg/kg dry wt	*0.125*	17.6	15.0	18.3	18.7	17.6
Copper	mg/kg dry wt	*0.075*	12.1	11.7	13.3	12.6	12.0
Lead	mg/kg dry wt	*0.25*	21.2	20.1	24.3	24.0	34.2
Nickel	mg/kg dry wt	*0.05*	13.2	12.2	14.3	13.9	12.3
Zinc	mg/kg dry wt	*0.05*	63.2	55.3	88.5	68.7	65.9

Heavy Metals in Soil

Client Sample ID			SS116.1 50	SS116.2 250	SS117.1 0-50	SS117.2 250	SS118.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-56	21-26606-57	21-26606-58	21-26606-59	21-26606-60
Arsenic	mg/kg dry wt	*0.125*	12.7	13.1	13.9	14.7	14.6
Cadmium	mg/kg dry wt	*0.005*	0.10	0.091	0.081	0.11	0.13
Chromium	mg/kg dry wt	*0.125*	17.2	19.1	14.7	18.7	18.4
Copper	mg/kg dry wt	*0.075*	12.4	13.1	11.2	14.2	13.0
Lead	mg/kg dry wt	*0.25*	22.3	23.9	19.4	23.9	24.3
Nickel	mg/kg dry wt	*0.05*	13.2	13.5	11.9	15.0	14.8
Zinc	mg/kg dry wt	*0.05*	60.5	71.9	56.5	70.3	67.0

Heavy Metals in Soil

Client Sample ID			SS118.2 250	SS119.1 0-50	SS119.2 150	SS120.1	SS120.2
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-61	21-26606-62	21-26606-63	21-26606-64	21-26606-65
Arsenic	mg/kg dry wt	*0.125*	13.0	11	6.9	11	14.8
Cadmium	mg/kg dry wt	*0.005*	0.11	0.098	0.056	0.088	0.091
Chromium	mg/kg dry wt	*0.125*	16.9	14.9	20.0	18.2	17.2
Copper	mg/kg dry wt	*0.075*	13.2	10.3	12.2	12.8	13.1
Lead	mg/kg dry wt	*0.25*	22.8	17.8	21.8	23.5	22.9
Nickel	mg/kg dry wt	*0.05*	13.7	11.0	16.4	14.5	14.2
Zinc	mg/kg dry wt	*0.05*	66.2	49.7	68.6	64.9	65.8

Heavy Metals in Soil

Client Sample ID			SS121.1 0-50	SS121.2 250	SS122.1	SS122.2	SS123.1 50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-66	21-26606-67	21-26606-68	21-26606-69	21-26606-70
Arsenic	mg/kg dry wt	*0.125*	12	13.1	12	16.0	13.2
Cadmium	mg/kg dry wt	*0.005*	0.067	0.082	0.073	0.10	0.11
Chromium	mg/kg dry wt	*0.125*	19.4	16.8	15.9	16.3	17.8
Copper	mg/kg dry wt	*0.075*	11.0	11.7	12.0	13.3	13.6
Lead	mg/kg dry wt	*0.25*	21.4	20.7	21.8	20.2	22.4
Nickel	mg/kg dry wt	*0.05*	12.1	13.3	12.6	12.9	14.7
Zinc	mg/kg dry wt	*0.05*	56.1	60.6	58.7	60.7	63.5

Heavy Metals in Soil

			Client Sample ID	SS123.2 250	SS20.1	SS20.2
			Date Sampled	10/06/2021	10/06/2021	10/06/2021
Analyte		Unit	*Reporting Limit*	21-26606-71	21-26606-72	21-26606-73
Arsenic		mg/kg dry wt	*0.125*	15.2	9.2	11
Cadmium		mg/kg dry wt	*0.005*	0.091	0.082	0.059
Chromium		mg/kg dry wt	*0.125*	17.3	15.7	19.5
Copper		mg/kg dry wt	*0.075*	13.8	9.55	12.7
Lead		mg/kg dry wt	*0.25*	20.5	16.5	23.3
Nickel		mg/kg dry wt	*0.05*	14.4	13.5	17.5
Zinc		mg/kg dry wt	*0.05*	59.0	56.1	73.6

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Emily Hanna, B.Sc.
Trace Elements Team Leader

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Certificate of Analysis

Momentum Environmental Ltd
19 Robertsons Road, Kirwee, RD1
Christchurch 7671

Attention: Nicola Peacock
Phone: 0275134057
Email: hollie@momentumenviro.co.nz

Lab Reference: 21-49953
Submitted by: Hollie Griffith
Date Received: 01/12/2021
Testing Initiated: 1/12/2021
Date Completed: 3/12/2021
Order Number:
Reference: 363

Sampling Site: 1 Sutherlands Road, Halswell

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

		Client Sample ID	SS139.1 0-50	SS139.2 0-50	SS139.3 300	SS132.1 0-50	SS132.2 300
		Date Sampled	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021
Analyte	Unit	*Reporting Limit*	21-49953-1	21-49953-2	21-49953-3	21-49953-4	21-49953-5
Arsenic	mg/kg dry wt	*0.125*	18.2	19.4	11	12	8.0
Cadmium	mg/kg dry wt	*0.005*	0.094	0.079	0.078	0.058	0.051
Chromium	mg/kg dry wt	*0.125*	18.2	18.7	18.9	15.9	17.4
Copper	mg/kg dry wt	*0.075*	12.3	12.5	11.5	10.0	9.63
Lead	mg/kg dry wt	*0.25*	20.0	21.5	27.9	17.9	17.9
Nickel	mg/kg dry wt	*0.05*	13.7	14.3	14.0	13.2	13.9
Zinc	mg/kg dry wt	*0.05*	61.6	65.6	72.1	57.8	55.8

Heavy Metals in Soil

		Client Sample ID	SS133.1 0-50	SS133.2 300	SS134.1 0-50	SS134.2 300	SS135.1 0-50
		Date Sampled	30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021
Analyte	Unit	*Reporting Limit*	21-49953-6	21-49953-7	21-49953-8	21-49953-9	21-49953-10
Arsenic	mg/kg dry wt	*0.125*	14.3	8.5	13.5	13.4	15.3
Cadmium	mg/kg dry wt	*0.005*	0.066	0.046	0.058	0.067	0.058
Chromium	mg/kg dry wt	*0.125*	15.8	16.3	16.5	16.0	16.4
Copper	mg/kg dry wt	*0.075*	9.93	9.20	10.1	10.2	9.77
Lead	mg/kg dry wt	*0.25*	17.4	18.2	18.2	17.7	18.1
Nickel	mg/kg dry wt	*0.05*	12.5	13.3	12.9	13.1	12.4
Zinc	mg/kg dry wt	*0.05*	57.2	54.8	60.2	58.0	59.7

Heavy Metals in Soil

Client Sample ID			SS135.2 300	SS136.1 0-50	SS136.2 250	SS125.1 0-50	SS125.2 250
Date Sampled			30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021
Analyte	Unit	*Reporting Limit*	21-49953-11	21-49953-12	21-49953-13	21-49953-14	21-49953-15
Arsenic	mg/kg dry wt	*0.125*	18.6	16.7	22.5	18.6	47.3
Cadmium	mg/kg dry wt	*0.005*	0.080	0.073	0.068	0.072	0.097
Chromium	mg/kg dry wt	*0.125*	16.2	17.4	19.5	19.1	29.5
Copper	mg/kg dry wt	*0.075*	9.71	10.7	11.4	13.8	31.9
Lead	mg/kg dry wt	*0.25*	18.2	19.4	21.4	22.1	32.2
Nickel	mg/kg dry wt	*0.05*	12.1	13.8	15.0	15.0	12.8
Zinc	mg/kg dry wt	*0.05*	61.5	61.2	68.2	66.4	74.3

Heavy Metals in Soil

Client Sample ID			SS126.1 0-50	SS126.2 250	SS127.1 0-50	SS127.2 250	SS128.1 0-50
Date Sampled			30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021
Analyte	Unit	*Reporting Limit*	21-49953-16	21-49953-17	21-49953-18	21-49953-19	21-49953-20
Arsenic	mg/kg dry wt	*0.125*	21.6	16.1	19.2	20.7	17.0
Cadmium	mg/kg dry wt	*0.005*	0.073	0.091	0.076	0.098	0.083
Chromium	mg/kg dry wt	*0.125*	20.7	21.7	19.3	18.7	19.4
Copper	mg/kg dry wt	*0.075*	16.2	12.8	13.2	13.1	12.7
Lead	mg/kg dry wt	*0.25*	23.5	22.4	25.0	23.4	22.0
Nickel	mg/kg dry wt	*0.05*	14.3	14.2	14.7	14.3	15.5
Zinc	mg/kg dry wt	*0.05*	68.4	62.5	67.7	66.6	65.6

Heavy Metals in Soil

Client Sample ID			SS128.2 250	SS129.1 0-50	SS129.2 0-50	SS129.3 250	SS124.1 0-50
Date Sampled			30/11/2021	30/11/2021	30/11/2021	30/11/2021	30/11/2021
Analyte	Unit	*Reporting Limit*	21-49953-21	21-49953-22	21-49953-23	21-49953-24	21-49953-25
Arsenic	mg/kg dry wt	*0.125*	16.5	16.3	15.2	18.9	21.5
Cadmium	mg/kg dry wt	*0.005*	0.092	0.095	0.074	0.11	0.094
Chromium	mg/kg dry wt	*0.125*	18.4	19.1	19.3	17.8	21.5
Copper	mg/kg dry wt	*0.075*	12.4	12.5	13.9	13.0	16.9
Lead	mg/kg dry wt	*0.25*	21.2	21.9	22.5	21.2	24.4
Nickel	mg/kg dry wt	*0.05*	15.0	15.0	15.2	15.2	15.1
Zinc	mg/kg dry wt	*0.05*	63.3	67.3	66.2	64.6	71.9

Heavy Metals in Soil

Client Sample ID			SS124.2 250
Date Sampled			30/11/2021
Analyte	Unit	*Reporting Limit*	21-49953-26
Arsenic	mg/kg dry wt	*0.125*	22.3
Cadmium	mg/kg dry wt	*0.005*	0.065
Chromium	mg/kg dry wt	*0.125*	22.4
Copper	mg/kg dry wt	*0.075*	18.7
Lead	mg/kg dry wt	*0.25*	22.7
Nickel	mg/kg dry wt	*0.05*	13.8
Zinc	mg/kg dry wt	*0.05*	67.5

Method Summary

Elements in Soil	Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Sharelle Frank, B.Sc. (Tech)
Technologist

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Certificate of Analysis

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Christchurch 7671

Attention: Nicola Peacock
Phone: 0275134057
Email: hollie@momentumenviro.co.nz

Lab Reference: 22-02095
Submitted by: Hollie Griffith
Date Received: 21/01/2022
Testing Initiated: 21/01/2022
Date Completed: 26/01/2022
Order Number:
Reference: 363

Sampling Site: 1 Sutherlands Rd, Halswell

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Please note variance was observed on replicate samples for heavy metals which may indicate sample heterogeneity*

AMENDED REPORT. This report replaces in full a previous version [00]. Client updated sample ID.

Heavy Metals in Soil

			Client Sample ID	SS132.1 0-50	SS132.2 0-50	SS132.3 250	SS133.1 0-50	SS133.2 300
			Date Sampled	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022
Analyte		Unit	*Reporting Limit*	22-02095-1	22-02095-2	22-02095-3	22-02095-4	22-02095-5
Arsenic		mg/kg dry wt	*0.125*	17.5	16.7	12	13.7	3.7
Cadmium		mg/kg dry wt	*0.005*	0.089	0.082	0.077	0.067	0.032
Chromium		mg/kg dry wt	*0.125*	18.4	19.0	19.0	18.1	16.8
Copper		mg/kg dry wt	*0.075*	11.7	11.3	10.5	11.0	9.03
Lead		mg/kg dry wt	*0.25*	19.9	19.4	19.2	19.4	15.9
Nickel		mg/kg dry wt	*0.05*	14.6	14.6	14.3	14.4	13.8
Zinc		mg/kg dry wt	*0.05*	62.8	61.5	60.6	62.1	51.2

Heavy Metals in Soil

			Client Sample ID	SS134.1 0-50	SS134.2 300	SS135.1 0-50	SS135.2 300	SS136.1 0-50
			Date Sampled	20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022
Analyte		Unit	*Reporting Limit*	22-02095-6	22-02095-7	22-02095-8	22-02095-9	22-02095-10
Arsenic		mg/kg dry wt	*0.125*	13.8	15.0	13.5	15.8	12.7
Cadmium		mg/kg dry wt	*0.005*	0.071	0.082	0.076	0.080	0.076
Chromium		mg/kg dry wt	*0.125*	17.8	22.9	17.0	20.8	16.9
Copper		mg/kg dry wt	*0.075*	10.5	13.2	10.1	13.4	11.9
Lead		mg/kg dry wt	*0.25*	18.9	24.3	19.1	21.6	23.0
Nickel		mg/kg dry wt	*0.05*	13.7	16.4	12.7	14.6	13.9
Zinc		mg/kg dry wt	*0.05*	65.8	65.6	60.8	63.9	64.2

Heavy Metals in Soil

	Client Sample ID		SS136.2 250	SS124.1 0-50	SS124.2 250	SS125.1 0-50	SS125.2 300
	Date Sampled		20/01/2022	20/01/2022	20/01/2022	20/01/2022	20/01/2022
Analyte	Unit	*Reporting Limit*	22-02095-11	22-02095-12	22-02095-13	22-02095-14	22-02095-15
Arsenic	mg/kg dry wt	*0.125*	18.1	20.2	17.2	16.8	12.8
Cadmium	mg/kg dry wt	*0.005*	0.11	0.11	0.10	0.095	0.061
Chromium	mg/kg dry wt	*0.125*	19.7	21.8	19.1	21.2	18.6
Copper	mg/kg dry wt	*0.075*	14.3	14.7	14.7	15.3	12.6
Lead	mg/kg dry wt	*0.25*	23.2	26.0	23.0	23.1	24.4
Nickel	mg/kg dry wt	*0.05*	14.6	15.5	14.6	15.0	14.7
Zinc	mg/kg dry wt	*0.05*	67.6	68.2	66.9	67.3	70.9

Heavy Metals in Soil

	Client Sample ID		SS126.1 0-50	SS126.2 300
	Date Sampled		20/01/2022	20/01/2022
Analyte	Unit	*Reporting Limit*	22-02095-16	22-02095-17
Arsenic	mg/kg dry wt	*0.125*	16.3	9.4
Cadmium	mg/kg dry wt	*0.005*	0.11	0.061
Chromium	mg/kg dry wt	*0.125*	22.3	19.7
Copper	mg/kg dry wt	*0.075*	14.4	11.1
Lead	mg/kg dry wt	*0.25*	23.9	20.4
Nickel	mg/kg dry wt	*0.05*	16.0	14.3
Zinc	mg/kg dry wt	*0.05*	68.8	63.8

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Sharelle Frank, B.Sc. (Tech)
Technologist

Appendix H – Soil Disposal Location Plan

Graphic scale is approximate only

0 5 10 15m

Date: 22 February 2022 **Drawing No:** 1363/6

Soil Disposal Location Plan

1 Sutherlands Rd & 848 Cashmere Rd, Christchurch

Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3

MOMENTUM ENVIRONMENTAL LTD.

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LEGEND

- • SS — Validation Sample Location
- NO COLOUR — Material suitable for disposal as cleanfill
- Material NOT suitable for cleanfill but does meet current disposal criteria at Selwyn Quarries Ltd – 48 Selwyn Road, Rolleston
- Material suitable for disposal at Frews Wasteport (Chapmans Road)/Burwood Landfill or other appropriate facility

PLAN MUST BE PRINTED IN COLOUR

Notes:

1. This plan has been prepared for soil contamination risk assessment purposes only. No liability is accepted if the plan is used for any other purposes.
2. Any measurements taken from this plan which are not dimensioned on the electronic copy are at the risk of the user.
3. Soil sample locations are approximate only

Soil Contamination Risk
Site Validation Report

1 Sutherlands Road & 848 Cashmere Road, Halswell, Christchurch

Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9 and Stage 10

April 2022

QUALITY CONTROL AND CERTIFICATION SHEET

Client: Your Section Ltd

Date of issue: 22 April 2022

Report written by:

Hollie Griffith, Environmental Scientist, BEMP
(5 years contaminated land experience)

Signed: 

Email: hollie@momentumenviro.co.nz
Phone: 027 5134 057

Report reviewed and certified as a Suitably Qualified and Experienced Practitioner by:

Nicola Peacock, Principal Environmental Engineer, NZCE, CEnvP
(13 years contaminated land experience within 29 years environmental experience)

Signed: 

Email: nicola@momentumenviro.co.nz
Phone: 021 1320 321

CONTENTS

APPENDICES

1 Executive Summary

The site involves two adjacent rural lots with street addresses 1 Sutherlands Road and 848 Cashmere Road, Halswell, Christchurch. The site is currently undergoing a subdivision development for residential use and as such has undergone an assessment under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS). It is also noted that Momentum Environmental Ltd is obligated to consider the requirements of Section 10(4) of the Health and Safety at Work (Asbestos) Regulations 2016.

This Site Validation Report is for Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9 and Stage 10 only. A separate Site Validation Report was prepared for the other stages within the development and reported in February 2022.

A Preliminary Site Investigation (PSI) was undertaken by Malloch Environmental Ltd (now Momentum Environmental Ltd, MEL) in April 2019 and confirmed the site had been used predominantly for pastoral activities since the earliest available aerial photograph of 1941. A historical shed noted on the aerial photograph from 1941 posed a risk of contamination from the use of lead-based paints. Pre-purchase due diligence XRF screening showed arsenic exceeding the 'residential 10% produce' soil guideline values (SGV) present across the paddock areas. It was recommended that a Detailed Site Investigation (DSI) be undertaken to fully investigate the site.

As recommended by the PSI, Detailed Site Investigations (DSI) were undertaken by MEL. Sampling across the site was performed on 05 and 06 March 2019 and two reports were produced. The first focussed on the anthropogenic contamination risk areas and is dated April 2019. The lead and arsenic contaminated area identified within this report has been remediated and a separate Site Validation Report has been produced, dated April 2020. The second DSI report, dated May 2019, investigated the elevated arsenic within the paddocks of the site with no known anthropogenic source. It identified arsenic levels across the paddocks above the 'residential 10% produce' SGV of 20mg/kg. Samples exceeding the residential SGV were found mostly across the south-western corner and the north-eastern corner of the site. Several factors indicated that the source of the arsenic was natural and as such there would be a likelihood that the bioavailability of the arsenic to humans would be low. A detailed assessment to determine the relative oral bioavailability (RBA) and derive a Tier 2 Site Specific Soil Guideline Value for the site was undertaken.

The bioavailability assessment showed that the relative oral bioavailability of the arsenic in the soils of the paddocks was low, with the calculated UCL_{95} for percentage bioavailability being 20.5%. This was applied to the derivation equation set out in the MfE Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health, to determine a site-specific soil guideline value (SGV) for the proposed residential use of the site. By applying the reduced bioavailability to the 'soil ingestion' pathway a site-specific soil guideline value of 60mg/kg was generated.

When the site specific SGV was compared with the measured arsenic levels across the paddocks, all but one location, SS66, was below the SGV. Therefore, except for SS66, the paddock areas with no known anthropogenic source were considered suitable for a residential use with no remediation required and a Remediation Action Plan (RAP) for the balance of the site was not developed at that time. Remediation was proposed for the soils surrounding SS66. Several remediation options were considered, and off-site disposal was determined to be the most practical and cost-effective option for the site.

Prior to the planned remediation occurring, there was short notice of an increase in costs to dispose of soils at Burwood Landfill, and this along with the unknown market response to bioavailability

assessments, meant the developer made a decision to remediate a much larger area of the wider site than originally intended.

The proposal was changed to excavate and dispose of soils at Burwood Landfill from large parts of the site where the higher arsenic levels were present, with the goal of having all soils meet the NESCS Soil Contaminant Standard of 20mg/kg for arsenic. It was not intended to completely remediate only by excavation, but also to utilise mixing of remaining topsoil. Individual lot validation was proposed to occur after completion of each stage.

The construction, remediation and validation process took place over a period of approximately 18 months and consisted of the following steps:

- Excavation of large areas of topsoil with elevated arsenic
- XRF screening to confirm the remaining subsoil layer was clean
- Introduction of engineered fill material from another site
- Validation of the stockpiles of introduced material prior to spreading
- Spreading and compaction of engineered fill material
- Respreading of mixed topsoil
- Individual lot validation sampling

There were no exceedances of the 'residential 10% produce' soil guideline value (SGV) in the lot sampling undertaken. Arsenic results across all stages included in this SVR ranged from 2.7-19.2mg/kg.

Based on the heavy metal results received for Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9 and Stage 10, each individual lot within these stages is considered suitable for the proposed residential use with no further remediation required.

The final heavy metal concentrations were above expected background values for one or more analytes in 34 out of 73 lots. For the lots containing concentrations of contaminants above expected background levels, any material requiring off-site disposal from within these areas during the construction of the dwelling may not qualify for disposal as cleanfill material, however they can be disposed of at managed fill facilities dependant on those facilities' acceptance criteria. A Soil Disposal Options Plan is attached in **Appendix G,** highlighting potential disposal facilities for each applicable lot.

The NESCS Regulations 5(7) state that land is covered only if it has had or is more than likely to have had an activity or industry described in the Hazardous Activities and Industries List (HAIL) carried out on it. As no actual or potential HAIL activities have been carried out on the site the NESCS does not apply.

2 Objectives of the Investigation

This report has been prepared in general accordance with the Ministry for the Environment's (MfE) "Contaminated Land Management Guidelines No 1: Reporting on Contaminated Sites in New Zealand, revised 2021" (CLMG) and the "New Zealand Guidelines for Assessing and Managing Asbestos in Soils" (NZ GAMAS). This report includes all requirements for a Site Validation Report.

The objectives of this investigation are to:

- Describe project information and any physical and environmental features of the site.
- Summarise any relevant resource consent information, specifically consent condition requirements.
- Summarise previous contaminated land investigations, specifically remedial strategy and objectives of the remediation.
- Describe remediation/management works undertaken including testing, sampling and inspections
- Analyse all results and provide an assessment of the effectiveness of the remediation against the remediation objectives
- Provide further recommendations such as long-term management controls if necessary.
- Describe and attach any documentary evidence, such as waste disposal documentation.

3 Scope of Work Undertaken

This Site Validation Report is for Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9 and Stage 10 only. A separate Site Validation Report was prepared for the other stages within the subdivision and reported in February 2022.

Stage 5 is excluded from both Site Validation Reports as the existing dwelling and sheds are to remain on site. Stage 5 was adequately characterised during the Detailed Site Investigation phase, and no remediation was required. There have been no earthworks undertaken within Stage 5 as part of the residential development, therefore no validation is required.

The scope of the work undertaken has included:

- Review of previous investigations undertaken at the site.
- Design and implement the Site Validation Investigation based on the remediation strategy and objectives and the remedial works undertaken.
- On site soil validation sampling and laboratory analysis.
- Analysis of results against applicable soil guidelines values (SGV).
- Preparation of report in accordance with MfE guidelines.

4 Site Identification

The site is located across two addresses, 1 Sutherlands Road and 848 Cashmere Road in Halswell, Christchurch, as shown in **Figure 1** below. The site is legally described as Part Lot 6 DP 2380 and Lot 7 DP 2380 and has a total area of 9.5308 ha.

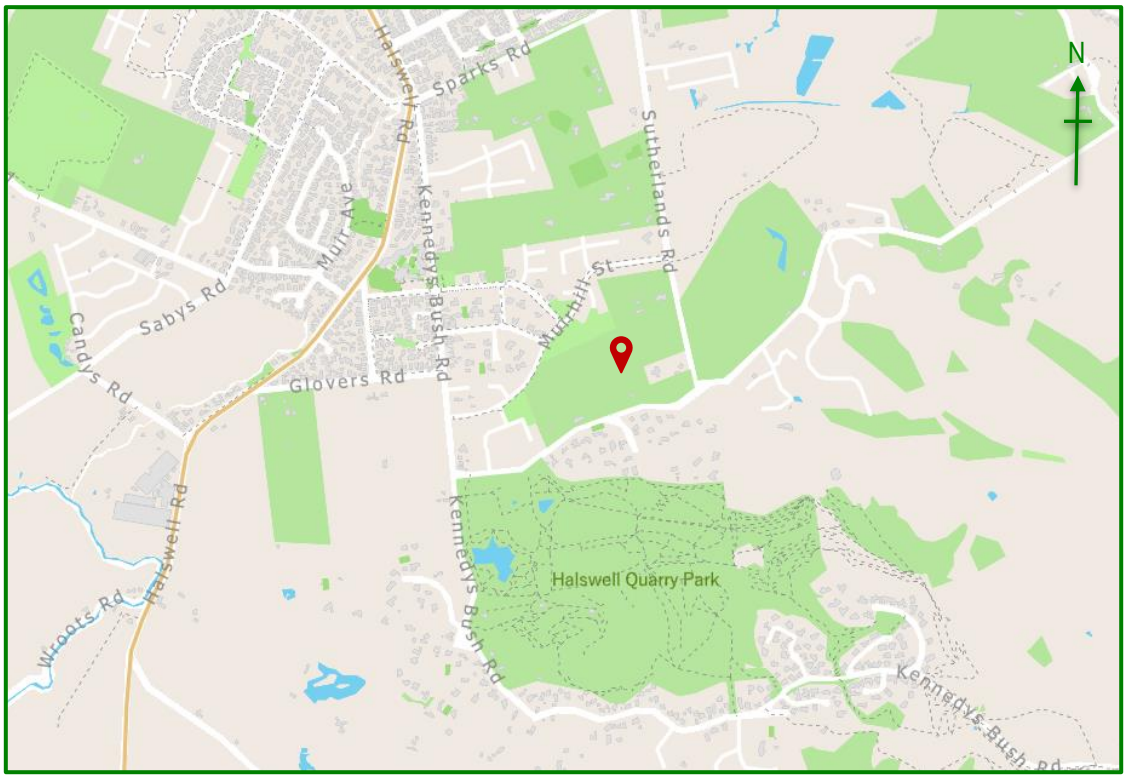


Figure 1 – Location Plan

5 Site Description

Environmental Setting

Table 1 – Environmental Setting

Topography	The site is generally flat land.
Geology	The ECan GIS database describes the soils at the site as a combination of the Taitapu deep silt, the Timaru shallow silt, the Timaru moderately deep silt and the Dukes deep silt. The published geology beneath most of the site is described by Forsyth et al (2008) as part of the Lyttelton volcanic group with basaltic to trachytic lava flows interbedded with breccia and tuff. The north-west corner is shown as being grey river alluvium beneath plains or low-level terraces on the north of the site. Nearby borelogs indicate that topsoils are underlain by layers of sandy silts and sandy gravels with some sand shown in some borelogs.
Soil Trace Elements	According to the ECan GIS database, natural concentrations of trace elements for the northern portion of the site are those of the 'Regional, Gley' soil group and 'Regional, Yellow Grey Earth' in the southern portion of the site.
Groundwater	The site lies over the coastal confined gravel aquifer system. Groundwater levels recorded on nearby bore logs are between 0.70m and 1.38m deep. The direction of groundwater flow is generally in a south-easterly direction.
Surface Water	Open drains run along the Sutherlands Road boundary of the site, between the two properties and along the northern boundary of 848 Cashmere Road. Cashmere Stream lies approximately 540m to the north of the site.

5.1

5.2

Site Layout and Current Site Uses

The majority of the site is currently undergoing earthworks as part of a residential subdivision. A dwelling and sheds are located within Stage 5 of the development. Prior to development the site was rural residential land. 848 Cashmere Road was in pasture and a shed was located in the south-eastern corner of the site.

5.3

Surrounding Land Uses

5.4 The site is bound to the west, north and east by similar rural residential properties and to the south by residential properties. The Halswell shopping centre lies approximately 1.5km to the north-west of the site.

Geotechnical Investigations

At the time of writing no geotechnical investigations were available to MEL.

6 Proposed Site Use

The site is being developed for higher density residential use, which has involved subdivision, change of use of the land, soil disturbance and disposal of soils off-site.

The subdivision has been divided into 16 separate stages, totalling approximately 140 residential lots ranging in size from 359-958m². This Site Validation Report is for Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9 and Stage 10 only.

The existing dwelling and sheds are to remain within Stage 5 of the development.

A Subdivision Plan is attached in **Appendix A**.

7 Summary of Previous Investigations

Preliminary Site Investigation

Malloch Environmental Ltd (now Momentum Environmental Ltd, MEL) undertook a Preliminary Site Investigation (PSI) for the site in April 2019. It found the site had been used predominantly for pastoral activities since the earliest aerial photograph of 1941. Anecdotal history indicated the site was likely used for mainly cattle rearing and dairy prior to that, since the late 1800's. In more recent years the site has been used as a horse training facility.

7.1

A possible shed was noted in the middle of the site on the 1941 aerial but was removed by 1955. This posed a risk of contamination from lead-based paints. Knowledge of nearby site investigations identified a potential risk of naturally elevated arsenic being present. Pre-purchase due diligence XRF screening showed arsenic exceeding the residential soil guideline values was present across the paddock areas.

The PSI recommended that a Detailed Site Investigation (DSI), in terms of the Ministry for the Environments Contaminated Land Management Guidelines, be undertaken prior to any change of use or development.

Detailed Site Investigation

7.2

As recommended by the PSI, Detailed Site Investigations (DSI) were undertaken by MEL. Sampling across the site was performed on 05 and 06 March 2019 and two reports were produced:

- 'Detailed Site Investigation Report & Remediation Action Plan – Potential Anthropogenic Contamination Risk Areas - 1 Sutherlands Road & 848 Cashmere Road, Halswell, Christchurch', dated April 2019.
- 'Detailed Site Investigation Report – Paddocks, & Remediation Action Plan - 1 Sutherlands Road & 848 Cashmere Road, Halswell, Christchurch', dated May 2019.

The 'Anthropogenic Risk Areas' report detailed the investigations into an area of soil contamination likely associated with a historical burn pile and around the location of the historical shed noted on the 1941 aerial. Lead and arsenic contamination was identified adjacent to an existing shed located in the south-eastern corner of 848 Cashmere Road. It was recommended that this portion of the site be remediated by excavation and disposal of the contaminated soils to an approved facility. This area was successfully remediated, and a Site Validation Report issued in April 2020. No contamination was found in the location of the historical shed.

The 'Paddocks' report detailed the investigations into the balance of the site. Elevated arsenic levels were found to be above the 'residential 10% produce' soil guideline value (SGV) of 20mg/kg in approximately one third of the sample locations. Upon review of the desktop information, several factors indicated that the source of the arsenic may be natural and if that was the case there was every chance that the bioavailability of the arsenic to humans would be low. A detailed assessment to determine the relative oral bioavailability (RBA) and derive a Tier 2 Site Specific Soil Guideline Value for the site was undertaken.

A detailed bioavailability assessment was carried out by MEL as an adjunct report titled 'Arsenic Bioavailability Assessment and Derivation of Site Specific SGV'. The bioavailability assessment showed

that the relative oral bioavailability of the arsenic in the soils of the paddocks was low, with the calculated UCL_{95} for percentage bioavailability being 20.5%. This was applied to the derivation equation set out in the MfE Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health, to determine a site-specific SGV for the proposed residential use of the site. By applying the reduced bioavailability to the 'soil ingestion' pathway a site-specific soil guideline value of 60mg/kg was generated.

When the site specific SGV was compared with the measured arsenic levels across the paddocks, all but one location, sample location SS66, was below the SGV. Therefore, except for SS66, the paddock areas with no known anthropogenic source were considered suitable for a residential use with no remediation required. It was noted that if any soils were to be removed from site, that the soils would not qualify for disposal at a clean fill facility and would need to be disposed of at Burwood Landfill.

For soils surrounding sample SS66, remediation would be required following delineation sampling. Viable remediation options discussed included mixing and diluting the soils, relocating the affected soils to a reserve area of the site or excavation and disposal to Burwood Landfill.

A copy of the DSI Sample Location Plan from the 'Paddocks' report is included in **Appendix B.** A full copy of the above-mentioned reports can be provided upon request.

8 Remediation

Soil Guideline Values

8.1

Human health soil contaminant standards for a group of 12 priority contaminants were derived under a set of five land-use scenarios and are legally binding under The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Health) Regulations 2011 (NESCS). These standards have been applied where applicable. The regulations describe these as Soil Contaminant Standards. For contaminants other than the 12 priority contaminants, the hierarchy as set out in the Ministry for the Environment Contaminated Land Management Guidelines No 2 has been followed. These are generally described as Soil Guideline Values. For simplicity, this report uses the terminology Soil Guideline Values (SGV) when referring to the appropriate soil contaminant standard or other derived value from the hierarchy. For soil, guideline values are predominantly risk based, in that they are typically derived using designated exposure scenarios that relate to different land uses. For each exposure scenario, selected pathways of exposure are used to derive guideline values. These pathways typically include soil ingestion, inhalation and dermal adsorption. The guideline values for the appropriate land use scenario relate to the most critical pathway.

The land-use scenarios applicable for this site are 'residential 10% produce' and 'commercial/industrial' as a proxy for construction workers disturbing soils.

The adopted trigger value used to determine need for assessment of ecological receptors, also referred to as Ecological Guideline Values (EGVs) is the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (online) – Sediment GV-high (ANZWQ).

Although the site consists of a combination of soils from the 'Regional, Gley' and 'Regional, Yellow Grey Earth' soil groups, heavy metal concentrations are also to be assessed against the expected background levels for 'Regional, Recent' soils as published in Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007. These background levels are considered most relevant since at this validation stage, whether or not the results exceed background levels impacts whether the remaining

soils can be considered suitable for cleanfill disposal and does not impact the risk to human health/the environment or resource consent requirements. For cleanfill disposal, most facilities will accept soils up to 'Regional, Recent' levels.

Quality Assurance and Quality Control

8.2 Field quality assurance measures as described in Section 4.3.1 of the "Contaminated Land Management Guidelines No 5: Site Investigation and Analysis of Soils, revised 2021" (CLMG) are to be followed. These include using trained staff, choosing appropriate sample containers, accurate and individual labelling and recording of locations, completing appropriate laboratory chain of custody forms, chilling of samples as appropriate and timely delivery to laboratories. All non-disposable sampling equipment should be decontaminated between samples using Decon 90 and rinsed with tap water. All samples are to be submitted to IANZ accredited laboratories. Quality control to ensure freedom from sample cross-contamination is to be measured by the appropriate use of duplicate and rinsate blank samples.

Initial Proposed Remediation Action Plan

8.3 A Remediation Action Plan (RAP) for the balance of the site was not developed at the time of the DSI report as the findings of the DSI indicated there was no need for remediation. However, remediation was proposed for soils surrounding SS66 and several remediation options were considered. These included leaving the soils in-situ, soil mixing, relocating the soils to an alternative location on-site and off-site disposal. Off-site disposal was determined to be the most practical and cost-effective option for the site.

The remediation goals were to:

- Ensure that the soils remaining in the remediated areas have arsenic levels below the 'residential 10% produce' SGV of 20 mg/kg.
- Ensure that any contaminated soils removed off-site was disposed of to an approved facility.

The affected area was not fully delineated at the time, however given the results of adjacent samples it was unlikely to exceed 3,500m^2. It was also considered likely that the contamination was restricted to the top 300mm layer of soil. Soil validation samples were to be taken following remediation of the contaminated area.

8.4 The remainder of the site was considered to be suitable for residential use without remediation based on the bioavailability assessment which derived a site specific SGV of 60mg/kg.

Revised Remediation Action Plan

Prior to the planned remediation occurring, there was short notice of an increase in costs to dispose of soils at Burwood Landfill, and this along with the unknown market response to bioavailability assessments, meant the developer made a decision to remediate a much larger area of the wider site than originally intended.

The proposal was changed to excavate and dispose of soils at Burwood Landfill from large parts of the site where the higher arsenic levels were present. It was not intended to completely remediate only by excavation, but also to utilise mixing of remaining soils. Following removal of the worst affected soils, the normal subdivision earthworks process would take place. This would involve stripping back all remaining topsoil, introducing clean silts for engineering fill, shaping of sections and finally respreading topsoil. It was expected that the stripping, stockpiling and relaying of the topsoil would sufficiently mix to ensure arsenic levels would comply with the NESCS soil contaminant standard of 20mg/kg.

The validation process for the revised remediation measures was to include:

- Use of XRF as a screening tool to indicate that the appropriate depth of material had been excavated.
- Testing as required of any introduced fill material to the site.
- Final validation of all residential lots when finished, involving sampling one location per lot at surface and 250-300mm depth, for 7 heavy metals.

Summary of Remedial Works

8.5 The development of the site took place in stages, over a number of months, with many delays due to weather and availability of resources. As planned, soils with higher arsenic levels were excavated down to the subsoil layer which was at a depth of approximately 300mm, with a deeper cut at the edge of the slope within the southern portion of the site. Throughout the process, XRF screening was carried out to show that the soils with elevated arsenic had been removed successfully. The subsoil layer was easily visually identified and the XRF screening showed that the subsoil layer had arsenic concentrations generally below 10mg/kg. This was consistent with the laboratory results of the subsoil layer during the DSI investigation stage.

The remediation of the shed area occurred at the same time as the remediation for the balance of the site. Lead was also a contaminant of concern in this area and was also completely removed by the excavation to the subsoil layer. Waste disposal dockets for Burwood Landfill are attached in **Appendix C** and include soils removed from all remediation areas.

9 Summary of Site Validation Investigation

9.1 Imported Fill Validation Investigation

Following removal of contaminated soils, and stripping back of remining topsoil, it was necessary to import fill onto the bulk of the site to use as sub-base material and raise the final finished site levels. The client imported a significant volume of fill material from a separate site on Central Avenue in Prebbleton. Limited investigation of some parts of the Central Avenue site have previously been carried out by Malloch Environmental Ltd (now Momentum Environmental Ltd, MEL) in relation to soil contamination due to uncontrolled filling and historical railway yards. Subsequent remediation at that site has occurred. Those investigations indicated that the subsoil layer of material from the wider Central Avenue site was likely to be clean material.

9.2 In order to ensure the imported fill material from Central Avenue in Prebbleton, was suitable for reuse on the site, testing of the stockpiled material was deemed necessary. The details of the stockpile assessment were included in the Site Validation Report prepared for Stage 1, Stage 1A, Stage 1B, Stage 2, Stage 2A and Stage 3, dated February 2022.

Lot Validation Investigation

As the development progressed in stages, MEL staff attended site on several occasions over a period of approximately 18 months. Samples were collected from the surface soils which represented the mixed topsoil material and from approximately 300-400mm depth which represented the interface between the topsoil and the sub-base layer, which included imported sub-base material from Central Avenue in Prebbleton. On most occasions there was a clear colour change between the topsoil and sub-base layer and this occurred at varying depths between 200-500mm below ground level.

Table 2 below summarises the relevant information in regard to the lot validation investigation undertaken for Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9 and Stage 10. A Lot Sample Location Plan is attached in **Appendix D**.

Table 2 – Lot Validation Investigation

Date	Location of Samples	Sampling Undertaken	Comments
30/07/2020	• Stage 4; Lot 39-42	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Due to wet weather sampling had been delayed several weeks until the water had subsided. • Soils on site consisted of topsoils underlain by a sandy clay, with some minor gravels present. • Refer to **Photo 1** below.
10/06/2021	• Stage 8; Lot 110-113 • Stage 8A; Lot 114-118 • Stage 9; Lot 62-64 • Stage 9; Lot 107 • Stage 10; Lot 108-109	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Soils on the site consisted of topsoils underlain by compact silt, sand and some minor gravels.
13/07/2021	• Stage 6; Lot 69-73 • Stage 6; Lot 89-93 • Stage 8; Lot 104-106 • Stage 9; Lot 61 • Stage 9; Lot 99-100 • Stage 10; Lot 101-103	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Soils on the site consisted of topsoils underlain by compact silt, sand and some minor gravels. • Refer to **Photo 2** and **Photo 3** below.
05/08/2021	• Stage 6A; Lot 119-123 • Stage 7; Lot 59-60 • Stage 7; Lot 74-77 • Stage 7; Lot 94-98	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Soils on the site consisted of topsoils underlain by compact silt, sand and some minor gravels.
07/04/2022	• Stage 1C; Lot 130-131 • Stage 4; Lot 27-31, Lot 36-38 and Lot 48-55 • Stage 7; Lot 58	Two samples taken from each lot; one surface sample (0-50mm) and one sample at depth (sub-base material). Analysis of samples for seven heavy metals.	• Heavy rain the previous night caused the soils on site to be extremely wet. • Soils on the site consisted of topsoils, with some gravel in locations, underlain by light brown sandy silt. • Refer to **Photo 4 - Photo 6** below.

Photo 1 – 30/07/2020; Lot 41 looking west

Photo 2 – 13/07/2021; Lot 62 looking east

Photo 3 – 13/07/2021; Lot 62 looking north

Photo 4 – 07/04/2022; Lot 31 looking west

Photo 5 – 07/04/2022; Lot 31 looking north

Photo 6 – 07/04/2022; Lot 48 and Lot 49

9.3

Evaluation of Results

There were no exceedances of the 'residential 10% produce' soil guideline value (SGV) in the lot sampling undertaken. Arsenic results across all stages included in this SVR range from 2.7-19.0mg/kg.

The final heavy metal concentrations were above expected background values for one or more analytes in 34 out of 73 lots.

A Table of Laboratory Lot Validation Results is included in **Appendix E** and Laboratory Reports are attached in **Appendix F**.

Results of Field & Laboratory Quality Assurance and Quality Control

No quality control issues were identified during sampling. All laboratory tested samples were submitted to Analytica Laboratories for analysis. Analytica holds IANZ accreditation. As part of holding accreditation the laboratory follows appropriate testing and quality control procedures. No quality control issues were identified.

9.4

10 Summary of Resource Consent and Conditions

Resource consents (RMA/2019/1733 and RMA/2020/47) were obtained from Christchurch City Council for the residential subdivision, general earthworks and remediation of contaminated soils. The resource consent contained several conditions relating to the testing of stockpiled material sourced from Prebbleton, remediation of contaminated soils if identified and remediation of soils around SS66, disposal of soil to an approved disposal facility and disposal documents to be included in a Site Validation Report which shall be submitted to Christchurch City Council following completion of the remediation process.

In order to comply with condition 19.1 of RMA/2019/1733, a letter dated 29 October 2020 was sent to Christchurch City Council outlining the results of the stockpile sampling.

In order to comply with condition 19.6 and 19.7, remediation of soils surrounding sample location SS66 was undertaken in conjunction with the wider remediation. Therefore, exact disposal volumes in relation to this specific area cannot be provided. Waste disposal dockets for Burwood Landfill are attached in **Appendix C** and include soils removed from the entire site. In terms of soil validation sampling, lot samples from Stage 1A and Stage 1B are in the general location of sample location SS66 and are considered to be suitable for use as validation samples. Heavy metal concentrations across these two stages are below the 'residential 10% produce' SGV.

This Site Validation Report has been prepared in general accordance with the "Contaminated Land Management Guidelines No 1: Reporting on Contaminated Sites in New Zealand, revised 2021" and is considered to have met the remaining conditions of consent.

This Site Validation Report is for Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9 and Stage 10 only. A separate Site Validation Report was prepared for the other stages within the development and reported in February 2022.

11 Planning Status

The NESCS Regulations 5(7) state that land is covered only if it has had or is more than likely to have had an activity or industry described in the Hazardous Activities and Industries List (HAIL) carried out on it. As no actual or potential HAIL activities have been carried out on the site the NESCS does not apply.

12 Conclusion

Momentum Environmental Ltd attended site on several occasions over approximately 18 months to undertake XRF testing of the remediated soils, stockpile testing and final lot validation.

The heavy metal concentrations for each individual lot for Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9 and Stage 10 showed concentrations of contaminants below the 'residential 10% produce' SGV. Therefore, these stages are considered suitable for the proposed residential use with no further remediation required.

Heavy metal concentrations were above expected background values for one or more analytes in 34 out of 73 lots. While the concentrations in these 34 lots may be above expected background levels, they are below the 'residential 10% produce' SGV and are suitable for residential use. For the lots containing concentrations of contaminants above expected background levels, any material requiring off-site disposal from within these areas during the construction of the dwelling may not qualify for disposal as cleanfill material, however, they can be disposed of at managed fill facilities dependant on those facilities' acceptance criteria. A Soil Disposal Options Plan is attached in **Appendix G,** highlighting potential disposal facilities for each applicable lot.

13 Limitations

Momentum Environmental Limited has performed services for this project in accordance with current professional standards for environmental site assessments, and in terms of the client's financial and technical brief for the work. Any reliance on this report by other parties shall be at such party's own risk. It does not purport to completely describe all the site characteristics and properties. Where data is supplied by the client or any third party, it has been assumed that the information is correct, unless otherwise stated. Momentum Environmental Limited accepts no responsibility for errors or omissions in the information provided. Should further information become available regarding the conditions at the site, Momentum Environmental Limited reserves the right to review the report in the context of the additional information.

Opinions and judgments expressed in this report are based on an understanding and interpretation of regulatory standards at the time of writing and should not be construed as legal opinions. As regulatory standards are constantly changing, conclusions and recommendations considered to be acceptable at the time of writing, may in the future become subject to different regulatory standards which cause them to become unacceptable. This may require further assessment and/or remediation of the site to be suitable for the existing or proposed land use activities. There is no investigation that is thorough enough to preclude the presence of materials at the site that presently or in the future may be considered hazardous.

Appendix A – Subdivision Plan

AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION
R1	16.4.19	LAYOUT UPDATED
R2	09.5.19	LAYOUT UPDATED
R3	15.5.19	LAYOUT UPDATED
R4	23.7.19	LAYOUT UPDATED
R5	29.8.19	LAYOUT UPDATED STAGE 1B
R6	03.9.19	LAYOUT UPDATED NORTHERN BOUNDARY
R7	13.2.20	STAGING UPDATED,LOTS 58, 59, 116-121,139-140 & 227 AMENDED, 201, 207 & 208 ADDED, 228 REM, LOTS 61-63 & 113-116 AMENDED
R8	06.8.20	LOT 207 SPLIT INTO LOTS 207A & 207B.
R9	08.9.20	SW EASEMENT AMENDED

NOTES :

1. Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
2. Service easements to be created as required.
3. This plan has been prepared for consent purposes only. No liability is accepted if the plan is used for any other purposes.
4. Road details are indicative only.
5. The Stormwater Easement, along the northern boundary of Lots 114-129, 131-136, 138 & 139 is indicative only, width is subject to survey and is to be measured at 4m from the south bank of the waterway, measured at the waterline.

AMALGAMATION CONDITIONS

That Lot 224 hereon (Access Lot) be held as to 5 undivided one fifth shares by the owners of Lots 4-8.

That Lot 225 hereon (Access Lot) be held as to 4 undivided one fourth shares by the owners of Lots 17-20 .

That Lot 226 hereon (Access Lot) be held as to 5 undivided one fifth shares by the owners of Lots 38-42.

That Lot 227 hereon (Access Lot) be held as to 4 undivided one fourth shares by the owners of Lots 32-35.

SCHEDULE OF AREAS

Description	Area
Residential Lots - (Lots 1 -141) Nett area	7.1854ha
Right of Ways and Access	489m²
Access Lots - (Lots 224, 225, 226 & 227)	1388m²
Road to vest in CCC (Lots 202-205, 208 & 210-221)	2.0716ha
Recreation Reserve to vest in CCC (Lot 201)	327m²
Local purpose (Utility)Reserve to vest in CCC (Lots 206 & 231)	403m²
Local Purpose (Pedestrian) Reserve to vest in CCC (Lot 232)	86m²

Total Area : 9.5263ha (RT 9.5308ha)

Comprised in: RT's CB11K/1284 & CB7D/169

DAVIE LOVELL-SMITH
PLANNING SURVEYING ENGINEERING
116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:

Quarry Paddocks Sutherlands Road

SHEET TITLE:

Proposed Subdivision of Lot 7 & Pt Lot 6 DP 2380

DRAWING STATUS

Application for Subdivision Consent

SCALE : 1:750@A1 1:1500@A3

DATE : September 2020

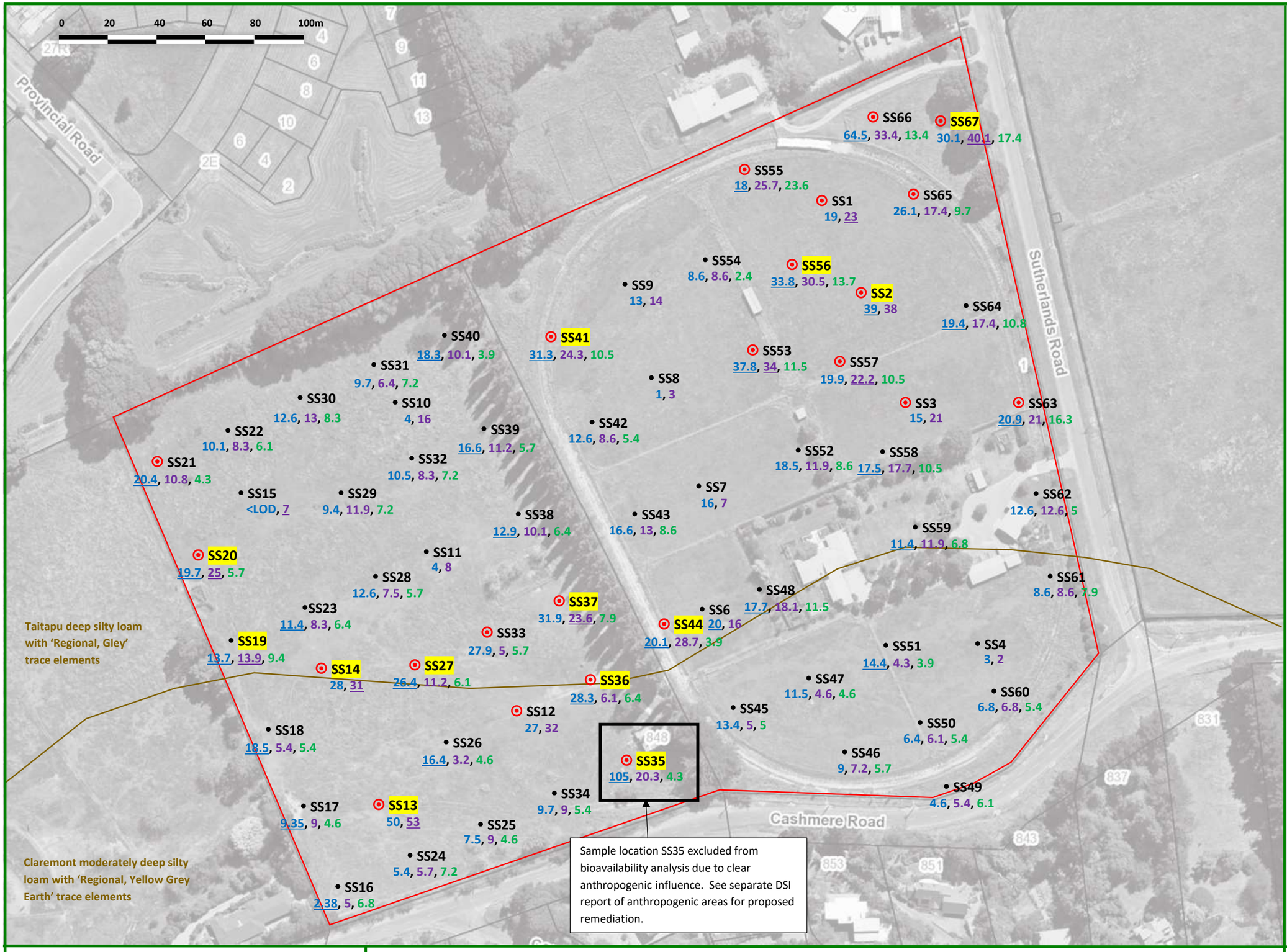
CAD FILE : J:\19812\C\19812 Concept_R9.dwg

REVISION : R9

DRAWING No : C.19812

SHEET No: 1 OF 1

Appendix B – DSI Sample Location Plan



Notes:

1. This plan has been prepared for soil contamination risk assessment purposes only. No liability is accepted if the plan is used for any other purposes.
2. Any measurements taken from this plan which are not dimensioned on the electronic copy are at the risk of the user.
3. Soil sample locations are approximate only.
4. XRF result derived by averaging the readings at each sample location and depth then applying the regression equation.
5. For locations with a laboratory duplicate the highest result is shown.

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
RD1, Christchurch 7671
021 132 0321
www.mallochenviro.co.nz

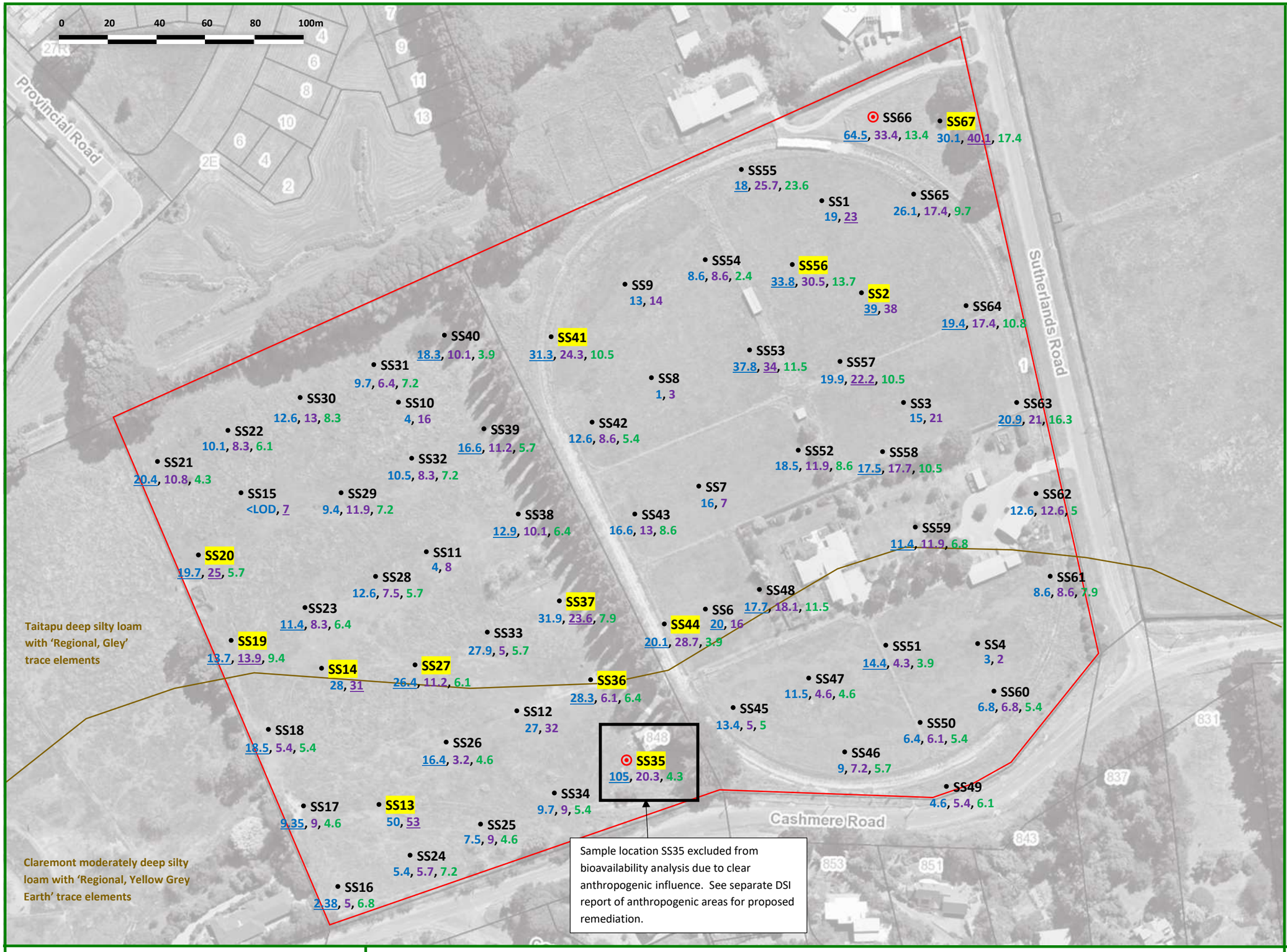
Sampling Location Plan – Showing exceedences PRIOR to bioavailability assessments

1 Sutherlands Rd & 848 Cashmere Rd, Christchurch

Scale: NTS

Date: 15 May 2019

Drawing No: 01363/2



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5. For locations with a laboratory duplicate the highest result is shown.

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
RD1, Christchurch 7671
021 132 0321
www.mallochenviro.co.nz

Sampling Location Plan - Showing exceedences AFTER to bioavailability assessments

1 Sutherlands Rd & 848 Cashmere Rd, Christchurch

Scale: NTS

Date: 16 May 2019

Drawing No: 01363/3

Appendix C – Disposal Documentation

Job Transaction - Frews

Frews

Periods: From 2019 / 09 To 2019 / 09

Filter: Start Year/Period = '2019/09' and End Year/Period = '2019/09' and Job = '33183 : 1 Sutherland Rd'

Job Code: 33183 - 1 Sutherland Rd
Client: Yoursection Ltd
Profit Centre: Contracting
Job Manager: Jasper Manuntag

Work Centre	Activity	Tran Date	Period	Reference	Description	Batch No	Inv No	Quantity
	ECCONT - CCC - Contaminated Hardfill							
		02-Dec-2019	*2019 / 9*	*DN:438621*		4190017	0	10.04
		02-Dec-2019	*2019 / 9*	*DN:438622*		4190017	0	14.08
		02-Dec-2019	*2019 / 9*	*DN:438579*		4190017	0	9.96
		02-Dec-2019	*2019 / 9*	*DN:438580*		4190017	0	16.36
		02-Dec-2019	*2019 / 9*	*DN:438549*		4190017	0	14.60
		02-Dec-2019	*2019 / 9*	*DN:438550*		4190017	0	19.94
		02-Dec-2019	*2019 / 9*	*DN:438507*		4190017	0	8.60
		02-Dec-2019	*2019 / 9*	*DN:438508*		4190017	0	8.60
		02-Dec-2019	*2019 / 9*	*DN:438504*		4190017	0	9.20
		02-Dec-2019	*2019 / 9*	*DN:438505*		4190017	0	12.92
		02-Dec-2019	*2019 / 9*	*DN:438547*		4190017	0	17.08
		02-Dec-2019	*2019 / 9*	*DN:438548*		4190017	0	19.62
		02-Dec-2019	*2019 / 9*	*DN:438577*		4190017	0	9.76
		02-Dec-2019	*2019 / 9*	*DN:438578*		4190017	0	14.94
		02-Dec-2019	*2019 / 9*	*DN:438605*		4190017	0	10.08
		02-Dec-2019	*2019 / 9*	*DN:438606*		4190017	0	15.68
		02-Dec-2019	*2019 / 9*	*DN:438480*		4190017	0	16.02

	02-Dec-2019	*2019 / 9*	*DN:438481*	4190017	0	19.50
	02-Dec-2019	*2019 / 9*	*DN:438524*	4190017	0	10.18
	02-Dec-2019	*2019 / 9*	*DN:438525*	4190017	0	16.48
	02-Dec-2019	*2019 / 9*	*DN:438564*	4190017	0	13.34
	02-Dec-2019	*2019 / 9*	*DN:438565*	4190017	0	16.12
	02-Dec-2019	*2019 / 9*	*DN:438592*	4190017	0	9.96
	02-Dec-2019	*2019 / 9*	*DN:438593*	4190017	0	15.32
	02-Dec-2019	*2019 / 9*	*DN:438632*	4190017	0	6.78
	02-Dec-2019	*2019 / 9*	*DN:438633*	4190017	0	13.10
	02-Dec-2019	*2019 / 9*	*DN:438629*	4190017	0	7.08
	02-Dec-2019	*2019 / 9*	*DN:438630*	4190017	0	12.32
	02-Dec-2019	*2019 / 9*	*DN:438489*	4190017	0	14.32
	02-Dec-2019	*2019 / 9*	*DN:438490*	4190017	0	12.24
	02-Dec-2019	*2019 / 9*	*DN:438535*	4190017	0	13.30
	02-Dec-2019	*2019 / 9*	*DN:438536*	4190017	0	15.24
	02-Dec-2019	*2019 / 9*	*DN:438582*	4190017	0	10.38
	02-Dec-2019	*2019 / 9*	*DN:438583*	4190017	0	12.22
	02-Dec-2019	*2019 / 9*	*DN:438638*	4190017	0	9.52
	02-Dec-2019	*2019 / 9*	*DN:438639*	4190017	0	11.60
	02-Dec-2019	*2019 / 9*	*DN:438485*	4190017	0	13.22
	02-Dec-2019	*2019 / 9*	*DN:438486*	4190017	0	16.22

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	02-Dec-2019	2019 / 9	DN:438529	4190017	0	14.82
	02-Dec-2019	2019 / 9	DN:438551	4190017	0	12.32
	02-Dec-2019	2019 / 9	DN:438552	4190017	0	15.70
	02-Dec-2019	2019 / 9	DN:438476	4190017	0	8.44
	02-Dec-2019	2019 / 9	DN:438477	4190017	0	15.14
	02-Dec-2019	2019 / 9	DN:438517	4190017	0	8.34
	02-Dec-2019	2019 / 9	DN:438518	4190017	0	15.48
	02-Dec-2019	2019 / 9	DN:438559	4190017	0	11.52
	02-Dec-2019	2019 / 9	DN:438560	4190017	0	18.34
	02-Dec-2019	2019 / 9	DN:438586	4190017	0	11.54
	02-Dec-2019	2019 / 9	DN:438587	4190017	0	16.88
	02-Dec-2019	2019 / 9	DN:438627	4190017	0	9.14
	02-Dec-2019	2019 / 9	DN:438628	4190017	0	15.60
	02-Dec-2019	2019 / 9	DN:438640	4190017	0	7.90
	02-Dec-2019	2019 / 9	DN:438641	4190017	0	11.80
	02-Dec-2019	2019 / 9	DN:438600	4190017	0	8.38
	02-Dec-2019	2019 / 9	DN:438601	4190017	0	12.94
	02-Dec-2019	2019 / 9	DN:438482	4190017	0	10.34
	02-Dec-2019	2019 / 9	DN:438483	4190017	0	13.32

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02-Dec-2019	2019 / 9	DN:438567	4190017	0	12.32
02-Dec-2019	2019 / 9	DN:438568	4190017	0	16.58
02-Dec-2019	2019 / 9	DN:438596	4190017	0	10.04
02-Dec-2019	2019 / 9	DN:438597	4190017	0	14.42
02-Dec-2019	2019 / 9	DN:438636	4190017	0	9.02
02-Dec-2019	2019 / 9	DN:438637	4190017	0	12.78
02-Dec-2019	2019 / 9	DN:438472	4190017	0	19.48
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02-Dec-2019	2019 / 9	DN:438474	4190017	0	15.76
02-Dec-2019	2019 / 9	DN:438470	4190017	0	11.06
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02-Dec-2019	2019 / 9	DN:438519	4190017	0	10.42
02-Dec-2019	2019 / 9	DN:438479	4190017	0	18.78
02-Dec-2019	2019 / 9	DN:438510	4190017	0	9.98
02-Dec-2019	2019 / 9	DN:438469	4190017	0	10.76
03-Dec-2019	2019 / 9	DN:438685	4190017	0	7.92
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	03-Dec-2019	2019 / 9	DN:438789	4190017	0	15.10
	03-Dec-2019	2019 / 9	DN:438848	4190017	0	9.38
	03-Dec-2019	2019 / 9	DN:438849	4190017	0	17.88
	03-Dec-2019	2019 / 9	DN:438732	4190017	0	9.04
	03-Dec-2019	2019 / 9	DN:438733	4190017	0	18.08
	03-Dec-2019	2019 / 9	DN:438790	4190017	0	10.68
	03-Dec-2019	2019 / 9	DN:438791	4190017	0	14.94
	03-Dec-2019	2019 / 9	DN:438838	4190017	0	9.16
	03-Dec-2019	2019 / 9	DN:438839	4190017	0	16.10
	03-Dec-2019	2019 / 9	DN:438846	4190017	0	13.00
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	03-Dec-2019	2019 / 9	DN:438859	4190017	0	9.24
	03-Dec-2019	2019 / 9	DN:438860	4190017	0	18.40
	03-Dec-2019	2019 / 9	DN:438752	4190017	0	5.14
	03-Dec-2019	2019 / 9	DN:438753	4190017	0	10.46
	03-Dec-2019	2019 / 9	DN:438812	4190017	0	10.62
	03-Dec-2019	2019 / 9	DN:438813	4190017	0	16.36
	03-Dec-2019	2019 / 9	DN:438674	4190017	0	7.94
	03-Dec-2019	2019 / 9	DN:438675	4190017	0	11.90

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03-Dec-2019	2019 / 9	DN:438767	4190017	0	9.62
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03-Dec-2019	2019 / 9	DN:438817	4190017	0	14.38
03-Dec-2019	2019 / 9	DN:438870	4190017	0	11.08
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03-Dec-2019	2019 / 9	DN:438693	4190017	0	7.96
03-Dec-2019	2019 / 9	DN:438722	4190017	0	12.46
03-Dec-2019	2019 / 9	DN:438723	4190017	0	19.82
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	03-Dec-2019	2019 / 9	DN:438725	4190017	0	12.64
	03-Dec-2019	2019 / 9	DN:438726	4190017	0	16.82
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	03-Dec-2019	2019 / 9	DN:438845	4190017	0	14.42
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	03-Dec-2019	2019 / 9	DN:438745	4190017	0	17.14
	03-Dec-2019	2019 / 9	DN:438868	4190017	0	20.04
	04-Dec-2019	2019 / 9	DN:439009	4190017	0	9.30
	04-Dec-2019	2019 / 9	DN:439010	4190017	0	17.16
	04-Dec-2019	2019 / 9	DN:439055	4190017	0	11.80
	04-Dec-2019	2019 / 9	DN:439056	4190017	0	15.04
	04-Dec-2019	2019 / 9	DN:438886	4190017	0	11.22

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04-Dec-2019	*2019 / 9*	*DN:439079*		4190017	0	11.48
04-Dec-2019	*2019 / 9*	*DN:439080*		4190017	0	17.38
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04-Dec-2019	*2019 / 9*	*DN:439042*		4190017	0	10.82
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	04-Dec-2019	*2019 / 9*	*DN:438984*	4190017	0	14.64
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	04-Dec-2019	*2019 / 9*	*DN:438910*	4190017	0	13.66
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	04-Dec-2019	*2019 / 9*	*DN:438953*	4190017	0	13.76
	04-Dec-2019	*2019 / 9*	*DN:438995*	4190017	0	16.58
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	04-Dec-2019	*2019 / 9*	*DN:439046*	4190017	0	15.94
	04-Dec-2019	*2019 / 9*	*DN:439092*	4190017	0	14.56
	04-Dec-2019	*2019 / 9*	*DN:439093*	4190017	0	14.70
	04-Dec-2019	*2019 / 9*	*DN:438922*	4190017	0	12.04
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	04-Dec-2019	*2019 / 9*	*DN:438988*	4190017	0	17.78
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	04-Dec-2019	*2019 / 9*	*DN:438986*	4190017	0	16.82
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	05-Dec-2019	*2019 / 9*	*DN:439210*	4190017	0	9.34
	05-Dec-2019	*2019 / 9*	*DN:439211*	4190017	0	16.02
	05-Dec-2019	*2019 / 9*	*DN:439179*	4190017	0	9.50
	05-Dec-2019	*2019 / 9*	*DN:439180*	4190017	0	13.18
	05-Dec-2019	*2019 / 9*	*DN:439143*	4190017	0	11.12

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05-Dec-2019	2019 / 9	DN:439172	4190017	0	14.60
05-Dec-2019	2019 / 9	DN:439105	4190017	0	11.62
05-Dec-2019	2019 / 9	DN:439106	4190017	0	13.74
05-Dec-2019	2019 / 9	DN:439135	4190017	0	10.68
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05-Dec-2019	2019 / 9	DN:439189	4190017	0	16.08
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	05-Dec-2019	2019 / 9	DN:439241	4190017	0	13.58
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	05-Dec-2019	2019 / 9	DN:439206	4190017	0	14.82
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	05-Dec-2019	2019 / 9	DN:439176	4190017	0	14.94
	05-Dec-2019	2019 / 9	DN:439107	4190017	0	9.16
	05-Dec-2019	2019 / 9	DN:439108	4190017	0	14.50
	05-Dec-2019	2019 / 9	DN:439138	4190017	0	10.62
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	06-Dec-2019	2019 / 9	DN:439283	4190017	0	8.94
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	06-Dec-2019	2019 / 9	DN:439341	4190017	0	10.42
	06-Dec-2019	2019 / 9	DN:439342	4190017	0	18.64
	06-Dec-2019	2019 / 9	DN:439368	4190017	0	9.26
	06-Dec-2019	2019 / 9	DN:439369	4190017	0	17.06

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06-Dec-2019	*2019 / 9*	*DN:439279*	4190017	0	15.68
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06-Dec-2019	*2019 / 9*	*DN:439325*	4190017	0	10.86
06-Dec-2019	*2019 / 9*	*DN:439326*	4190017	0	16.76
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06-Dec-2019	*2019 / 9*	*DN:439361*	4190017	0	16.20
06-Dec-2019	*2019 / 9*	*DN:439287*	4190017	0	12.76
06-Dec-2019	*2019 / 9*	*DN:439288*	4190017	0	17.36
06-Dec-2019	*2019 / 9*	*DN:439315*	4190017	0	14.92
06-Dec-2019	*2019 / 9*	*DN:439316*	4190017	0	20.22
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06-Dec-2019	*2019 / 9*	*DN:439338*	4190017	0	14.90
06-Dec-2019	*2019 / 9*	*DN:439377*	4190017	0	11.56
06-Dec-2019	*2019 / 9*	*DN:439378*	4190017	0	14.14
06-Dec-2019	*2019 / 9*	*DN:439329*	4190017	0	14.16
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06-Dec-2019	*2019 / 9*	*DN:439370*	4190017	0	12.00

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	07-Dec-2019	2019 / 9	DN:439401	4190017	0	14.88
	07-Dec-2019	2019 / 9	DN:439389	4190017	0	9.74
	07-Dec-2019	2019 / 9	DN:439390	4190017	0	16.22
	07-Dec-2019	2019 / 9	DN:439383	4190017	0	11.98
	07-Dec-2019	2019 / 9	DN:439384	4190017	0	16.26
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	07-Dec-2019	2019 / 9	DN:439385	4190017	0	9.10
	07-Dec-2019	2019 / 9	DN:439386	4190017	0	15.56

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07-Dec-2019	*2019 / 9*	*DN:439387*		4190017	0	12.14
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07-Dec-2019	*2019 / 9*	*DN:439406*		4190017	0	10.92
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09-Dec-2019	*2019 / 9*	*DN:439460*		4190017	0	11.22
09-Dec-2019	*2019 / 9*	*DN:439461*		4190017	0	17.28
09-Dec-2019	*2019 / 9*	*DN:439515*		4190017	0	11.56
09-Dec-2019	*2019 / 9*	*DN:439516*		4190017	0	16.36
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	09-Dec-2019	2019 / 9	DN:439609	4190017	0	10.34
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	09-Dec-2019	2019 / 9	DN:439411	4190017	0	11.62

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	13-Dec-2019	2019 / 9	DN:440381	4190017	0	10.76
	13-Dec-2019	2019 / 9	DN:440382	4190017	0	15.98
	13-Dec-2019	2019 / 9	DN:440387	4190017	0	10.70
	13-Dec-2019	2019 / 9	DN:440388	4190017	0	14.16
	14-Dec-2019	2019 / 9	DN:440398	4190017	0	12.76
	14-Dec-2019	2019 / 9	DN:440399	4190017	0	17.62
	14-Dec-2019	2019 / 9	DN:440410	4190017	0	12.50
	14-Dec-2019	2019 / 9	DN:440411	4190017	0	16.96
	14-Dec-2019	2019 / 9	DN:440408	4190017	0	10.58
	14-Dec-2019	2019 / 9	DN:440409	4190017	0	16.38
	14-Dec-2019	2019 / 9	DN:440404	4190017	0	11.48

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16-Dec-2019	*2019 / 9*	*DN:440492*		4190017	0	16.34
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	16-Dec-2019	2019 / 9	DN:440554		4190017	0	19.44
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	16-Dec-2019	2019 / 9	DN:440654		4190017	0	14.28
	16-Dec-2019	2019 / 9	DN:440655		4190017	0	14.66
	16-Dec-2019	2019 / 9	DN:440557		4190017	0	13.07
	16-Dec-2019	2019 / 9	DN:440558		4190017	0	16.80
	16-Dec-2019	2019 / 9	DN:440602		4190017	0	11.93
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	16-Dec-2019	2019 / 9	DN:440661		4190017	0	16.09
	16-Dec-2019	2019 / 9	DN:440662		4190017	0	10.78
	16-Dec-2019	2019 / 9	DN:440425		4190017	0	7.70
	16-Dec-2019	2019 / 9	DN:440426		4190017	0	16.74
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	16-Dec-2019	2019 / 9	DN:440502		4190017	0	10.44
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	16-Dec-2019	2019 / 9	DN:440565		4190017	0	20.00

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	16-Dec-2019	*2019 / 9*	*DN:440440*	4190017	0	15.68
	16-Dec-2019	*2019 / 9*	*DN:440479*	4190017	0	9.24
	16-Dec-2019	*2019 / 9*	*DN:440480*	4190017	0	16.58
	16-Dec-2019	*2019 / 9*	*DN:440519*	4190017	0	6.84
	16-Dec-2019	*2019 / 9*	*DN:440520*	4190017	0	17.80
	16-Dec-2019	*2019 / 9*	*DN:440570*	4190017	0	11.32
	16-Dec-2019	*2019 / 9*	*DN:440571*	4190017	0	20.02
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	16-Dec-2019	*2019 / 9*	*DN:440615*	4190017	0	15.50
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	16-Dec-2019	*2019 / 9*	*DN:440577*	4190017	0	10.86
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	16-Dec-2019	*2019 / 9*	*DN:440528*	4190017	0	10.36
	16-Dec-2019	*2019 / 9*	*DN:440484*	4190017	0	14.26

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	16-Dec-2019	*2019 / 9*	*DN:440445*	4190017	0	10.70
	16-Dec-2019	*2019 / 9*	*DN:440446*	4190017	0	15.00
	16-Dec-2019	*2019 / 9*	*DN:440514*	4190017	0	10.18
	16-Dec-2019	*2019 / 9*	*DN:440515*	4190017	0	16.86
	16-Dec-2019	*2019 / 9*	*DN:440467*	4190017	0	11.22
	16-Dec-2019	*2019 / 9*	*DN:440468*	4190017	0	16.06
	16-Dec-2019	*2019 / 9*	*DN:440433*	4190017	0	10.98
	16-Dec-2019	*2019 / 9*	*DN:440434*	4190017	0	16.18
	16-Dec-2019	*2019 / 9*	*DN:440432*	4190017	0	15.32
	16-Dec-2019	*2019 / 9*	*DN:440431*	4190017	0	10.38
	16-Dec-2019	*2019 / 9*	*DN:440466*	4190017	0	14.58
	16-Dec-2019	*2019 / 9*	*DN:440465*	4190017	0	10.98
	16-Dec-2019	*2019 / 9*	*DN:440512*	4190017	0	13.76
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	16-Dec-2019	*2019 / 9*	*DN:440567*	4190017	0	14.32
	16-Dec-2019	*2019 / 9*	*DN:440566*	4190017	0	10.08
	16-Dec-2019	*2019 / 9*	*DN:440633*	4190017	0	13.00
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	16-Dec-2019	*2019 / 9*	*DN:440635*	4190017	0	11.06

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16-Dec-2019	*2019 / 9*	*DN:440663*		4190017	0	8.36
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16-Dec-2019	*2019 / 9*	*DN:440580*		4190017	0	17.08
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16-Dec-2019	*2019 / 9*	*DN:440563*		4190017	0	17.50
16-Dec-2019	*2019 / 9*	*DN:440526*		4190017	0	11.16
16-Dec-2019	*2019 / 9*	*DN:440653*		4190017	0	1.94
17-Dec-2019	*2019 / 9*	*DN:440669*		4190017	0	10.74
17-Dec-2019	*2019 / 9*	*DN:440670*		4190017	0	17.78

610000000217/DN:4390

ECCONT Total 9,752.24

Job Transaction - Frews

Frews

Periods: From 2019 / 10 To 2019 / 10

Filter: Start Year/Period = '2019/10' and End Year/Period = '2019/10' and Job = '33183 : 1 Sutherland Rd'

Job Code: 33183 - 1 Sutherland Rd
Client: Yoursection Ltd
Profit Centre: Contaminated Site Remediation
Job Manager: Tom Clark

Work Centre	Activity	Tran Date	Period	Reference	Description	Batch No	Inv No	Quantity
Mat - Material								
	ECCONT - CCC - Contaminated Hardfill							
		06-Jan-2020	*2019 / 10*	*DN:441357*		4190018	0	10.68
		06-Jan-2020	*2019 / 10*	*DN:441358*		4190018	0	17.32
		06-Jan-2020	*2019 / 10*	*DN:441383*		4190018	0	10.66
		06-Jan-2020	*2019 / 10*	*DN:441384*		4190018	0	16.06
		06-Jan-2020	*2019 / 10*	*DN:441403*		4190018	0	11.12
		06-Jan-2020	*2019 / 10*	*DN:441404*		4190018	0	15.94
		06-Jan-2020	*2019 / 10*	*DN:441431*		4190018	0	12.72
		06-Jan-2020	*2019 / 10*	*DN:441432*		4190018	0	17.92
		06-Jan-2020	*2019 / 10*	*DN:441334*		4190018	0	18.02
		06-Jan-2020	*2019 / 10*	*DN:441335*		4190018	0	21.18
		06-Jan-2020	*2019 / 10*	*DN:441391*		4190018	0	16.88
		06-Jan-2020	*2019 / 10*	*DN:441392*		4190018	0	18.94
		06-Jan-2020	*2019 / 10*	*DN:441368*		4190018	0	14.90
		06-Jan-2020	*2019 / 10*	*DN:441369*		4190018	0	17.54
		06-Jan-2020	*2019 / 10*	*DN:441416*		4190018	0	17.30
		06-Jan-2020	*2019 / 10*	*DN:441417*		4190018	0	20.36
		06-Jan-2020	*2019 / 10*	*DN:441459*		4190018	0	18.00

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06-Jan-2020	2019 / 10	DN:441339	4190018	0	16.88
06-Jan-2020	2019 / 10	DN:441366	4190018	0	9.50
06-Jan-2020	2019 / 10	DN:441367	4190018	0	17.02
06-Jan-2020	2019 / 10	DN:441389	4190018	0	11.12
06-Jan-2020	2019 / 10	DN:441390	4190018	0	17.42
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06-Jan-2020	2019 / 10	DN:441439	4190018	0	16.78
06-Jan-2020	2019 / 10	DN:441350	4190018	0	16.82
06-Jan-2020	2019 / 10	DN:441352	4190018	0	16.64
06-Jan-2020	2019 / 10	DN:441379	4190018	0	15.76
06-Jan-2020	2019 / 10	DN:441380	4190018	0	15.36
06-Jan-2020	2019 / 10	DN:441399	4190018	0	16.40
06-Jan-2020	2019 / 10	DN:441400	4190018	0	14.64
06-Jan-2020	2019 / 10	DN:441421	4190018	0	17.94
06-Jan-2020	2019 / 10	DN:441422	4190018	0	16.88
06-Jan-2020	2019 / 10	DN:441457	4190018	0	17.18

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08-Jan-2020	*2019 / 10*	*DN:441855*		4190018	0	12.22
08-Jan-2020	*2019 / 10*	*DN:441856*		4190018	0	17.36
08-Jan-2020	*2019 / 10*	*DN:441886*		4190018	0	12.36
08-Jan-2020	*2019 / 10*	*DN:441887*		4190018	0	16.84
08-Jan-2020	*2019 / 10*	*DN:441722*		4190018	0	20.42
08-Jan-2020	*2019 / 10*	*DN:441723*		4190018	0	25.00
08-Jan-2020	*2019 / 10*	*DN:441898*		4190018	0	11.46
08-Jan-2020	*2019 / 10*	*DN:441899*		4190018	0	14.56
08-Jan-2020	*2019 / 10*	*DN:441701*		4190018	0	13.96
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08-Jan-2020	2019 / 10	DN:441754	4190018	0	12.68
08-Jan-2020	2019 / 10	DN:441815	4190018	0	14.10
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08-Jan-2020	2019 / 10	DN:441849	4190018	0	13.18
08-Jan-2020	2019 / 10	DN:441884	4190018	0	13.24
08-Jan-2020	2019 / 10	DN:441885	4190018	0	13.58
08-Jan-2020	2019 / 10	DN:441728	4190018	0	8.70
08-Jan-2020	2019 / 10	DN:441729	4190018	0	15.44
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08-Jan-2020	2019 / 10	DN:441792	4190018	0	16.24
08-Jan-2020	2019 / 10	DN:441831	4190018	0	9.44
08-Jan-2020	2019 / 10	DN:441832	4190018	0	14.42
08-Jan-2020	2019 / 10	DN:441863	4190018	0	10.30
08-Jan-2020	2019 / 10	DN:441864	4190018	0	14.32
08-Jan-2020	2019 / 10	DN:441894	4190018	0	9.86
08-Jan-2020	2019 / 10	DN:441895	4190018	0	14.84
08-Jan-2020	2019 / 10	DN:441724	4190018	0	9.74
08-Jan-2020	2019 / 10	DN:441725	4190018	0	12.52

08-Jan-2020	2019 / 10	DN:441789	4190018	0	11.92
08-Jan-2020	2019 / 10	DN:441790	4190018	0	15.50
08-Jan-2020	2019 / 10	DN:441833	4190018	0	8.90
08-Jan-2020	2019 / 10	DN:441834	4190018	0	12.74
08-Jan-2020	2019 / 10	DN:441866	4190018	0	10.98
08-Jan-2020	2019 / 10	DN:441867	4190018	0	14.48
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08-Jan-2020	2019 / 10	DN:441803	4190018	0	15.60
08-Jan-2020	2019 / 10	DN:441836	4190018	0	16.58
08-Jan-2020	2019 / 10	DN:441837	4190018	0	15.74
08-Jan-2020	2019 / 10	DN:441871	4190018	0	14.66
08-Jan-2020	2019 / 10	DN:441872	4190018	0	17.48
08-Jan-2020	2019 / 10	DN:441900	4190018	0	10.58
08-Jan-2020	2019 / 10	DN:441901	4190018	0	14.54
08-Jan-2020	2019 / 10	DN:441873	4190018	0	10.44

	08-Jan-2020	*2019 / 10*	*DN:441874*	4190018	0	16.06
	08-Jan-2020	*2019 / 10*	*DN:441845*	4190018	0	13.02
	08-Jan-2020	*2019 / 10*	*DN:441844*	4190018	0	10.50
	08-Jan-2020	*2019 / 10*	*DN:441694*	4190018	0	8.54
	08-Jan-2020	*2019 / 10*	*DN:441695*	4190018	0	18.20
	08-Jan-2020	*2019 / 10*	*DN:441749*	4190018	0	9.70
	08-Jan-2020	*2019 / 10*	*DN:441750*	4190018	0	14.76
	08-Jan-2020	*2019 / 10*	*DN:441809*	4190018	0	8.08
	08-Jan-2020	*2019 / 10*	*DN:441810*	4190018	0	17.54
	08-Jan-2020	*2019 / 10*	*DN:441839*	4190018	0	10.02
	08-Jan-2020	*2019 / 10*	*DN:441840*	4190018	0	17.06
	08-Jan-2020	*2019 / 10*	*DN:441875*	4190018	0	9.62
	08-Jan-2020	*2019 / 10*	*DN:441876*	4190018	0	17.20
	08-Jan-2020	*2019 / 10*	*DN:441888*	4190018	0	9.96
	08-Jan-2020	*2019 / 10*	*DN:441889*	4190018	0	11.42
	08-Jan-2020	*2019 / 10*	*DN:441859*	4190018	0	8.56
	08-Jan-2020	*2019 / 10*	*DN:441860*	4190018	0	11.86
	08-Jan-2020	*2019 / 10*	*DN:441829*	4190018	0	8.76
	08-Jan-2020	*2019 / 10*	*DN:441830*	4190018	0	10.70
	08-Jan-2020	*2019 / 10*	*DN:441785*	4190018	0	8.78

08-Jan-2020	2019 / 10	DN:441786		4190018	0	11.94
08-Jan-2020	2019 / 10	DN:441735		4190018	0	9.68
08-Jan-2020	2019 / 10	DN:441736		4190018	0	11.22
08-Jan-2020	2019 / 10	DN:441688		4190018	0	8.04
08-Jan-2020	2019 / 10	DN:441689		4190018	0	11.36
08-Jan-2020	2019 / 10	DN:441759		4190018	0	9.24
08-Jan-2020	2019 / 10	DN:441760		4190018	0	12.62
08-Jan-2020	2019 / 10	DN:441693		4190018	0	12.00
08-Jan-2020	2019 / 10	DN:441692		4190018	0	8.06
08-Jan-2020	2019 / 10	DN:441812		4190018	0	13.50
08-Jan-2020	2019 / 10	DN:441811		4190018	0	9.24
09-Jan-2020	2019 / 10	DN:441930		4190018	0	13.82
09-Jan-2020	2019 / 10	DN:441931		4190018	0	19.80
09-Jan-2020	2019 / 10	DN:441963		4190018	0	9.26
09-Jan-2020	2019 / 10	DN:441964		4190018	0	11.62
09-Jan-2020	2019 / 10	DN:441987		4190018	0	7.62
09-Jan-2020	2019 / 10	DN:441988		4190018	0	11.02
09-Jan-2020	2019 / 10	DN:441907		4190018	0	14.26
09-Jan-2020	2019 / 10	DN:441908		4190018	0	16.16
09-Jan-2020	2019 / 10	DN:441941		4190018	0	18.58
09-Jan-2020	2019 / 10	DN:441942		4190018	0	25.08

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09-Jan-2020	2019 / 10	DN:441975	4190018	0	17.50
09-Jan-2020	2019 / 10	DN:441916	4190018	0	11.26
09-Jan-2020	2019 / 10	DN:441917	4190018	0	12.64
09-Jan-2020	2019 / 10	DN:441946	4190018	0	10.96
09-Jan-2020	2019 / 10	DN:441947	4190018	0	11.34
09-Jan-2020	2019 / 10	DN:441968	4190018	0	9.68
09-Jan-2020	2019 / 10	DN:441969	4190018	0	10.44
09-Jan-2020	2019 / 10	DN:441990	4190018	0	10.14
09-Jan-2020	2019 / 10	DN:441991	4190018	0	11.28
09-Jan-2020	2019 / 10	DN:441905	4190018	0	10.04
09-Jan-2020	2019 / 10	DN:441906	4190018	0	15.36
09-Jan-2020	2019 / 10	DN:441936	4190018	0	11.78
09-Jan-2020	2019 / 10	DN:441937	4190018	0	19.92
09-Jan-2020	2019 / 10	DN:441976	4190018	0	10.16
09-Jan-2020	2019 / 10	DN:441977	4190018	0	19.44
09-Jan-2020	2019 / 10	DN:441911	4190018	0	11.38
09-Jan-2020	2019 / 10	DN:441912	4190018	0	12.94
09-Jan-2020	2019 / 10	DN:441913	4190018	0	16.78
09-Jan-2020	2019 / 10	DN:441914	4190018	0	16.38

09-Jan-2020	2019 / 10	DN:441943	4190018	0	12.62
09-Jan-2020	2019 / 10	DN:441944	4190018	0	15.94
09-Jan-2020	2019 / 10	DN:441950	4190018	0	17.42
09-Jan-2020	2019 / 10	DN:441951	4190018	0	21.00
09-Jan-2020	2019 / 10	DN:441965	4190018	0	11.20
09-Jan-2020	2019 / 10	DN:441966	4190018	0	14.78
09-Jan-2020	2019 / 10	DN:441978	4190018	0	14.02
09-Jan-2020	2019 / 10	DN:441979	4190018	0	17.78
09-Jan-2020	2019 / 10	DN:441904	4190018	0	13.10
09-Jan-2020	2019 / 10	DN:441903	4190018	0	8.84
09-Jan-2020	2019 / 10	DN:441935	4190018	0	15.98
09-Jan-2020	2019 / 10	DN:441934	4190018	0	10.98
09-Jan-2020	2019 / 10	DN:441956	4190018	0	8.28
09-Jan-2020	2019 / 10	DN:441957	4190018	0	9.44
09-Jan-2020	2019 / 10	DN:441980	4190018	0	7.56
09-Jan-2020	2019 / 10	DN:441981	4190018	0	11.24
09-Jan-2020	2019 / 10	DN:441921	4190018	0	9.26
09-Jan-2020	2019 / 10	DN:441922	4190018	0	17.12
09-Jan-2020	2019 / 10	DN:441952	4190018	0	10.54
09-Jan-2020	2019 / 10	DN:441953	4190018	0	23.96
09-Jan-2020	2019 / 10	DN:A1	4190018	0	146.30

ECCONT Total	4,480.12

ECCONT - CCC - Contaminated Hardfill						
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	19-Feb-2020	*2019 / 11*	*DN:443806*	4190019	0	18.54
	19-Feb-2020	*2019 / 11*	*DN:443778*	4190019	0	9.48
	19-Feb-2020	*2019 / 11*	*DN:443779*	4190019	0	13.04
	19-Feb-2020	*2019 / 11*	*DN:443759*	4190019	0	11.44
	19-Feb-2020	*2019 / 11*	*DN:443760*	4190019	0	14.32
	19-Feb-2020	*2019 / 11*	*DN:443737*	4190019	0	9.22
	19-Feb-2020	*2019 / 11*	*DN:443738*	4190019	0	17.26
	19-Feb-2020	*2019 / 11*	*DN:443751*	4190019	0	15.91
	19-Feb-2020	*2019 / 11*	*DN:443752*	4190019	0	12.68
	19-Feb-2020	*2019 / 11*	*DN:443768*	4190019	0	11.51
	19-Feb-2020	*2019 / 11*	*DN:443769*	4190019	0	11.18
	19-Feb-2020	*2019 / 11*	*DN:443812*	4190019	0	13.35
	19-Feb-2020	*2019 / 11*	*DN:443813*	4190019	0	12.82
	19-Feb-2020	*2019 / 11*	*DN:443746*	4190019	0	19.10
	19-Feb-2020	*2019 / 11*	*DN:443761*	4190019	0	17.96
	19-Feb-2020	*2019 / 11*	*DN:443780*	4190019	0	16.96
	19-Feb-2020	*2019 / 11*	*DN:443807*	4190019	0	19.10
	19-Feb-2020	*2019 / 11*	*DN:443743*	4190019	0	11.18
	19-Feb-2020	*2019 / 11*	*DN:443744*	4190019	0	14.54
	19-Feb-2020	*2019 / 11*	*DN:443765*	4190019	0	8.76
	19-Feb-2020	*2019 / 11*	*DN:443767*	4190019	0	14.76

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19-Feb-2020	2019 / 11	DN:443782		4190019	0	14.18
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19-Feb-2020	2019 / 11	DN:443809		4190019	0	15.20
19-Feb-2020	2019 / 11	DN:443788		4190019	0	12.50
19-Feb-2020	2019 / 11	DN:443814		4190019	0	9.34
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19-Feb-2020	2019 / 11	DN:443774		4190019	0	9.34
19-Feb-2020	2019 / 11	DN:443775		4190019	0	12.22
19-Feb-2020	2019 / 11	DN:443787		4190019	0	982.00 Not an erro
19-Feb-2020	2019 / 11	DN:A1		4190019	0	67.10
20-Feb-2020	2019 / 11	DN:443821		4190019	0	11.56
20-Feb-2020	2019 / 11	DN:443822		4190019	0	16.32
20-Feb-2020	2019 / 11	DN:443865		4190019	0	9.22
20-Feb-2020	2019 / 11	DN:443866		4190019	0	17.22
20-Feb-2020	2019 / 11	DN:443906		4190019	0	11.62
20-Feb-2020	2019 / 11	DN:443907		4190019	0	19.06
20-Feb-2020	2019 / 11	DN:443930		4190019	0	8.42
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20-Feb-2020	2019 / 11	DN:443828		4190019	0	17.52
20-Feb-2020	2019 / 11	DN:443870		4190019	0	17.70

20-Feb-2020	*2019 / 11*	*DN:443903*	4190019	0	20.14
20-Feb-2020	*2019 / 11*	*DN:443929*	4190019	0	14.62
20-Feb-2020	*2019 / 11*	*DN:443954*	4190019	0	16.96
20-Feb-2020	*2019 / 11*	*DN:443819*	4190019	0	9.18
20-Feb-2020	*2019 / 11*	*DN:443820*	4190019	0	15.06
20-Feb-2020	*2019 / 11*	*DN:443858*	4190019	0	9.02
20-Feb-2020	*2019 / 11*	*DN:443859*	4190019	0	14.80
20-Feb-2020	*2019 / 11*	*DN:443901*	4190019	0	10.40
20-Feb-2020	*2019 / 11*	*DN:443902*	4190019	0	14.62
20-Feb-2020	*2019 / 11*	*DN:443925*	4190019	0	10.60
20-Feb-2020	*2019 / 11*	*DN:443926*	4190019	0	14.62
20-Feb-2020	*2019 / 11*	*DN:443950*	4190019	0	8.44
20-Feb-2020	*2019 / 11*	*DN:443951*	4190019	0	15.18
20-Feb-2020	*2019 / 11*	*DN:443962*	4190019	0	9.88
20-Feb-2020	*2019 / 11*	*DN:443963*	4190019	0	13.44
20-Feb-2020	*2019 / 11*	*DN:443915*	4190019	0	15.18
20-Feb-2020	*2019 / 11*	*DN:443914*	4190019	0	11.46
20-Feb-2020	*2019 / 11*	*DN:443940*	4190019	0	10.94
20-Feb-2020	*2019 / 11*	*DN:443941*	4190019	0	15.50
20-Feb-2020	*2019 / 11*	*DN:443880*	4190019	0	10.64
20-Feb-2020	*2019 / 11*	*DN:443881*	4190019	0	17.84
20-Feb-2020	*2019 / 11*	*DN:443844*	4190019	0	10.66

20-Feb-2020	*2019 / 11*	*DN:443845*	4190019	0	18.60
20-Feb-2020	*2019 / 11*	*DN:443841*	4190019	0	11.61
20-Feb-2020	*2019 / 11*	*DN:443842*	4190019	0	14.40
20-Feb-2020	*2019 / 11*	*DN:443889*	4190019	0	11.77
20-Feb-2020	*2019 / 11*	*DN:443890*	4190019	0	13.00
20-Feb-2020	*2019 / 11*	*DN:443916*	4190019	0	14.85
20-Feb-2020	*2019 / 11*	*DN:443917*	4190019	0	12.26
20-Feb-2020	*2019 / 11*	*DN:443949*	4190019	0	13.26
20-Feb-2020	*2019 / 11*	*DN:443948*	4190019	0	12.13
20-Feb-2020	*2019 / 11*	*DN:443962*	4190019	0	9.88
20-Feb-2020	*2019 / 11*	*DN:443963*	4190019	0	13.44
21-Feb-2020	*2019 / 11*	*DN:443971*	4190019	0	17.02
21-Feb-2020	*2019 / 11*	*DN:443977*	4190019	0	10.14
21-Feb-2020	*2019 / 11*	*DN:443978*	4190019	0	14.26
21-Feb-2020	*2019 / 11*	*DN:443983*	4190019	0	12.17
21-Feb-2020	*2019 / 11*	*DN:443984*	4190019	0	13.06
				ECCONT Total	2,117.02
					Mat Total
					33183 Total
					Report Total

ır (total cartage in that day by Frews Transport)

Appendix D – Lot Sample Location Plan

MOMENTUM ENVIRONMENTAL LTD.

Specialist soil contamination experts, keeping your project moving.

www.momentumenviro.co.nz

LEGEND

- • SS — Validation Sample Location
- Concentration of contaminants above background, below residential SGV
- NO COLOUR — Concentrations of contaminants below expected background concentrations (Regional, Recent)

PLAN MUST BE PRINTED IN COLOUR

Graphic scale is approximate only

0 30 60 90m

Date: 06 April 2022 **Drawing No:** 01363/6

Lot Validation Sample Location Plan

1 Sutherlands Rd & 848 Cashmere Rd, Christchurch

Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9, Stage 10

Notes:

1. This plan has been prepared for soil contamination risk assessment purposes only. No liability is accepted if the plan is used for any other purposes.
2. Any measurements taken from this plan which are not dimensioned on the electronic copy are at the risk of the user.
3. Soil sample locations are approximate only

Appendix E – Table of Laboratory Lot Validation Results

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch

Stage 1C

Soil Results	Sample Name:	SS130.1	SS130.2	SS131.1	SS131.2	Soil Guideline Values				
	Lab Number:	7/04/2022	7/04/2022	07/04/2022	07/04/2022	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	22-13376-34	22-13376-35	22-13376-36	22-13376-37					
	Depth (mm):	0-50	250	0-50	250					
Heavy Metals										
Arsenic	mg/kg dry wt	13.3	8.7	8.6	8.7	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.085	0.081	0.079	0.085	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	18.4	19.2	17.3	17.2	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10.7	10.6	10.3	9.99	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	20.5	20.2	19.5	22.5	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	15.1	15.2	14.5	13.9	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	68.7	68.1	69.8	70.1	7,400	NEPM	410	ANZWQ	93.94

STAGE 4

Soil Results	Sample Name:	SS27.1	SS27.2	SS28.1	SS28.2	SS29.1	SS29.2	SS30.1	SS30.2	SS31.1	SS31.2	Soil Guideline Values				
	Lab Number:	22-13376-1	22-13376-2	22-13376-3	22-13376-4	22-13376-5	22-13376-6	22-13376-7	22-13376-8	22-13376-9	22-13376-10	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022					
	Depth (mm):	0-50	300	0-50	250	0-50	250	0-50	250	0-50	250					
Heavy Metals																
Arsenic	mg/kg dry wt	11	10	12	11	6.4	8.4	10	7.8	7.6	7.9	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.071	0.063	0.07	0.071	0.083	0.07	0.075	0.07	0.075	0.079	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15.9	17.3	15.8	16.6	17.1	16.2	16.8	16.6	15.5	17.6	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	8.89	8.71	8.82	8.19	12.7	9.29	10	9.42	8.27	9.48	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	17.2	17	16.8	16.1	30.4	18.4	18.8	18.5	17.1	18.3	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.2	13.7	13.4	12.9	15.8	13.3	13.8	13.1	13	13.7	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	55.1	54.2	56.6	48.9	69.2	60.4	59.4	57.2	53.3	61.9	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS36.1	SS36.2	SS37.1	SS37.2	SS38.1	SS38.2	SS39.1	SS39.2	SS40.1	SS40.2	Soil Guideline Values				
	Lab Number:	22-13376-11	22-13376-13	22-13376-14	22-133761-15	22-13376-16	22-13376-17	20-27886-7	20-27886-8	20-27886-5	20-27886-6	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/30/2020	7/30/2020	7/30/2020	7/30/2020					
	Depth (mm):	0-50	250	0-50	250	0-50	300	0-50	250	0-50	250					
Heavy Metals																
Arsenic	mg/kg dry wt	11	12	12	11	11	12	4.4	4.1	4.5	4.3	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.074	0.072	0.084	0.097	0.097	0.087	0.046	0.065	0.031	0.027	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	17.4	16.8	16.8	17.3	16.8	18.3	15.4	15	15.6	15.2	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	9.58	9.13	9.52	10.1	9.96	11.7	6.4	7.2	6.1	6.8	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	19	17.6	18.6	27.2	21.9	31.5	20.9	19.7	14.7	14	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.7	13.4	13.6	13.4	13.8	14.6	11.8	11.3	11.6	11.6	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	61.6	60.5	62.9	69.2	64.7	74.8	66.5	61.2	49.2	44.4	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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[1] Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch

Stage 4 Continued

Soil Results	Sample Name:	SS41.1	SS41.2	SS42.1	SS42.2	SS48.1	SS48.2	SS49.1	SS49.2	SS50.1	SS50.2	Soil Guideline Values				
	Lab Number:	20-27886-1	20-27886-2	20-27886-3	20-27886-5	22-13376-18	22-13376-19	22-13376-20	22-13376-21	22-13376-22	22-13376-23	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	7/30/2020	7/30/2020	7/30/2020	7/30/2020	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022					
	Depth (mm):	0-50	250	0-50	250	0-50	250	0-50	250	0-50	200					
Heavy Metals																
Arsenic	mg/kg dry wt	3.8	4.6	4.1	4.5	11	11	9.4	9	11	10	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.041	0.021	0.04	0.034	0.088	0.08	0.11	0.068	0.079	0.071	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	14.4	15.6	15.2	16.2	18.1	19.4	19.6	16.8	19.3	19.9	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	5.1	6.7	6.3	6.8	11.6	11.8	12.7	10.2	10	10.5	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	13.2	15.1	18	16.3	35.4	24.7	22.5	17.4	18.5	18.5	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	10.7	12.1	11.1	12.4	14.4	15	18.5	13.6	14.2	14.4	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	47.7	47.7	58.4	55.9	66.1	65.5	66.8	55.8	60.6	62	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS51.1	SS51.2	SS52.1	SS52.2	SS53.1	SS53.2	SS54.1	SS54.2	SS55.1	SS55.2	Soil Guideline Values				
	Lab Number:	22-13376-24	22-13376-25	22-13376-38	22-13376-39	22-13376-26	22-13376-27	22-13376-28	22-13376-29	22-13376-30	22-13376-31	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	7/30/2020	7/30/2020	7/30/2020	7/30/2020	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022	7/04/2022					
	Depth (mm):	0-50	250	0-50	250	0-50	300	0-50	300	0-50	250					
Heavy Metals																
Arsenic	mg/kg dry wt	12	11	8.3	13.2	9.2	8.1	6.8	6.5	6	6.5	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.11	0.073	0.077	0.086	0.075	0.08	0.077	0.076	0.063	0.076	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	18.3	18.3	16.6	20.6	17.7	17.1	16.4	16.6	15.8	16.9	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10.3	9.29	9.91	9.91	10.4	9.65	9.4	9.25	8.86	9.32	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	19.5	17.7	20.8	21.9	21.9	20.8	17.1	17.6	16.7	17	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	14.7	13.9	13.5	14.7	14.1	13.5	12.5	13	12.5	13	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	64.9	60.1	61.7	69.3	71.4	65.8	61.7	61.2	57.1	58.2	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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[1] Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch

STAGE 6

Soil Results	Sample Name:	SS69.1	SS69.2	SS70.1	SS70.2	SS71.1	SS71.2	SS72.1	SS72.2	SS73.1	SS73.2	Soil Guideline Values				
	Lab Number:	21-31080-24	21-31080-25	21-31080-26	21-31080-27	21-31080-28	21-31080-29	21-31080-30	21-31080-31	21-31080-32	21-31080-33	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021					
	Depth (mm):	0-50	300	0-50	300	0-50	300	0-50	250	0-50	250					
Heavy Metals																
Arsenic	mg/kg dry wt	12	15.6	13.4	11	4.5	6.3	8.6	7.6	7.0	7.7	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.073	0.072	0.066	0.079	0.054	0.096	0.11	0.11	0.11	0.11	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	17.4	17.1	16.6	15.6	13.0	18.2	17.8	17.4	17.1	17.2	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10.4	10.9	10.5	9.99	8.15	11.1	10.5	10.5	10.4	10.4	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	19.9	18.9	18.7	17.0	15.2	18.3	19.6	18.6	19.0	18.8	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	14.0	14.5	14.1	12.9	8.97	17.3	15.8	15.3	15.5	15.3	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	63.9	65.5	61.4	62.8	62.2	58.0	61.6	58.5	59.6	59.1	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS89.1	SS89.2	SS90.1	SS90.2	SS91.1	SS91.2	SS92.1	SS92.2	SS93.1	SS93.2	Soil Guideline Values				
	Lab Number:	21-31080-14	21-31080-15	21-31080-16	21-31080-17	21-31080-18	21-31080-19	21-31080-20	21-31080-21	21-31080-22	21-31080-23	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021					
	Depth (mm):	0-50	250	0-50	250	0-50	250	0-50	150	0-50	250					
Heavy Metals																
Arsenic	mg/kg dry wt	4.8	4.1	4.2	5.4	9.1	7.7	9.6	10	10	10	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.044	0.027	0.038	0.067	0.11	0.094	0.091	0.079	0.083	0.087	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	17.1	15.9	18.8	25.8	18.8	20.4	18.0	18.0	18.6	19.0	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10.9	7.96	11.5	13.9	11.7	13.6	9.95	9.48	9.99	10.5	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	18.1	16.0	14.9	16.0	18.7	20.3	19.3	18.8	19.1	20.6	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	17.9	13.8	19.7	23.5	17.7	21.2	15.4	14.8	15.3	15.6	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	55.8	44.4	51.4	55.3	58.5	64.4	64.2	63.1	63.6	66.4	7,400	NEPM	410	ANZWQ	93.94

STAGE 6A

Soil Results	Sample Name:	SS119.1	SS119.2	SS120.1	SS120.2	SS121.1	SS121.2	SS122.1	SS122.2	SS123.1	SS123.3	Soil Guideline Values				
	Lab Number:	21-34502-1	21-34502-2	21-34502-3	21-34502-4	21-34502-5	21-34502-6	21-34502-33	21-34502-34	21-34502-7	21-34502-9	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021					
	Depth (mm):	0-50	250	0-50	300	0-50	300	0-50	300	0-50	300					
Heavy Metals																
Arsenic	mg/kg dry wt	3.6	14	12.9	14.1	18.1	17.5	14.2	18.2	13.3	16	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.12	0.11	0.11	0.1	0.1	0.099	0.099	0.12	0.099	0.11	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	11	18.6	17.9	18.5	18.4	19.9	18.1	20.7	17.9	19.4	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	6.6	13.7	13.5	13.2	13.2	14.1	13.2	16.4	14.2	14.7	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	12.3	22.4	23.1	22.3	27.1	23.1	28.7	24.3	23.1	23.5	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	7.12	15.5	14.7	15.2	15.1	15.9	14.4	16.5	14.9	16	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	55.6	65.9	65.4	66.7	69.9	68.3	69.5	71.2	64.4	67.1	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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[1] Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch

STAGE 7

Soil Results	Sample Name:	SS58.1	SS58.2	SS59.1	SS59.3	SS60.1	SS60.2	SS74.1	SS74.2	Soil Guideline Values				
	Lab Number:	22-13376-32	22-13376-33	21-34502-20	21-34502-22	21-34502-23	21-34502-24	21-34502-25	21-34502-26	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	7/04/2022	7/04/2022	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021					
	Depth (mm):	0-50	250	0-50	300	0-50	300	0-50	300					
Heavy Metals														
Arsenic	mg/kg dry wt	13.2	11	16.9	18.2	18.2	13.9	7.3	8	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.086	0.13	0.084	0.073	0.077	0.091	0.1	0.081	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	20.1	18.6	17.9	17.4	16.6	19.2	18.6	17.6	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	13.1	11.1	10.6	9.61	10.4	12.7	11	10.3	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	26.5	21.8	19.6	18.2	18.5	21.6	19.3	18	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	17.2	15.7	13.7	12.9	13.2	15.6	16.2	15	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	81.5	68.5	62.8	56.4	59.8	66.1	59.7	57.7	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS75.1	SS75.2	SS76.1	SS76.2	SS77.1	SS77.2	SS94.1	SS94.2	Soil Guideline Values				
	Lab Number:	21-34502-27	21-34502-28	21-34502-29	21-34502-30	21-34502-31	21-34502-32	21-34502-10	21-34502-11	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021					
	Depth (mm):	0-50	300	0-50	300	0-50	300	0-50	300					
Heavy Metals														
Arsenic	mg/kg dry wt	6.9	6.9	12	13	9.1	11	9.6	9.4	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.083	0.094	0.07	0.095	0.088	0.078	0.078	0.064	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	16.9	18.7	21.3	18.5	16.9	16.5	16.6	19.1	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10.2	10.6	9.93	11.1	9.44	8.43	9.12	9.43	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	18	18.6	19.1	20.1	18.6	18.3	18.4	19.1	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	14.7	16.3	16.2	14	14	12.9	13.6	15.1	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	56.6	58.2	64.4	62.9	59.4	59.3	61.7	63.6	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS95.1	SS95.2	SS96.1	SS96.2	SS97.1	SS97.2	SS98.1	SS98.2	Soil Guideline Values				
	Lab Number:	21-34502-12	21-34502-13	21-34502-14	21-34502-15	21-34502-16	21-34502-17	21-34502-18	21-34502-19	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021	5/08/2021					
	Depth (mm):	0-50	300	0-50	300	0-50	300	0-50	300					
Heavy Metals														
Arsenic	mg/kg dry wt	10	11	5.2	5	6.9	8.9	11	6.6	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.061	0.07	0.062	0.064	0.076	0.066	0.08	0.077	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	17.8	17.1	20.2	20.2	17.9	23.6	17.4	18.3	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	9.3	9.25	14.3	13.9	11	15	10.3	11	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	17.9	17.9	34.8	36.2	22.8	28	19.7	20.6	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.9	14	18.5	18.5	15.2	20.3	15.1	16	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	59.3	59.6	72	71.6	61.2	83	60.3	62.2	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

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[1] Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch

STAGE 8

Soil Results	Sample Name:	SS104.1	SS104.2	SS105.1	SS105.2	SS106.1	SS106.2	SS110.1	Soil Guideline Values				
	Lab Number:	21-31080-5	21-31080-6	21-31080-3	21-31080-4	21-31080-1	21-31080-2	21-26606-40	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	10/06/2021					
	Depth (mm):	0-50	250	0-50	250	0-50	250	0-50					
Heavy Metals													
Arsenic	mg/kg dry wt	5.0	3.9	4.9	10	6.0	10	13.4	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.036	0.026	0.048	0.075	0.080	0.088	0.096	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	19.3	16.3	22.3	18.6	22.7	18.7	15.4	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	12.2	9.16	16.4	10.8	17.7	11.6	10.7	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	17.3	12.9	18.3	19.6	39.6	22.2	19.6	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	18.8	15.7	25.8	15.4	21.3	15.2	12	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	54.1	43.4	61.4	62.0	80.7	63.2	57.4	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS110.2	SS111.1	SS111.2	SS112.1	SS112.2	SS113.1	SS113.2	Soil Guideline Values				
	Lab Number:	21-26606-41	21-26606-42	21-26606-43	21-26606-48	21-26606-49	21-26606-50	21-2660651	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
	Depth (mm):	250	0-50	250	0-50	250	0-50	250					
Heavy Metals													
Arsenic	mg/kg dry wt	16.6	15.7	18.4	11	13	12	14.3	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.096	0.081	0.076	0.08	0.091	0.11	0.4	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	17.9	18	17.3	17.3	16.1	17.4	17.6	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	12.4	12.6	11.3	12.2	11.2	11.5	12.1	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	21.2	20.6	20.9	20.8	20.3	22.1	21.2	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	14.3	15.2	13.9	13.5	12.7	13.5	13.2	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	66.3	63.8	61	61.4	56	63.4	63.2	7,400	NEPM	410	ANZWQ	93.94

STAGE 8A

Soil Results	Sample Name:	SS114.1	SS114.2	SS115.1	SS115.2	SS116.1	SS116.2	SS117.1	SS117.2	SS118.1	SS118.2	Soil Guideline Values				
	Lab Number:	21-26606-52	21-26606-53	21-26606-54	21-26606-55	21-26606-56	21-26606-57	21-26606-58	21-26606-59	21-26606-60	21-26606-61	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
	Depth (mm):	0-50	250	0-50	250	50	250	0-50	250	0-50	250					
Heavy Metals																
Arsenic	mg/kg dry wt	12	19	11	17.5	12.7	13.1	13.9	14.7	14.6	13	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.082	0.12	0.096	0.08	0.1	0.091	0.081	0.11	0.13	0.11	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15	18.3	18.7	17.6	17.2	19.1	14.7	18.7	18.4	16.9	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	11.7	13.3	12.6	12	12.4	13.1	11.2	14.2	13	13.2	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	20.1	24.3	24	34.2	22.3	23.9	19.4	23.9	24.3	22.8	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	12.2	14.3	13.9	12.3	13.2	13.5	11.9	15	14.8	13.7	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	55.3	88.5	68.7	65.9	60.5	71.9	56.5	70.3	67	66.2	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

NES - National Environmental Standard for Assessing and Managing Contaminants in Soils, MfE
NEPM - National Environmental Protection Measures 2013, Formerly NEPC, Australia
ANZWQ - Australian and New Zealand - Guidelines for Fresh and Marine Water Quality (online) - Sediment GV-high
[1] Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Table of Laboratory Results - 1 Sutherlands Road & 848 Cashmere Road, Christchurch

STAGE 9

Soil Results	Sample Name:	SS61.1	SS61.3	SS62.1	SS62.2	SS63.1	SS63.2	SS64.1	Soil Guideline Values				
	Lab Number:	21-31080-38	21-31080-40	21-26606-32	21-26606-33	21-26606-34	21-26606-35	21-26606-38	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	13/07/2021	13/07/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
	Depth (mm):	0-50	300	50	250	0-50	250	0-50					
Heavy Metals													
Arsenic	mg/kg dry wt	13.7	4.0	2.7	2.7	9.1	13.1	9.1	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.070	0.035	0.028	0.021	0.062	0.071	0.05	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15.9	13.9	9.9	11	14.1	14.6	12.8	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	10.6	5.4	4.9	3.5	7.62	8.73	6.8	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	18.3	12.4	10.2	8.88	15.8	17.1	14.6	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	13.5	8.90	5.97	6.12	9.97	11	8.82	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	58.8	45.4	33.2	28.1	57.6	56.7	48.8	7,400	NEPM	410	ANZWQ	93.94

Soil Results	Sample Name:	SS64.2	SS99.1	SS99.2	SS100.1	SS100.2	SS107.1	SS107.2	Soil Guideline Values				
	Lab Number:	21-26606-39	21-31080-36	21-31080-37	21-31080-34	21-31080-35	21-26606-44	21-26606-45	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	10/06/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	10/06/2021	10/06/2021					
	Depth (mm):	250	0-50	300	0-50	300	50	250					
Heavy Metals													
Arsenic	mg/kg dry wt	4.8	13.8	9.8	9.6	8.3	12.8	6.7	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.052	0.093	0.071	0.091	0.10	0.065	0.037	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	15	17.3	17.7	18.3	19.5	14	16.1	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	8.21	11.3	9.70	12.4	12.5	8.08	8.69	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	15.7	19.2	18.8	18.3	19.1	16.8	17.5	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	11.7	14.6	14.2	19.0	20.1	9.89	12.3	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	52.7	64.5	61.5	61.0	61.9	54.8	54.2	7,400	NEPM	410	ANZWQ	93.94

STAGE 10

Soil Results	Sample Name:	SS101.1	SS101.2	SS102.1	SS102.3	SS103.1	SS103.2	SS108.1	SS108.2	SS109.1	SS109.2	Soil Guideline Values				
	Lab Number:	21-31080-12	21-31080-13	21-31080-9	21-31080-11	21-31080-7	21-31080-8	21-26606-46	21-26606-47	21-26606-36	21-26606-37	Residential 10% Produce	Reference	Ecological Receptors	Reference	Background[1]
	Date Sampled:	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
	Depth (mm):	0-50	250	0-50	250	0-50	250	50	250	0-50	200					
Heavy Metals																
Arsenic	mg/kg dry wt	8.5	9.3	8.2	7.6	7.7	7.1	12.8	15.1	13.7	12.8	20	NES	70	ANZWQ	12.58
Cadmium	mg/kg dry wt	0.090	0.075	0.11	0.095	0.090	0.10	0.05	0.061	0.076	0.083	3	NES	10	ANZWQ	0.19
Chromium	mg/kg dry wt	19.3	17.9	19.2	19.0	19.0	20.1	15.4	16.2	16.2	16.6	460	NES	370	ANZWQ	22.7
Copper	mg/kg dry wt	12.0	9.83	12.8	12.3	15.2	13.6	8.22	9.18	10.5	11.4	>10,000	NES	270	ANZWQ	20.3
Lead	mg/kg dry wt	19.2	19.1	19.3	18.7	18.6	18.2	16.6	19.4	20.4	21.2	210	NES	220	ANZWQ	40.96
Nickel	mg/kg dry wt	17.4	14.8	19.4	19.3	18.7	21.5	12	11.8	12.3	13.1	130	NEPM	52	ANZWQ	20.7
Zinc	mg/kg dry wt	63.0	59.2	62.5	61.9	59.5	61.7	55.5	56.1	58.8	56.3	7,400	NEPM	410	ANZWQ	93.94

Indicates result exceeds residential guideline value
Indicates result exceeds ecological guideline value
Indicates result exceeds background value for soil type

NES - National Environmental Standard for Assessing and Managing Contaminants in Soils, MfE
NEPM - National Environmental Protection Measures 2013, Formerly NEPC, Australia
ANZWQ - Australian and New Zealand - Guidelines for Fresh and Marine Water Quality (online) - Sediment GV-high
[1] Concentrations for "Regional, Recent" soil group from Background Concentrations in Canterbury Soils, Tonkin and Taylor, July 2007

Appendix F – Laboratory Reports

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Certificate of Analysis

Momentum Environmental Ltd
19 Robertsons Road, Kirwee, RD1
Christchurch 7671

Attention: Nicola Peacock
Phone: 0275134057
Email: hollie@momentumenviro.co.nz

Lab Reference: 22-13376
Submitted by: Hollie Griffith
Date Received: 08/04/2022
Testing Initiated: 8/04/2022
Date Completed: 13/04/2022
Order Number:
Reference: 363

Sampling Site: 1 Sutherlands Road, Halswell

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

		Client Sample ID	SS27.1 0-50	SS27.2 300	SS28.1 0-50	SS28.2 250	SS29.1 0-50
		Date Sampled	07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022
Analyte	Unit	*Reporting Limit*	22-13376-1	22-13376-2	22-13376-3	22-13376-4	22-13376-5
Arsenic	mg/kg dry wt	*0.125*	11	10	12	11	6.4
Cadmium	mg/kg dry wt	*0.005*	0.071	0.063	0.070	0.071	0.083
Chromium	mg/kg dry wt	*0.125*	15.9	17.3	15.8	16.6	17.1
Copper	mg/kg dry wt	*0.075*	8.89	8.71	8.82	8.19	12.7
Lead	mg/kg dry wt	*0.25*	17.2	17.0	16.8	16.1	30.4
Nickel	mg/kg dry wt	*0.05*	13.2	13.7	13.4	12.9	15.8
Zinc	mg/kg dry wt	*0.05*	55.1	54.2	56.6	48.9	69.2

Heavy Metals in Soil

		Client Sample ID	SS29.2 250	SS30.1 0-50	SS30.2 250	SS31.1 0-50	SS31.2 250
		Date Sampled	07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022
Analyte	Unit	*Reporting Limit*	22-13376-6	22-13376-7	22-13376-8	22-13376-9	22-13376-10
Arsenic	mg/kg dry wt	*0.125*	8.4	10	7.8	7.6	7.9
Cadmium	mg/kg dry wt	*0.005*	0.070	0.075	0.070	0.075	0.079
Chromium	mg/kg dry wt	*0.125*	16.2	16.8	16.6	15.5	17.6
Copper	mg/kg dry wt	*0.075*	9.29	10.0	9.42	8.27	9.48
Lead	mg/kg dry wt	*0.25*	18.4	18.8	18.5	17.1	18.3
Nickel	mg/kg dry wt	*0.05*	13.3	13.8	13.1	13.0	13.7
Zinc	mg/kg dry wt	*0.05*	60.4	59.4	57.2	53.3	61.9

Heavy Metals in Soil

Client Sample ID			SS36.1 0-50	SS36.2 0-50	SS36.3 250	SS37.1 0-50	SS37.2 250
Date Sampled			07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022
Analyte	Unit	*Reporting Limit*	22-13376-11	22-13376-12	22-13376-13	22-13376-14	22-13376-15
Arsenic	mg/kg dry wt	*0.125*	11	9.4	12	12	11
Cadmium	mg/kg dry wt	*0.005*	0.074	0.070	0.072	0.084	0.097
Chromium	mg/kg dry wt	*0.125*	17.4	16.7	16.8	16.8	17.3
Copper	mg/kg dry wt	*0.075*	9.58	8.98	9.13	9.52	10.1
Lead	mg/kg dry wt	*0.25*	19.0	17.9	17.6	18.6	27.2
Nickel	mg/kg dry wt	*0.05*	13.7	13.1	13.4	13.6	13.4
Zinc	mg/kg dry wt	*0.05*	61.6	59.9	60.5	62.9	69.2

Heavy Metals in Soil

Client Sample ID			SS38.1 0-50	SS38.2 300	SS48.1 0-50	SS48.2 250	SS49.1 0-50
Date Sampled			07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022
Analyte	Unit	*Reporting Limit*	22-13376-16	22-13376-17	22-13376-18	22-13376-19	22-13376-20
Arsenic	mg/kg dry wt	*0.125*	11	12	11	11	9.4
Cadmium	mg/kg dry wt	*0.005*	0.097	0.087	0.088	0.080	0.11
Chromium	mg/kg dry wt	*0.125*	16.8	18.3	18.1	19.4	19.6
Copper	mg/kg dry wt	*0.075*	9.96	11.7	11.6	11.8	12.7
Lead	mg/kg dry wt	*0.25*	21.9	31.5	35.4	24.7	22.5
Nickel	mg/kg dry wt	*0.05*	13.8	14.6	14.4	15.0	18.5
Zinc	mg/kg dry wt	*0.05*	64.7	74.8	66.1	65.5	66.8

Heavy Metals in Soil

Client Sample ID			SS49.2 250	SS50.1 0-50	SS50.2 200	SS51.1 0-50	SS51.2 250
Date Sampled			07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022
Analyte	Unit	*Reporting Limit*	22-13376-21	22-13376-22	22-13376-23	22-13376-24	22-13376-25
Arsenic	mg/kg dry wt	*0.125*	9.0	11	10	12	11
Cadmium	mg/kg dry wt	*0.005*	0.068	0.079	0.071	0.11	0.073
Chromium	mg/kg dry wt	*0.125*	16.8	19.3	19.9	18.3	18.3
Copper	mg/kg dry wt	*0.075*	10.2	10.0	10.5	10.3	9.29
Lead	mg/kg dry wt	*0.25*	17.4	18.5	18.5	19.5	17.7
Nickel	mg/kg dry wt	*0.05*	13.6	14.2	14.4	14.7	13.9
Zinc	mg/kg dry wt	*0.05*	55.8	60.6	62.0	64.9	60.1

Heavy Metals in Soil

Client Sample ID			SS53.1 0-50	SS53.2 300	SS54.1 0-50	SS54.2 300	SS55.1 0-50
Date Sampled			07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022
Analyte	Unit	*Reporting Limit*	22-13376-26	22-13376-27	22-13376-28	22-13376-29	22-13376-30
Arsenic	mg/kg dry wt	*0.125*	9.2	8.1	6.8	6.5	6.0
Cadmium	mg/kg dry wt	*0.005*	0.075	0.080	0.077	0.076	0.063
Chromium	mg/kg dry wt	*0.125*	17.7	17.1	16.4	16.6	15.8
Copper	mg/kg dry wt	*0.075*	10.4	9.65	9.40	9.25	8.86
Lead	mg/kg dry wt	*0.25*	21.9	20.8	17.1	17.6	16.7
Nickel	mg/kg dry wt	*0.05*	14.1	13.5	12.5	13.0	12.5
Zinc	mg/kg dry wt	*0.05*	71.4	65.8	61.7	61.2	57.1

Heavy Metals in Soil

Client Sample ID			SS55.2 250	SS58.1 0-50	SS58.2 250	SS130.1 0-50	SS130.2 250
Date Sampled			07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022
Analyte	Unit	*Reporting Limit*	22-13376-31	22-13376-32	22-13376-33	22-13376-34	22-13376-35
Arsenic	mg/kg dry wt	*0.125*	6.5	13.2	11	13.3	8.7
Cadmium	mg/kg dry wt	*0.005*	0.076	0.086	0.13	0.085	0.081
Chromium	mg/kg dry wt	*0.125*	16.9	20.1	18.6	18.4	19.2
Copper	mg/kg dry wt	*0.075*	9.32	13.1	11.1	10.7	10.6
Lead	mg/kg dry wt	*0.25*	17.0	26.5	21.8	20.5	20.2
Nickel	mg/kg dry wt	*0.05*	13.0	17.2	15.7	15.1	15.2
Zinc	mg/kg dry wt	*0.05*	58.2	81.5	68.5	68.7	68.1

Heavy Metals in Soil

Client Sample ID			SS131.1 0-50	SS131.2 250	SS52.1 0-50	SS52.2 250
Date Sampled			07/04/2022	07/04/2022	07/04/2022	07/04/2022
Analyte	Unit	*Reporting Limit*	22-13376-36	22-13376-37	22-13376-38	22-13376-39
Arsenic	mg/kg dry wt	*0.125*	8.6	8.7	8.3	13.2
Cadmium	mg/kg dry wt	*0.005*	0.079	0.085	0.077	0.086
Chromium	mg/kg dry wt	*0.125*	17.3	17.2	16.6	20.6
Copper	mg/kg dry wt	*0.075*	10.3	9.99	9.91	9.91
Lead	mg/kg dry wt	*0.25*	19.5	22.5	20.8	21.9
Nickel	mg/kg dry wt	*0.05*	14.5	13.9	13.5	14.7
Zinc	mg/kg dry wt	*0.05*	69.8	70.1	61.7	69.3

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Sharelle Frank, B.Sc. (Tech)
Technologist

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Certificate of Analysis

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19 Robertsons Road, Kirwee
Christchurch 7671

Attention: Nicola Peacock
Phone: 0275134057
Email: hollie@mallochenviro.co.nz

Lab Reference: 20-27886
Submitted by: Hollie Griffith
Date Received: 31/07/2020
Testing Initiated: 31/07/2020
Date Completed: 4/08/2020
Order Number: N/A
Reference: N/A

Sampling Site: 1 Sutherlands Rd, Halswell, Chch

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

	Client Sample ID		SS41.1 0-50	SS41.2 250	SS42.1 0-50	SS42.2 250	SS40.1 0-50
	Date Sampled		30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Analyte	Unit	*Reporting Limit*	20-27886-1	20-27886-2	20-27886-3	20-27886-4	20-27886-5
Arsenic	mg/kg dry wt	*0.125*	3.8	4.6	4.1	4.5	4.5
Cadmium	mg/kg dry wt	*0.005*	0.041	0.021	0.040	0.034	0.031
Chromium	mg/kg dry wt	*0.125*	14.4	15.6	15.2	16.2	15.6
Copper	mg/kg dry wt	*0.075*	5.1	6.7	6.3	6.8	6.1
Lead	mg/kg dry wt	*0.25*	13.2	15.1	18.0	16.3	14.7
Nickel	mg/kg dry wt	*0.05*	10.7	12.1	11.1	12.4	11.6
Zinc	mg/kg dry wt	*0.05*	47.7	47.7	58.4	55.9	49.2

Heavy Metals in Soil

	Client Sample ID		SS40.2 250	SS39.1 0-50	SS39.2 250	SS20.1 0-50	SS20.2 250
	Date Sampled		30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Analyte	Unit	*Reporting Limit*	20-27886-6	20-27886-7	20-27886-8	20-27886-9	20-27886-10
Arsenic	mg/kg dry wt	*0.125*	4.3	4.4	4.1	4.5	4.7
Cadmium	mg/kg dry wt	*0.005*	0.027	0.046	0.065	0.034	0.037
Chromium	mg/kg dry wt	*0.125*	15.2	15.4	15.0	15.2	16.5
Copper	mg/kg dry wt	*0.075*	6.8	6.4	7.2	6.6	6.5
Lead	mg/kg dry wt	*0.25*	14.0	20.9	19.7	17.1	18.6
Nickel	mg/kg dry wt	*0.05*	11.6	11.8	11.3	11.6	12.0
Zinc	mg/kg dry wt	*0.05*	44.4	66.5	61.2	57.1	54.2

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation, with the exception of tests marked *, which are not accredited.

Heavy Metals in Soil

			Client Sample ID	SS19.1 0-50	SS19.2 250
			Date Sampled	30/07/2020	30/07/2020
Analyte		Unit	*Reporting Limit*	20-27886-11	20-27886-12
Arsenic		mg/kg dry wt	*0.125*	4.4	4.2
Cadmium		mg/kg dry wt	*0.005*	0.040	0.024
Chromium		mg/kg dry wt	*0.125*	15.2	15.9
Copper		mg/kg dry wt	*0.075*	6.9	6.1
Lead		mg/kg dry wt	*0.25*	14.8	14.0
Nickel		mg/kg dry wt	*0.05*	11.6	11.1
Zinc		mg/kg dry wt	*0.05*	52.3	50.2

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Emily Hanna, B.Sc.
Trace Elements Team Leader

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Certificate of Analysis

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Christchurch 7671

Attention: Nicola Peacock
Phone: 027 513 4057
Email: hollie@mallochenviro.co.nz

Sampling Site: 1 Sutherlands Road

Lab Reference: 21-26606
Submitted by: Hollie Griffith
Date Received: 14/06/2021
Testing Initiated: 14/06/2021
Date Completed: 17/06/2021
Order Number:
Reference:

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

			Client Sample ID	SS56.1 50	SS56.2 250	SS46.1 0-50	SS46.2 300	SS47.1 0-50
			Date Sampled	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*		21-26606-1	21-26606-2	21-26606-3	21-26606-4	21-26606-5
Arsenic	mg/kg dry wt	*0.125*		6.6	4.6	15.1	13.5	14.2
Cadmium	mg/kg dry wt	*0.005*		0.050	0.025	0.14	0.15	0.15
Chromium	mg/kg dry wt	*0.125*		14.9	14.8	17.2	16.7	16.6
Copper	mg/kg dry wt	*0.075*		8.90	8.98	11.8	11.2	11.1
Lead	mg/kg dry wt	*0.25*		15.7	13.7	20.3	18.9	19.3
Nickel	mg/kg dry wt	*0.05*		12.4	12.6	14.6	13.7	14.4
Zinc	mg/kg dry wt	*0.05*		46.7	41.8	56.6	58.1	54.1

Heavy Metals in Soil

			Client Sample ID	SS47.2 30	SS57.1 50	SS57.2 500	SS21.1 0-50	SS21.2 300
			Date Sampled	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*		21-26606-6	21-26606-7	21-26606-8	21-26606-9	21-26606-10
Arsenic	mg/kg dry wt	*0.125*		10	12	5.5	13.9	13.0
Cadmium	mg/kg dry wt	*0.005*		0.083	0.083	0.041	0.076	0.072
Chromium	mg/kg dry wt	*0.125*		16.8	17.6	15.7	15.7	15.6
Copper	mg/kg dry wt	*0.075*		10.8	11.4	7.61	9.30	8.64
Lead	mg/kg dry wt	*0.25*		19.8	19.8	15.9	17.2	17.4
Nickel	mg/kg dry wt	*0.05*		14.1	14.6	13.1	13.4	13.2
Zinc	mg/kg dry wt	*0.05*		52.5	59.3	44.1	52.0	49.8

Heavy Metals in Soil

Client Sample ID			SS22.1 050	SS22.2 350	SS23.1 0-50	SS23.2 500	SS141.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-11	21-26606-12	21-26606-13	21-26606-14	21-26606-15
Arsenic	mg/kg dry wt	*0.125*	16.1	6.7	13.9	8.8	14.9
Cadmium	mg/kg dry wt	*0.005*	0.079	0.048	0.058	0.052	0.076
Chromium	mg/kg dry wt	*0.125*	17.3	16.3	15.7	14.9	17.6
Copper	mg/kg dry wt	*0.075*	9.93	7.5	9.07	8.83	12.2
Lead	mg/kg dry wt	*0.25*	18.6	16.2	17.2	16.3	21.4
Nickel	mg/kg dry wt	*0.05*	14.3	12.6	13.1	13.1	14.9
Zinc	mg/kg dry wt	*0.05*	58.8	44.6	49.0	45.5	58.2

Heavy Metals in Soil

Client Sample ID			SS141.2 0-50	SS141.3 150	SS140.1 0-50	SS140.2 150	SS24.1 50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-16	21-26606-17	21-26606-18	21-26606-19	21-26606-20
Arsenic	mg/kg dry wt	*0.125*	13.9	13.8	14.9	20.2	15.4
Cadmium	mg/kg dry wt	*0.005*	0.076	0.079	0.071	0.070	0.074
Chromium	mg/kg dry wt	*0.125*	16.0	17.6	16.3	18.2	15.9
Copper	mg/kg dry wt	*0.075*	11.7	11.6	11.2	11.2	9.77
Lead	mg/kg dry wt	*0.25*	20.3	22.6	17.9	20.5	16.7
Nickel	mg/kg dry wt	*0.05*	13.2	16.0	14.1	16.0	13.3
Zinc	mg/kg dry wt	*0.05*	51.4	58.0	52.1	60.4	52.4

Heavy Metals in Soil

Client Sample ID			SS24.2 500	SS25.1 0-50	SS25.2 250	SS26.1 50	SS26.2 250
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-21	21-26606-22	21-26606-23	21-26606-24	21-26606-25
Arsenic	mg/kg dry wt	*0.125*	9.7	11	12	12	12
Cadmium	mg/kg dry wt	*0.005*	0.053	0.071	0.063	0.062	0.066
Chromium	mg/kg dry wt	*0.125*	16.1	14.6	15.7	14.3	15.2
Copper	mg/kg dry wt	*0.075*	9.18	8.57	8.73	7.85	8.73
Lead	mg/kg dry wt	*0.25*	19.4	14.4	16.4	14.7	15.5
Nickel	mg/kg dry wt	*0.05*	13.2	12.3	12.5	11.7	12.9
Zinc	mg/kg dry wt	*0.05*	49.4	46.1	45.8	42.3	46.2

Heavy Metals in Soil

Client Sample ID			SS138.1 0-50	SS138.2 200	SS139.1 0-50	SS139.2 250	SS137.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-26	21-26606-27	21-26606-28	21-26606-29	21-26606-30
Arsenic	mg/kg dry wt	*0.125*	16.6	17.2	24.7	22.0	14.3
Cadmium	mg/kg dry wt	*0.005*	0.064	0.12	0.074	0.068	0.068
Chromium	mg/kg dry wt	*0.125*	16.0	24.8	17.3	16.6	15.1
Copper	mg/kg dry wt	*0.075*	10.4	19.9	11.2	10.5	10.1
Lead	mg/kg dry wt	*0.25*	18.5	45.7	20.2	19.5	19.3
Nickel	mg/kg dry wt	*0.05*	13.5	15.7	15.0	14.4	12.7
Zinc	mg/kg dry wt	*0.05*	51.9	79.3	58.1	54.9	57.3

Heavy Metals in Soil

Client Sample ID			SS137.2 250	SS62.1 50	SS62.2 250	SS63.1 0-50	SS63.2 250
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-31	21-26606-32	21-26606-33	21-26606-34	21-26606-35
Arsenic	mg/kg dry wt	*0.125*	14.7	2.7	2.7	9.1	13.1
Cadmium	mg/kg dry wt	*0.005*	0.074	0.028	0.021	0.062	0.071
Chromium	mg/kg dry wt	*0.125*	16.4	9.9	11	14.1	14.6
Copper	mg/kg dry wt	*0.075*	10.6	4.9	3.5	7.62	8.73
Lead	mg/kg dry wt	*0.25*	19.8	10.2	8.88	15.8	17.1
Nickel	mg/kg dry wt	*0.05*	13.1	5.97	6.12	9.97	11.0
Zinc	mg/kg dry wt	*0.05*	59.0	33.2	28.1	57.6	56.7

Heavy Metals in Soil

Client Sample ID			SS109.1 0-50	SS109.2 200	SS64.1 0-50	SS64.2 250	SS110.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-36	21-26606-37	21-26606-38	21-26606-39	21-26606-40
Arsenic	mg/kg dry wt	*0.125*	13.7	12.8	9.1	4.8	13.4
Cadmium	mg/kg dry wt	*0.005*	0.076	0.083	0.050	0.052	0.096
Chromium	mg/kg dry wt	*0.125*	16.2	16.6	12.8	15.0	15.4
Copper	mg/kg dry wt	*0.075*	10.5	11.4	6.8	8.21	10.7
Lead	mg/kg dry wt	*0.25*	20.4	21.2	14.6	15.7	19.6
Nickel	mg/kg dry wt	*0.05*	12.3	13.1	8.82	11.7	12.0
Zinc	mg/kg dry wt	*0.05*	58.8	56.3	48.8	52.7	57.4

Heavy Metals in Soil

Client Sample ID			SS110.2 250	SS111.1 0-50	SS111.2 250	SS107.1 50	SS107.2 250
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-41	21-26606-42	21-26606-43	21-26606-44	21-26606-45
Arsenic	mg/kg dry wt	*0.125*	16.6	15.7	18.4	12.8	6.7
Cadmium	mg/kg dry wt	*0.005*	0.096	0.081	0.076	0.065	0.037
Chromium	mg/kg dry wt	*0.125*	17.9	18.0	17.3	14.0	16.1
Copper	mg/kg dry wt	*0.075*	12.4	12.6	11.3	8.08	8.69
Lead	mg/kg dry wt	*0.25*	21.2	20.6	20.9	16.8	17.5
Nickel	mg/kg dry wt	*0.05*	14.3	15.2	13.9	9.89	12.3
Zinc	mg/kg dry wt	*0.05*	66.3	63.8	61.0	54.8	54.2

Heavy Metals in Soil

Client Sample ID			SS108.1 50	SS108.2 250	SS112.1 0-50	SS112.2 250	SS113.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-46	21-26606-47	21-26606-48	21-26606-49	21-26606-50
Arsenic	mg/kg dry wt	*0.125*	12.8	15.1	11	13.0	12
Cadmium	mg/kg dry wt	*0.005*	0.050	0.061	0.080	0.091	0.11
Chromium	mg/kg dry wt	*0.125*	15.4	16.2	17.3	16.1	17.4
Copper	mg/kg dry wt	*0.075*	8.22	9.18	12.2	11.2	11.5
Lead	mg/kg dry wt	*0.25*	16.6	19.4	20.8	20.3	22.1
Nickel	mg/kg dry wt	*0.05*	12.0	11.8	13.5	12.7	13.5
Zinc	mg/kg dry wt	*0.05*	55.5	56.1	61.4	56.0	63.4

Heavy Metals in Soil

Client Sample ID			SS113.2 250	SS114.1 0-50	SS114.2 250	SS115.1 0-50	SS115.2 250
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-51	21-26606-52	21-26606-53	21-26606-54	21-26606-55
Arsenic	mg/kg dry wt	*0.125*	14.3	12	19.0	11	17.5
Cadmium	mg/kg dry wt	*0.005*	0.40	0.082	0.12	0.096	0.080
Chromium	mg/kg dry wt	*0.125*	17.6	15.0	18.3	18.7	17.6
Copper	mg/kg dry wt	*0.075*	12.1	11.7	13.3	12.6	12.0
Lead	mg/kg dry wt	*0.25*	21.2	20.1	24.3	24.0	34.2
Nickel	mg/kg dry wt	*0.05*	13.2	12.2	14.3	13.9	12.3
Zinc	mg/kg dry wt	*0.05*	63.2	55.3	88.5	68.7	65.9

Heavy Metals in Soil

Client Sample ID			SS116.1 50	SS116.2 250	SS117.1 0-50	SS117.2 250	SS118.1 0-50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-56	21-26606-57	21-26606-58	21-26606-59	21-26606-60
Arsenic	mg/kg dry wt	*0.125*	12.7	13.1	13.9	14.7	14.6
Cadmium	mg/kg dry wt	*0.005*	0.10	0.091	0.081	0.11	0.13
Chromium	mg/kg dry wt	*0.125*	17.2	19.1	14.7	18.7	18.4
Copper	mg/kg dry wt	*0.075*	12.4	13.1	11.2	14.2	13.0
Lead	mg/kg dry wt	*0.25*	22.3	23.9	19.4	23.9	24.3
Nickel	mg/kg dry wt	*0.05*	13.2	13.5	11.9	15.0	14.8
Zinc	mg/kg dry wt	*0.05*	60.5	71.9	56.5	70.3	67.0

Heavy Metals in Soil

Client Sample ID			SS118.2 250	SS119.1 0-50	SS119.2 150	SS120.1	SS120.2
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-61	21-26606-62	21-26606-63	21-26606-64	21-26606-65
Arsenic	mg/kg dry wt	*0.125*	13.0	11	6.9	11	14.8
Cadmium	mg/kg dry wt	*0.005*	0.11	0.098	0.056	0.088	0.091
Chromium	mg/kg dry wt	*0.125*	16.9	14.9	20.0	18.2	17.2
Copper	mg/kg dry wt	*0.075*	13.2	10.3	12.2	12.8	13.1
Lead	mg/kg dry wt	*0.25*	22.8	17.8	21.8	23.5	22.9
Nickel	mg/kg dry wt	*0.05*	13.7	11.0	16.4	14.5	14.2
Zinc	mg/kg dry wt	*0.05*	66.2	49.7	68.6	64.9	65.8

Heavy Metals in Soil

Client Sample ID			SS121.1 0-50	SS121.2 250	SS122.1	SS122.2	SS123.1 50
Date Sampled			10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021
Analyte	Unit	*Reporting Limit*	21-26606-66	21-26606-67	21-26606-68	21-26606-69	21-26606-70
Arsenic	mg/kg dry wt	*0.125*	12	13.1	12	16.0	13.2
Cadmium	mg/kg dry wt	*0.005*	0.067	0.082	0.073	0.10	0.11
Chromium	mg/kg dry wt	*0.125*	19.4	16.8	15.9	16.3	17.8
Copper	mg/kg dry wt	*0.075*	11.0	11.7	12.0	13.3	13.6
Lead	mg/kg dry wt	*0.25*	21.4	20.7	21.8	20.2	22.4
Nickel	mg/kg dry wt	*0.05*	12.1	13.3	12.6	12.9	14.7
Zinc	mg/kg dry wt	*0.05*	56.1	60.6	58.7	60.7	63.5

Heavy Metals in Soil

			Client Sample ID	SS123.2 250	SS20.1	SS20.2
			Date Sampled	10/06/2021	10/06/2021	10/06/2021
Analyte		Unit	*Reporting Limit*	21-26606-71	21-26606-72	21-26606-73
Arsenic		mg/kg dry wt	*0.125*	15.2	9.2	11
Cadmium		mg/kg dry wt	*0.005*	0.091	0.082	0.059
Chromium		mg/kg dry wt	*0.125*	17.3	15.7	19.5
Copper		mg/kg dry wt	*0.075*	13.8	9.55	12.7
Lead		mg/kg dry wt	*0.25*	20.5	16.5	23.3
Nickel		mg/kg dry wt	*0.05*	14.4	13.5	17.5
Zinc		mg/kg dry wt	*0.05*	59.0	56.1	73.6

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Emily Hanna, B.Sc.
Trace Elements Team Leader

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Certificate of Analysis

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
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Attention: Nicola Peacock
Phone: 027 513 4057
Email: nicola@mallochenviro.co.nz

Lab Reference: 21-31080
Submitted by: Hollie Griffith
Date Received: 14/07/2021
Testing Initiated: 14/07/2021
Date Completed: 19/07/2021
Order Number:
Reference: 363

Sampling Site: 1 Sutherlands Road, Halswell

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

		Client Sample ID	SS106.1 0-50	SS106.2 250	SS105.1 0-50	SS105.2 250	SS104.1 0-50
		Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
Analyte	Unit	*Reporting Limit*	21-31080-1	21-31080-2	21-31080-3	21-31080-4	21-31080-5
Arsenic	mg/kg dry wt	*0.125*	6.0	10	4.9	10	5.0
Cadmium	mg/kg dry wt	*0.005*	0.080	0.088	0.048	0.075	0.036
Chromium	mg/kg dry wt	*0.125*	22.7	18.7	22.3	18.6	19.3
Copper	mg/kg dry wt	*0.075*	17.7	11.6	16.4	10.8	12.2
Lead	mg/kg dry wt	*0.25*	39.6	22.2	18.3	19.6	17.3
Nickel	mg/kg dry wt	*0.05*	21.3	15.2	25.8	15.4	18.8
Zinc	mg/kg dry wt	*0.05*	80.7	63.2	61.4	62.0	54.1

Heavy Metals in Soil

		Client Sample ID	SS104.2 250	SS103.1 0-50	SS103.2 250	SS102.1 0-50	SS102.2 0-50
		Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
Analyte	Unit	*Reporting Limit*	21-31080-6	21-31080-7	21-31080-8	21-31080-9	21-31080-10
Arsenic	mg/kg dry wt	*0.125*	3.9	7.7	7.1	8.2	11
Cadmium	mg/kg dry wt	*0.005*	0.026	0.090	0.10	0.11	0.19
Chromium	mg/kg dry wt	*0.125*	16.3	19.0	20.1	19.2	19.4
Copper	mg/kg dry wt	*0.075*	9.16	15.2	13.6	12.8	12.4
Lead	mg/kg dry wt	*0.25*	12.9	18.6	18.2	19.3	19.6
Nickel	mg/kg dry wt	*0.05*	15.7	18.7	21.5	19.4	18.9
Zinc	mg/kg dry wt	*0.05*	43.4	59.5	61.7	62.5	62.8

Heavy Metals in Soil

Client Sample ID			SS102.3 250	SS101.1 0-50	SS101.2 250	SS89.1 0-50	SS89.2 250
Date Sampled			13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
Analyte	Unit	*Reporting Limit*	21-31080-11	21-31080-12	21-31080-13	21-31080-14	21-31080-15
Arsenic	mg/kg dry wt	*0.125*	7.6	8.5	9.3	4.8	4.1
Cadmium	mg/kg dry wt	*0.005*	0.095	0.090	0.075	0.044	0.027
Chromium	mg/kg dry wt	*0.125*	19.0	19.3	17.9	17.1	15.9
Copper	mg/kg dry wt	*0.075*	12.3	12.0	9.83	10.9	7.96
Lead	mg/kg dry wt	*0.25*	18.7	19.2	19.1	18.1	16.0
Nickel	mg/kg dry wt	*0.05*	19.3	17.4	14.8	17.9	13.8
Zinc	mg/kg dry wt	*0.05*	61.9	63.0	59.2	55.8	44.4

Heavy Metals in Soil

Client Sample ID			SS90.1 0-50	SS90.2 250	SS91.1 0-50	SS91.2 250	SS92.1 0-50
Date Sampled			13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
Analyte	Unit	*Reporting Limit*	21-31080-16	21-31080-17	21-31080-18	21-31080-19	21-31080-20
Arsenic	mg/kg dry wt	*0.125*	4.2	5.4	9.1	7.7	9.6
Cadmium	mg/kg dry wt	*0.005*	0.038	0.067	0.11	0.094	0.091
Chromium	mg/kg dry wt	*0.125*	18.8	25.8	18.8	20.4	18.0
Copper	mg/kg dry wt	*0.075*	11.5	13.9	11.7	13.6	9.95
Lead	mg/kg dry wt	*0.25*	14.9	16.0	18.7	20.3	19.3
Nickel	mg/kg dry wt	*0.05*	19.7	23.5	17.7	21.2	15.4
Zinc	mg/kg dry wt	*0.05*	51.4	55.3	58.5	64.4	64.2

Heavy Metals in Soil

Client Sample ID			SS92.2 150	SS93.1 0-50	SS93.2 250	SS69.1 0-50	SS69.2 300
Date Sampled			13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
Analyte	Unit	*Reporting Limit*	21-31080-21	21-31080-22	21-31080-23	21-31080-24	21-31080-25
Arsenic	mg/kg dry wt	*0.125*	10	10	10	12	15.6
Cadmium	mg/kg dry wt	*0.005*	0.079	0.083	0.087	0.073	0.072
Chromium	mg/kg dry wt	*0.125*	18.0	18.6	19.0	17.4	17.1
Copper	mg/kg dry wt	*0.075*	9.48	9.99	10.5	10.4	10.9
Lead	mg/kg dry wt	*0.25*	18.8	19.1	20.6	19.9	18.9
Nickel	mg/kg dry wt	*0.05*	14.8	15.3	15.6	14.0	14.5
Zinc	mg/kg dry wt	*0.05*	63.1	63.6	66.4	63.9	65.5

Heavy Metals in Soil

Client Sample ID			SS70.1 0-50	SS70.2 300	SS71.1 0-50	SS71.2 300	SS72.1 0-50
Date Sampled			13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
Analyte	Unit	*Reporting Limit*	21-31080-26	21-31080-27	21-31080-28	21-31080-29	21-31080-30
Arsenic	mg/kg dry wt	*0.125*	13.4	11	4.5	6.3	8.6
Cadmium	mg/kg dry wt	*0.005*	0.066	0.079	0.054	0.096	0.11
Chromium	mg/kg dry wt	*0.125*	16.6	15.6	13.0	18.2	17.8
Copper	mg/kg dry wt	*0.075*	10.5	9.99	8.15	11.1	10.5
Lead	mg/kg dry wt	*0.25*	18.7	17.0	15.2	18.3	19.6
Nickel	mg/kg dry wt	*0.05*	14.1	12.9	8.97	17.3	15.8
Zinc	mg/kg dry wt	*0.05*	61.4	62.8	62.2	58.0	61.6

Heavy Metals in Soil

	Client Sample ID		SS72.2 250	SS73.1 0-50	SS73.2 250	SS100.1 0-50	SS100.2 300
	Date Sampled		13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
Analyte	Unit	*Reporting Limit*	21-31080-31	21-31080-32	21-31080-33	21-31080-34	21-31080-35
Arsenic	mg/kg dry wt	*0.125*	7.6	7.0	7.7	9.6	8.3
Cadmium	mg/kg dry wt	*0.005*	0.11	0.11	0.11	0.091	0.10
Chromium	mg/kg dry wt	*0.125*	17.4	17.1	17.2	18.3	19.5
Copper	mg/kg dry wt	*0.075*	10.5	10.4	10.4	12.4	12.5
Lead	mg/kg dry wt	*0.25*	18.6	19.0	18.8	18.3	19.1
Nickel	mg/kg dry wt	*0.05*	15.3	15.5	15.3	19.0	20.1
Zinc	mg/kg dry wt	*0.05*	58.5	59.6	59.1	61.0	61.9

Heavy Metals in Soil

	Client Sample ID		SS99.1 0-50	SS99.2 300	SS61.1 0-50	SS61.2 0-50	SS61.3 300
	Date Sampled		13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
Analyte	Unit	*Reporting Limit*	21-31080-36	21-31080-37	21-31080-38	21-31080-39	21-31080-40
Arsenic	mg/kg dry wt	*0.125*	13.8	9.8	13.7	14.8	4.0
Cadmium	mg/kg dry wt	*0.005*	0.093	0.071	0.070	0.079	0.035
Chromium	mg/kg dry wt	*0.125*	17.3	17.7	15.9	16.6	13.9
Copper	mg/kg dry wt	*0.075*	11.3	9.70	10.6	10.9	5.4
Lead	mg/kg dry wt	*0.25*	19.2	18.8	18.3	18.6	12.4
Nickel	mg/kg dry wt	*0.05*	14.6	14.2	13.5	13.8	8.90
Zinc	mg/kg dry wt	*0.05*	64.5	61.5	58.8	61.4	45.4

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Sharelle Frank, B.Sc. (Tech)
Technologist

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Certificate of Analysis

Malloch Environmental Ltd
19 Robertsons Road, Kirwee
Christchurch 7671

Attention: Nicola Peacock
Phone: 027 513 4057
Email: hollie@mallochenviro.co.nz

Lab Reference: 21-34502
Submitted by: Hollie Griffith
Date Received: 06/08/2021
Testing Initiated: 6/08/2021
Date Completed: 11/08/2021
Order Number:
Reference: 363

Sampling Site: 1 Sutherlands Road, Halswell

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

	Client Sample ID		SS119.1 0-50	SS119.2 250	SS120.1 0-50	SS120.2 300	SS121.1 0-50
	Date Sampled		05/08/2021	05/08/2021	05/08/2021	05/08/2021	05/08/2021
Analyte	Unit	*Reporting Limit*	21-34502-1	21-34502-2	21-34502-3	21-34502-4	21-34502-5
Arsenic	mg/kg dry wt	*0.125*	3.6	14.0	12.9	14.1	18.1
Cadmium	mg/kg dry wt	*0.005*	0.12	0.11	0.11	0.10	0.10
Chromium	mg/kg dry wt	*0.125*	11	18.6	17.9	18.5	18.4
Copper	mg/kg dry wt	*0.075*	6.6	13.7	13.5	13.2	13.2
Lead	mg/kg dry wt	*0.25*	12.3	22.4	23.1	22.3	27.1
Nickel	mg/kg dry wt	*0.05*	7.12	15.5	14.7	15.2	15.1
Zinc	mg/kg dry wt	*0.05*	55.6	65.9	65.4	66.7	69.9

Heavy Metals in Soil

	Client Sample ID		SS121.2 300	SS123.1 0-50	SS123.2 0-50	SS123.3 300	SS94.1 0-50
	Date Sampled		05/08/2021	05/08/2021	05/08/2021	05/08/2021	05/08/2021
Analyte	Unit	*Reporting Limit*	21-34502-6	21-34502-7	21-34502-8	21-34502-9	21-34502-10
Arsenic	mg/kg dry wt	*0.125*	17.5	13.3	13.3	16.0	9.6
Cadmium	mg/kg dry wt	*0.005*	0.099	0.099	0.11	0.11	0.078
Chromium	mg/kg dry wt	*0.125*	19.9	17.9	19.4	19.4	16.6
Copper	mg/kg dry wt	*0.075*	14.1	14.2	13.7	14.7	9.12
Lead	mg/kg dry wt	*0.25*	23.1	23.1	23.6	23.5	18.4
Nickel	mg/kg dry wt	*0.05*	15.9	14.9	15.1	16.0	13.6
Zinc	mg/kg dry wt	*0.05*	68.3	64.4	66.1	67.1	61.7

Heavy Metals in Soil

Client Sample ID			SS94.2 300	SS95.1 0-50	SS95.2 300	SS96.1 0-50	SS96.2 300
Date Sampled			05/08/2021	05/08/2021	05/08/2021	05/08/2021	05/08/2021
Analyte	Unit	*Reporting Limit*	21-34502-11	21-34502-12	21-34502-13	21-34502-14	21-34502-15
Arsenic	mg/kg dry wt	*0.125*	9.4	10	11	5.2	5.0
Cadmium	mg/kg dry wt	*0.005*	0.064	0.061	0.070	0.062	0.064
Chromium	mg/kg dry wt	*0.125*	19.1	17.8	17.1	20.2	20.2
Copper	mg/kg dry wt	*0.075*	9.43	9.30	9.25	14.3	13.9
Lead	mg/kg dry wt	*0.25*	19.1	17.9	17.9	34.8	36.2
Nickel	mg/kg dry wt	*0.05*	15.1	13.9	14.0	18.5	18.5
Zinc	mg/kg dry wt	*0.05*	63.6	59.3	59.6	72.0	71.6

Heavy Metals in Soil

Client Sample ID			SS97.1 0-50	SS97.2 300	SS98.1 0-50	SS98.2 300	SS59.1 0-50
Date Sampled			05/08/2021	05/08/2021	05/08/2021	05/08/2021	05/08/2021
Analyte	Unit	*Reporting Limit*	21-34502-16	21-34502-17	21-34502-18	21-34502-19	21-34502-20
Arsenic	mg/kg dry wt	*0.125*	6.9	8.9	11	6.6	16.9
Cadmium	mg/kg dry wt	*0.005*	0.076	0.066	0.080	0.077	0.084
Chromium	mg/kg dry wt	*0.125*	17.9	23.6	17.4	18.3	17.9
Copper	mg/kg dry wt	*0.075*	11.0	15.0	10.3	11.0	10.6
Lead	mg/kg dry wt	*0.25*	22.8	28.0	19.7	20.6	19.6
Nickel	mg/kg dry wt	*0.05*	15.2	20.3	15.1	16.0	13.7
Zinc	mg/kg dry wt	*0.05*	61.2	83.0	60.3	62.2	62.8

Heavy Metals in Soil

Client Sample ID			SS59.2 0-50	SS59.3 300	SS60.1 0-50	SS60.2 300	SS74.1 0-50
Date Sampled			05/08/2021	05/08/2021	05/08/2021	05/08/2021	05/08/2021
Analyte	Unit	*Reporting Limit*	21-34502-21	21-34502-22	21-34502-23	21-34502-24	21-34502-25
Arsenic	mg/kg dry wt	*0.125*	19.2	18.2	18.2	13.9	7.3
Cadmium	mg/kg dry wt	*0.005*	0.074	0.073	0.077	0.091	0.10
Chromium	mg/kg dry wt	*0.125*	16.9	17.4	16.6	19.2	18.6
Copper	mg/kg dry wt	*0.075*	10.7	9.61	10.4	12.7	11.0
Lead	mg/kg dry wt	*0.25*	20.2	18.2	18.5	21.6	19.3
Nickel	mg/kg dry wt	*0.05*	13.5	12.9	13.2	15.6	16.2
Zinc	mg/kg dry wt	*0.05*	63.4	56.4	59.8	66.1	59.7

Heavy Metals in Soil

Client Sample ID			SS74.2 300	SS75.1 0-50	SS75.2 300	SS76.1 0-50	SS76.2 300
Date Sampled			05/08/2021	05/08/2021	05/08/2021	05/08/2021	05/08/2021
Analyte	Unit	*Reporting Limit*	21-34502-26	21-34502-27	21-34502-28	21-34502-29	21-34502-30
Arsenic	mg/kg dry wt	*0.125*	8.0	6.9	6.9	12	13.0
Cadmium	mg/kg dry wt	*0.005*	0.081	0.083	0.094	0.070	0.095
Chromium	mg/kg dry wt	*0.125*	17.6	16.9	18.7	21.3	18.5
Copper	mg/kg dry wt	*0.075*	10.3	10.2	10.6	9.93	11.1
Lead	mg/kg dry wt	*0.25*	18.0	18.0	18.6	19.1	20.1
Nickel	mg/kg dry wt	*0.05*	15.0	14.7	16.3	16.2	14.0
Zinc	mg/kg dry wt	*0.05*	57.7	56.6	58.2	64.4	62.9

Heavy Metals in Soil

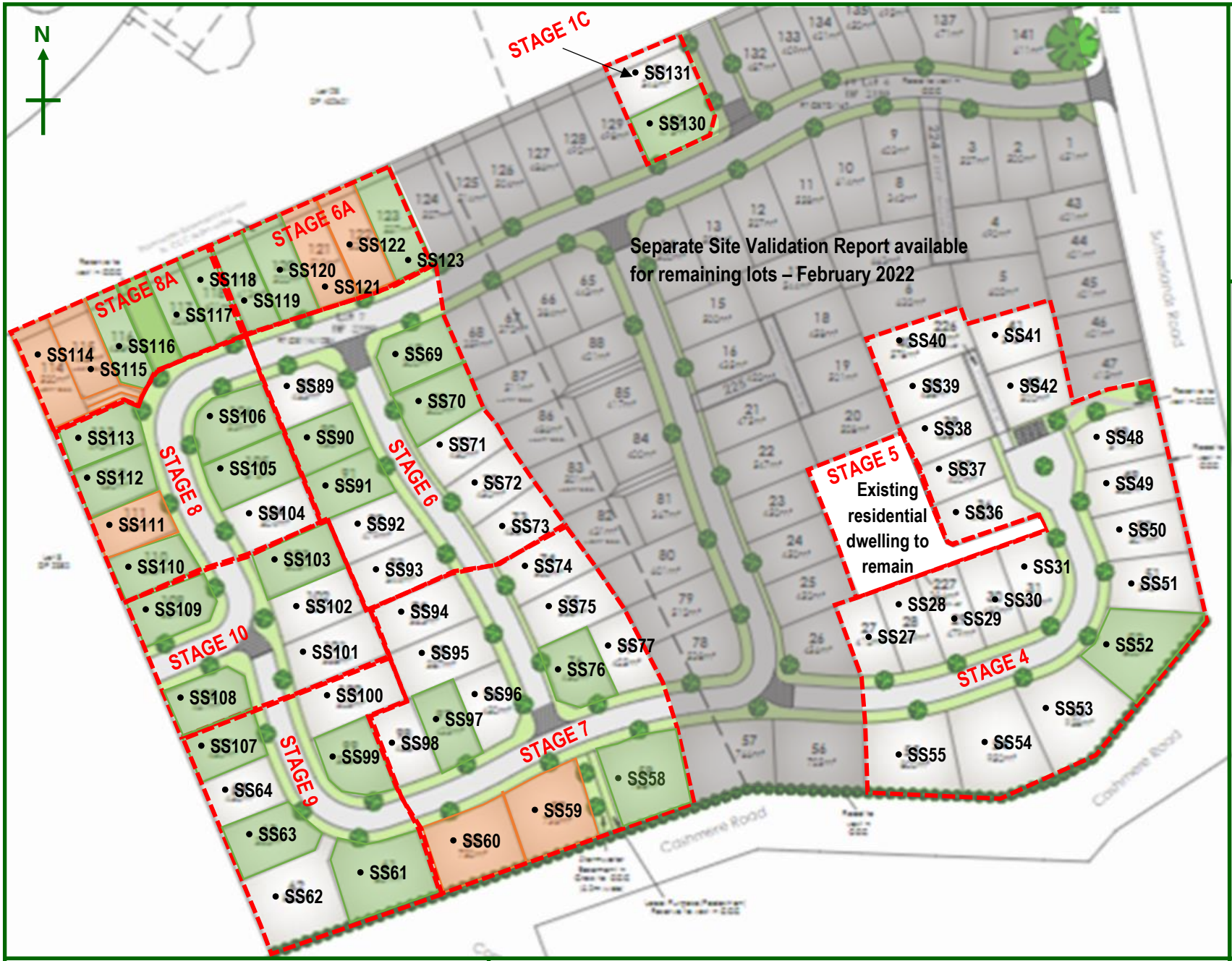
Client Sample ID			SS77.1 0-50	SS77.2 300	SS122.1 0-50	SS122.2 300
Date Sampled			05/08/2021	05/08/2021	05/08/2021	05/08/2021
Analyte	Unit	*Reporting Limit*	21-34502-31	21-34502-32	21-34502-33	21-34502-34
Arsenic	mg/kg dry wt	*0.125*	9.1	11	14.2	18.2
Cadmium	mg/kg dry wt	*0.005*	0.088	0.078	0.099	0.12
Chromium	mg/kg dry wt	*0.125*	16.9	16.5	18.1	20.7
Copper	mg/kg dry wt	*0.075*	9.44	8.43	13.2	16.4
Lead	mg/kg dry wt	*0.25*	18.6	18.3	28.7	24.3
Nickel	mg/kg dry wt	*0.05*	14.0	12.9	14.4	16.5
Zinc	mg/kg dry wt	*0.05*	59.4	59.3	69.5	71.2

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Emily Hanna, B.Sc.
Trace Elements Team Leader

Appendix G – Soil Disposal Options Plan



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LEGEND

- • SS — Validation Sample Location
- NO COLOUR — Material suitable for disposal as cleanfill
- Material NOT suitable for cleanfill but does meet current disposal criteria at Selwyn Quarries Ltd – 48 Selwyn Road, Rolleston
- Material suitable for disposal at Frews Wasteport (Chapmans Road)/Burwood Landfill or other appropriate facility

PLAN MUST BE PRINTED IN COLOUR

Graphic scale is approximate only

0 30 60 90m

Date: 20 April 2022 **Drawing No:** 01363/7

Soil Disposal Options Plan

1 Sutherlands Rd & 848 Cashmere Rd, Christchurch

Stage 1C, Stage 4, Stage 6, Stage 6A, Stage 7, Stage 8, Stage 8A, Stage 9, Stage 10

Notes:

1. This plan has been prepared for soil contamination risk assessment purposes only. No liability is accepted if the plan is used for any other purposes.
2. Any measurements taken from this plan which are not dimensioned on the electronic copy are at the risk of the user.
3. Soil sample locations are approximate only