Sections 95A-E, 104, 104C, 108 Resource Management Act 1991

Report pursuant to section 42A of the Resource Management Act 1991 recommending whether or not an application for resource consent should be:

- Publicly notified, limited notified or non-notified
- Granted or declined, and if granted, the conditions of the consent

Decision pursuant section 113 of the Resource Management Act 1991

Author: Jane Anderson

Position: Consultant Planner

Resource Consent Number: RC225368

APPLICANT:	J Howson
PROPOSAL:	To remediate contaminated soils under the NES-CS
LOCATION:	60 Leeston Dunsandel Road, Leeston
LEGAL DESCRIPTION:	Lot 2 DP 365379 BLKS XIII XIV Leeston SD.
ZONING:	**Operative Selwyn District Plan (2016)** The property is zoned Living 1 under the provisions of the Operative District Plan (Townships) Volume
STATUS:	**National Environmental Standard for Assessing and Manging Contaminants in Soil to Protect Health (NESCS)** This application has been assessed as a land use consent for a Restricted Discretionary activity under the NESCS.
This application was formally received by the Selwyn District Council on 26 May 2022. Assessment and approval took place on 14 June 2022 under a delegation given by the Council.	

Introduction

1. The applicant proposes to undertake earthworks to remediate contaminated soils on a portion of the subject site, as identified in **Figure 1** below.

Figure 1: Area of Proposed Remediation

Description of the Existing Environment

2. The application site is legally described as Lot 2 DP 365379 BLKS XIII XIV Leeston SD. The site has an area of approximately 5.444 hectares.

3. The site is described by the applicant as containing "multiple industrial type sheds along the eastern boundary", referred to as "contractors yard A" in the application. A second area, referred to as "contractors yard B" is located in the north-western corner of the site and is described by the applicant as a "general storage area" that includes vehicles, farm machinery and building materials. The remainder of the site is vacant of structures and in pasture.

4. The properties located to the north, east and west are currently rural in character. Ellesmere College is located to the south of the site, and the Leeston Township is located further to the east of the site.

Operative Selwyn District Plan (2016)

5. The Operative Selwyn District Plan ('the Operative District Plan') was made operative on 03 May 2016. Under the Operative District Plan the application site is zoned Living 1.

6. The application seeks to remove approximately 300 – 375m^2 of soil as part of the remediate works and therefore the land use proposal is a permitted activity under the Operative District Plan.

Proposed Selwyn District Plan (Notified 05 October 2020)

7. Under the Proposed Selwyn District Plan ('the Proposed District Plan') the site is zoned Large Lot Residential, General rural and Low Density Residential Zone. The site is also subject to Development Area DEV-LE1.

8. No decisions have yet been made on the Proposed Plan.

9. There are no rules with immediate legal effect that apply to this proposal.

National Environmental Standards

National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health

10. The NES manages activities which involve the disturbance of land which may be contaminated. This is determined by whether activities have or are likely to have occurred on the site, which are listed in the Hazardous Activities and Industries List (HAIL).

11. Momentum Environmental Ltd (MEL) have provided a Preliminary Site Investigation (PSI), and a Detailed Site Investigation (DSI) for the subject site. The DSI was completed in October 2021 and determined that no contamination exceeding

12. . "residential 10% produce" soil guideline values (SGVs) in the contractors yard A area.

13. In the contractors yard B area, sampling identified arsenic and chromium contamination exceeding 'residential 10% produce SGVs, with three arsenic results also exceeding the 'commercial/industrial SGV. The MEL report notes that while the contamination may be restricted to areas associated with burn piles, that there was evidence of significant movement of soils across the risk area. Further, the report notes that due to storage occurring on site, some areas within the contractors yard B have not been sampled and assessed under the 2021 DSI.

14. The 2021 DSI recommended additional sampling within contractors yard B to delineate the extent of contamination following site clearance and prior to any earthworks commencing.

15. The supplementary DSI (April 2022) delineated the two areas of contamination identified by the 2021 DSI and identified a third area of arsenic contamination. In total the area of contaminated soils is estimated to be approximately 1,500m^2 to a depth of between 200 – 250mm.

16. The supplementary DSI notes that the risk to human health from the identified contaminants is moderate to high, and recommends that the contaminated soils are remediated prior to the development of the site for residential use. The report states that remediation by excavation and disposal to an authorised facility is considered to be the most viable remediation option for this site, and recommends that following remediation, a Site Validation Report be required to be produced and provided to Selwyn District Council and Environment Canterbury.

17. The Contaminated Land Officer has peer reviewed the PSI, DSI and supplementary DSI. The results of this peer review are detailed further in paragraphs 38 to 56 below.

18. The proposal is therefore a Restricted Discretionary activity in terms of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

Notification

19. Sections 95A-E set out the process for determining whether an application should be processed on a notified, limited notified or non-notified basis. The following assessment considers whether public or limited notification is required or precluded.

Public Notification

20. Applications are subject to mandatory public notification where:

- The applicant has requested public notification
- Public notification is required under section 95C of the RMA (following a request for further information)
- The application has been made jointly with an application to exchange reserve land under section 15AA of the Reserves Act

21. None of these matters apply to this application.

22. Public notification is precluded where the application is for one or more of the following activities:

- A controlled activity; or
- A restricted discretionary, discretionary or non-complying activity that is a boundary activity

23. As discussed further in the Assessment of Environmental Effects below, the proposal is not considered to have more than minor effects on the environment.

24. There are no special circumstances that would warrant public notification.

25. In summary, public notification is not required for this application.

Limited Notification

26. There are no affected protected customary rights groups or affected customary marine title groups in relation to this proposal and the proposal is not on or adjacent to that is subject to a statutory acknowledgement made in accordance with the Ngai Tahu Claims Settlement Act 1998.

27. Limited notification is precluded where:

- The application is for a resource consent of 1 or more activities, and each activity is subject to a rule or national environmental standard that precludes limited notification; or
- The application is for a controlled activity (but no other activities) that requires a resource consent under a district plan (other than a subdivision of land)

28. As discussed further in the Assessment of Environmental Effects below, the proposal is considered to have less than minor adverse effects on any party.

29. There are no special circumstances that would warrant the limited notification of any other persons not already deemed to be affected parties.

30. In summary, limited notification is not required for this application.

Matters to be Considered

31. Section 104(1) of the Resource Management Act 1991 sets out the matters which must be considered by Selwyn District Council in considering an application for resource consent which include:

- Any actual and potential effects of allowing the activity (s104(1)(a));
- Any environmental compensation proposed or agreed by the applicant (s104(ab))
- Any relevant provisions of (s104(b)):
  - A national environmental standard
  - Other regulations
  - The Canterbury Regional Policy Statement
  - Any plan or proposed plan
- The permitted baseline (section 104(2))

32. All matters listed in s104(1) are subject to Part 2 of the Act which contains its purposes and principles.

33. In addition, the following section(s) apply to the consideration of this consent.

Section 104C – Determination of applications for restricted discretionary activities

34. When considering an application for a restricted discretionary activity, a consent authority may only consider those matters over which discretion is restricted (in either a National Environmental Standard or in the District Plan). The consent authority may grant or refuse the application and if granted, may impose conditions under section 108 in relation to a matter to which discretion has been restricted.

Assessment of Environmental Effects

Permitted Baseline

35. Section 104(2) of the RMA directs that the decision maker may disregard an adverse effect on the environment of an activity if a rule in the District Plan permits an activity with that effect, a concept known as the permitted baseline. The application of the permitted baseline is discretionary and case law has established that the permitted baseline test relates to the effects of non-fanciful hypothetical activities which could be carried out as of right under the District Plan, as well as any existing lawfully established activity on the site or any activity for which resource consent has been granted.

36. There is no relevant permitted baseline in relation to the proposed activity under the Operative District Plan.

Effects on Human Health

37. The NES manages activities which involve the disturbance of land which may be contaminated. This is determined by whether activities have or are likely to have occurred on the site, which are listed in the Hazardous Activities and Industries List (HAIL).

38. Momentum Environmental Ltd (MEL) have provided a Preliminary Site Investigation (PSI), and a Detailed Site Investigation (DSI) for the subject site. The DSI was completed in October 2021 and determined that no contamination exceeding "residential 10% produce" soil guideline values (SGVs) in the contractors yard A area.

39. In the contractors yard B area, sampling identified arsenic and chromium contamination exceeding 'residential 10% produce SGVs, with three arsenic results also exceeding the 'commercial/industrial SGV. The MEL report notes that while the contamination may be restricted to areas associated with burn piles, that there was evidence of significant movement of soils across the risk area. Further, the report notes that due to storage occurring on site, some areas within the contractors yard B have not been sampled and assessed under the 2021 DSI.

40. The 2021 DSI recommended additional sampling within contractors yard B to delineate the extent of contamination following site clearance and prior to any earthworks commencing.

41. The supplementary DSI (April 2022) delineated the two areas of contamination identified by the 2021 DSI and identified a third area of arsenic contamination. In total the area of contaminated soils is estimated to be approximately 1,500m^2 to a depth of between 200 – 250mm.

42. The Supplementary DSI notes that the risk to human health from the identified contaminants is moderate to high, and recommends that the contaminated soils are remediated prior to the development of the site for residential use. The report states that remediation by excavation and disposal to an authorised facility is considered to be the most viable remediation option for this site, and recommends that following remediation, a Site Validation Report (SVR) be required to be produced and provided to Selwyn District Council and Environment Canterbury.

43. The PSI, DSI and Supplementary DSI have been peer reviewed by the Contaminated Land Officer at Environment Canterbury. The Officer considers that the site is generally adequately investigated but notes that there has been minimal testing for asbestos and SVOCs. The Officer also notes that a number of structures within 'contractor's yard A' have not been accessed to determine contents that could cause contamination and adequacy of flooring, and that the above ground storage tanks have not had soil sampling undertaken. However, as the proposed works is limited to the northern portion of the site, managing the contamination in 'contractor's yard A' will need to be considered as part of future assessments.

44. As a Restricted Discretionary activity, the matters over which discretion is restricted are provided in Regulation 10(3). I have relied on the assessment of the Contaminated Land Officer where noted below:

(a) Adequacy of the DSI

45. The Contaminated Land Officer has reviewed the DSI and confirmed that adequate investigation of the site has been undertaken.

(b) Suitability of the land for the proposed activity

46. The land is suitable for the proposed works associated with the remediation strategy. Following successful remediation and management, the site will meet the required NES-CS standards for residential 10% produce SGV.

(c) Approach to the remediation, including

(i) The remediation or management methods to address risk to human health

47. As has been noted, there are a number of locations within the subject site that contain contamination levels with a moderate to high risk to human health. The MEL report states that the disturbance and removal of the soils is considered to be a low-risk process for workers provided that the site management measures outlined in the Remediation Action Plan (RAP) are followed.

(ii) The timing of the remediation

48. Soil disturbance activities shall not be undertaken during high winds or heavy rain.

(iii) The standard of the remediation on completion

49. Following successful remediation and management, the site will meet the required NES-CS standards for residential 10% produce SGV.

(iv) Mitigation measures for the piece of land, including frequency and location of monitoring of specified contaminants

50. A Site Validation Report (SVP) shall be produced for the site following the completion of the remediation process, to ensure the site's suitability for a future residential use.

(d) Adequacy of the site management plan or the site validation report

51. The Contaminated Land Officer has reviewed the Site Management Plan and considers that this is suitable given the contaminant types and concentrations on site.

(e) Transport, disposal and tracking of soil and other materials to be taken away in the course of the activity

52. Trucks shall park adjacent to excavated areas / stockpiles so that tracking of soils does not occur. The soil will be transported to an approved disposal facility and weighbridge dockets shall be provided to the Selwyn District Council.

(f) The requirement for and conditions of a financial bond

53. It is considered that this is not necessary for the scale of the proposed remediation.

(g) Timing and nature of review of conditions

54. It is considered that this is not necessary for the scale of the proposed remediation.

(h) Duration of consent

55. A consent duration of five years is requested.

Summary – Assessment of Environmental Effects

56. Overall, I consider that the environmental effects of this proposal will be less than minor.

Operative District Plan Objectives and Policies

57. The Operative District Plan objectives and policies that I consider relevant are:

Objective B1.1.1

Adverse effects on people, and their activities, ecosystems and land and soil resources from contaminated soil or unstable land, are minimised.

Policy B1.1.1

Ensure activities do not contaminate soil.

Policy B1.1.3

Avoid adverse effects on people's health or well-being from exposure to contaminated soil.

58. The objectives and policies of the District Plan relating to contaminated soil seek to protect human health and the environment from the adverse effects of contaminated soil. It is considered that the proposed remediation process will adequately manage effects on people and the ecosystem, subject to conditions of consent.

Summary – Operative District Plan Objectives and Policies

59. Overall, I consider the proposal to be consistent with the relevant objectives and policies of the Operative District Plan.

Proposed District Plan Objectives and Policies

60. The Proposed District Plan objectives and policies that I consider relevant are:

Objective CL-O1

Human health and the environment are not compromised by the use of contaminated land

Policy CL-P1

Require any proposal for subdivision, development or use of contaminated land or potentially contaminated land to apply best practice approach to investigate the risks and either remediate the contaminated land or manage activities on contaminated land to protect people and the environment.

Policy CL-P2

Use and development of remediated contaminated land does not damage or destroy any contaminated works, unless comparable or better containment is provided.

61. The applicant has provided a process for the management and remediation of the identified contaminated areas. All works will be subject to reporting and monitoring. It is considered that subject to the proposed conditions, the proposal will be consistent with the relevant objectives and policies for contaminated land in the proposed District Plan.

Summary – Proposed District Plan Objectives and Policies

62. Overall, I consider the proposal to be consistent with the relevant objectives and policies of the Proposed District Plan.

Weighting Between District Plans

63. Section 104(1)(b) requires decision makers to take account of any relevant plan or proposed plan. Where there is conflict between an operative and proposed plan, a weighting assessment is required to determine which plan should be afforded dominant weight.

Summary – Operative District Plan

64. I conclude that the effects of the proposal are acceptable and the proposal is consistent with the objectives and policies of the Operative District Plan. The application can therefore be granted under the Operative District Plan.

Summary – Proposed District Plan

65. I conclude that the proposal is consistent with the objectives and policies of the Proposed District Plan.

Weighting Assessment

66. In this case, as the conclusions reached in the above assessment lead to the same conclusion under both the Operative District Plan and Proposed District Plan, no weighting assessment is required.

Canterbury Regional Policy Statement

67. This proposal is not considered to be of a nature or scale that challenges the provisions of the Regional Policy Statement.

Part 2 Resource Management Act 1991

68. The purpose of the Resource Management Act 1991 is to promote the sustainable management of natural and physical resources. In summary enabling people and communities to provide for their well-being, while sustaining resources and addressing any adverse effects.

69. Based on the assessment in this report, it is my opinion that the proposal is in accordance with the purpose and principles of the Resource Management Act 1991.

Summary

70. The application is to remediate contaminated soils under the NES-CS.

71. The application is considered to be in accordance with the objectives and policies of the Operative District Plan and the Proposed District Plan. Effects on the environment are considered to be less than minor.

72. In summary, it is recommended that the application is in order for approval subject to certain conditions to mitigate potential effects on the environment.

Recommendations

A. Resource consent 225368 be processed on a **non-notified** basis in accordance with sections 95A-F of the Resource Management Act 1991; and

B. Resource consent 225368 be **granted** pursuant to sections 104 and 104C of the Resource Management Act 1991 subject to the following conditions imposed under section 108 of the Act:

1. The development shall proceed in accordance with the information and plans submitted with the application.
2. For clarity, the proposed disturbance and off-site disposal of soils associated with the remediation of contaminated soils shall be restricted to the area identified in **Figure 1** below:

Figure 1: Area of Proposed Remediation

3. The area shown in Figure 1 shall be remediated in accordance with the Remediation Action Plan.
4. Any soils removed from the site during the course of the remediation process shall be disposed of to a facility authorised to accept the material. The consent holder shall submit evidence (i.e. weighbridge receipts) of the disposal of surplus soils from the site to an authorised facility to the Team leader Compliance, Selwyn District Council within 5 working days following completion of the earthworks.
5. Contaminated soil shall be disposed of off-site in accordance with the procedures in the DSI and the following requirements:
    a) All trucks shall be loaded to minimise spillage of material outside of the works area;
    b) Trucks shall not track spoil offsite;
    c) Each truck shall have a tracking document signed out on-site to provide the driver documentation of the appropriate disposal location of the load;
    d) Trucks shall have their loads covered by tarpaulins during transport of contaminated material to a managed or licensed solid waste landfill;
    e) All vehicles and equipment shall be inspected and cleaned prior to leaving the site. This shall comprise washing or brushing down to remove all visible soil from vehicles and equipment
6. In the event that soils are found to have visible staining, odours and / or other conditions that indicate soil contamination different from that identified by the DSI, then work shall cease until a Suitably Qualified and Experienced Practitioner (SQEP) engaged by therosie consent holder has assessed the matter and advised of the appropriate remediation and/or disposal options for these soils.
7. A SQEP shall prepare a Site Validation Report (SVR) on behalf of the consent holder in accordance with the current edition of Contaminated Land Management Guideline No. 1 – Reporting on Contaminated Sites in New Zealand, Ministry for the Environment, to report on whether the remediated area is now suitable for the intended land use. The report shall be provided within 3 months following completion of the earthworks to the Team Leader Compliance, Selwyn District Council for validation. The SVR shall include but not be limited to:
    a) Details of the project works completed

b) A site plan showing the location and volume of the completed earthworks and drawing of the 'as built' state of the site;

c) Documentation of any incidents and how they were resolved

d) The results of sampling undertaken

e) Records of the disposal of material

Sediment Control and Dust Management

8. All earthworks authorised by this consent shall be undertaken in accordance with the current edition of Environment Canterbury's Erosion and Sediment Control Toolbox.
9. No works shall be undertaken on site during high winds or heavy rain.
10. Any stockpiling of contaminated soils on site shall be for a maximum period of 5 working days.

Notes to the Consent Holder

Lapse Period (Land Use Consents)

a) Pursuant to section 125 of the Resource Management Act 1991, if not given effect to, this resource consent shall lapse five years after the date of this decision unless a longer period is specified by the Council upon application under section 125 of the Act.

Monitoring

b) In accordance with section 36 of the Resource Management Act 1991, the Council's specialised monitoring fee has been charged.

c) If the conditions of this consent require any reports or information to be submitted to the Council, additional monitoring fees for the review and certification of reports or information will be charged on a time and cost basis. This may include consultant fees if the Council does not employ staff with the expertise to review the reports or information.

d) Where the conditions of this consent require any reports or information to be submitted to the Council, please forward to the Council's Compliance and Monitoring Team, compliance@selwyn.govt.nz

e) Any resource consent that requires additional monitoring due to non-compliance with the conditions of the resource consent will be charged additional monitoring fees on a time and cost basis.

Vehicle Crossings

f) Any new or upgraded vehicle crossing requires a vehicle crossing application from Council's Assets Department prior to installation. For any questions regarding this process please contact transportation@selwyn.govt.nz. You can use the following link for a vehicle crossing information pack and to apply online: https://www.selwyn.govt.nz/services/roads-And-transport/application-to-form-a-vehicle-crossing-entranceway

Building Act

g) This consent is not an authority to build or to change the use of a building under the Building Act. Building consent will be required before construction begins or the use of the building changes.

Regional Consents

h) This activity may require resource consent from Environment Canterbury. It is the consent holder's responsibility to ensure that all necessary resource consents are obtained prior to the commencement of the activity.

Impact on Council Assets

i) Any damage to fixtures or features within the Council road reserve that is caused as a result of construction or demolition on the site shall be repaired or reinstated and the expense of the consent holder.

Vehicle Parking During Earthworks

j) Selwyn District Council is working to keep our footpaths safe and accessible for pedestrians. During earthworks (and at all other times):

- Please park on the road or fully within your property.
- It is illegal to park on or obstruct a footpath.
- Arrange large deliveries when school children are not around
- Blocking the footpath can cause a school child to have to move out onto the road or cross the road at a location they are not familiar with.
- Parking on the footpath also damages the utility services like internet fibre underneath

Reported and recommended by  **Jane Anderson** Consultant Planner	**Date: 13 June 2022**

Decision

That the above recommendations be adopted under delegated authority.

 **Rosie Flynn, Team Leader Resource Consents**	**Date: 14 June 2022**

Soil Contamination Risk
Site Validation Report

60 Leeston Dunsandel Road, Leeston

September 2022

QUALITY CONTROL AND CERTIFICATION SHEET

Client: John Howson

Date of issue: 9 September 2022

Report written by:

Hollie Griffith, Environmental Scientist, BEMP, CEnvP
(6 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 subject of this report is located at 60 Leeston Dunsandel Road in Leeston, Canterbury, from herein referred to as 'the site'. The site is to be subdivided for residential use, resulting in the change of use of the land and subsequent soil disturbance activities. As such, an assessment under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Health) Regulations 2011 (NESCS) has been undertaken. 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.

A Preliminary Site Investigation (PSI) was undertaken by Malloch Environmental Ltd (now known as Momentum Environmental Ltd, MEL) in July 2017 for the site and several hectares of land to the south of the site as part of a proposed plan change. The PSI confirmed that two parts of the site had been used as a contractor's yard and as such there was considered to be potential risks associated with chemical and fuel storage. The PSI recommended a Detailed Site Investigation (DSI) be undertaken on the north-west corner of the site (contractor's yard B) and the developed area along the eastern boundary (contractor's yard A).

A DSI was completed by MEL in October 2021. The results of the soil sampling showed heavy metal concentrations below the 'residential 10% produce' soil guideline values (SGV) at contractor's yard A. As such, no remediation was deemed necessary for contactor's yard A.

Within contractor's yard B arsenic and chromium concentrations exceeding the 'residential 10% produce' SGVs were identified in two burn areas. Arsenic concentrations also exceeded the 'residential 10% produce' SGV in three sample locations containing blackened and ashy soils adjacent to the burn areas.

The DSI determined there was a moderate to high risk to human health from the identified contamination and recommended that the contaminated soils within contractor's yard B be remediated prior to the development of the site for residential use. Additional sampling was recommended within contractor's yard B to increase the density of sampling and delineate the extent of contamination.

A combined DSI/Remediation Action Plan (RAP) was completed by MEL in May 2022. The soil sampling results assisted with delineating the two areas of contamination identified by the original DSI and identified a third area of arsenic contamination with an isolated result exceeding the 'residential 10% produce' SGV.

Remediation by excavation and disposal to an authorised facility was considered to be the most viable remediation option for the site. The remediation objective was to remove all material containing arsenic and chromium concentrations above the 'residential 10% produce' SGV of 20mg/kg and 460mg/kg respectively are removed.

Remediation commenced in mid-June 2022 with the excavation of soils from the remediation area within the paddock, followed by the two remediation areas within the yard. MEL attended site on 16 June 2022 to undertake XRF testing of the walls and base of the excavated area and of the stockpiled material to assess its suitability for disposal at Burwood Landfill. MEL attended site a second time on 05 July 2022 to undertake XRF testing of soils that were previously inaccessible within the larger yard remediation area due to the presence of the stockpile.

Following successful remediation, a total of 16 validation samples were collected from the three remediation areas. The validation results showed heavy metal concentrations below the 'residential 10%

produce' SGVs. A total of 134 tonnes of soils were excavated from the site on 20 June and 18 July 2022 and disposed of at Burwood Landfill under manifest number 22/088.

The remediation actions have successfully remediated the identified contaminated areas at the site. Contaminant levels within the remediated areas remain elevated above expected background values. During future earthworks, any material requiring off-site disposal from within the excavated areas will not qualify for disposal as cleanfill material.

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

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 (SGVs).
- Preparation of this report in accordance with MfE guidelines.

4 Site Identification

The subject site is located at 60 Leeston Dunsandel Road, Leeston as shown on the plan in **Figure 1** below, from herein referred to as 'the site'. The site is legally described as Lot 2 DP 365379 and has a total area of approximately 5.44ha.

Figure 1 – Location Plan

5 Proposed Site Use

The client is preparing to develop the site for residential use. This will involve subdivision, change of use of the land, soil disturbance and disposal of soils off-site.

6 Site Description

6.1 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 Leeston stony clay, the Leeston shallow clay and the Ayreburn moderately deep clay. Wells in the area indicate that topsoils are underlain by a layer of clay and gravel.
Soil Trace Elements	According to the ECan GIS database, natural concentrations of trace elements for the site are mainly those within the 'Regional, Gley' soil group.
Groundwater	The site lies over the unconfined and semi-confined gravel aquifer system. Groundwater levels recorded on nearby bore logs are between 0.60m and 1.98m deep. The direction of groundwater flow is generally in a south easterly direction.
Surface Water	An open drain is present at the south-west corner of the site heading south. Birdlings Brook is located approximately 1km to the west and south-west of the site.

6.2 Site Layout and Current Site Uses

The site contains multiple industrial type sheds along the eastern boundary. A general storage area is located in the north-west corner of the site. Storage items include vehicles, trailers, farm machinery and building materials. The remainder of the site is vacant of structures and in pasture.

6.3 Surrounding Land Uses

The site is bound by similar rural and rural residential/lifestyle properties to the north, east and west. Ellesmere College is located to the south of the site. The Leeston township is also located approximately 850m south of the site.

6.4 Geotechnical Investigations

At the time of writing no geotechnical investigations were made available to Momentum Environmental Ltd (MEL).

7 Summary of Previous Investigations

7.1 Preliminary Site Investigation

A Preliminary Site Investigation (PSI) was undertaken by Malloch Environmental Ltd (now known as Momentum Environmental Ltd) in July 2017 for the site and several hectares of land to the south of the site as part of a proposed plan change. The information summarised below is relevant to the current site only.

The PSI included a site visit which noted that an area containing buildings along the eastern boundary appeared to be a work yard for contractors. This area of the site contained two above ground fuel tanks. One was a newer looking petrol tank, and the other an older tank likely for diesel. The north-west corner

of the site appeared to be used as a transport yard. The gate to access that area was locked at the time so close inspection was not possible.

Based on two areas of the site apparently being used as a contractor's yard there was considered to be potential risks associated with chemical and fuel storage. The PSI recommended a Detailed Site Investigation be undertaken on the north-west corner of the site and the developed area along the eastern boundary.

The full copy of the PSI can be made available upon request.

7.2 Detailed Site Investigation

A Detailed Site Investigation (DSI) was completed by MEL in October 2021. Prior to soil sampling a more detailed review of historical aerial photographs was undertaken. This determined the contractor's yard on the eastern boundary of the site, referred to as 'contractor's yard A' was vacant of structures until the mid-1970s when a shed was constructed. This area was further developed around 2010 when additional buildings were constructed, and the area was gravelled. Some storage was occurring along the eastern boundary of the site, as shown below in **Figure 2**.

Figure 2 – 2010-2014 aerial photograph showing eastern contractor's yard

The area in the north-west corner of the site, referred to as 'contractor's yard B' also appeared to be used as a contractor's yard. This area remained undeveloped until approximately 2010 when it was gravelled and some storage began occurring along the northern and western boundaries. In the latest aerial photograph, this area of the site was returned to pasture and several vehicles were present.

Storage is still occurring along the northern and western boundaries. Also in this aerial photograph, there is evidence of burn areas and/or stockpiles of soil, as shown in **Figure 3** below.

Figure 3 – Latest aerial photograph showing transport yard and burn area/stockpile (orange)

Soil sampling was undertaken on the 15 September 2021 to assess the extent of contamination within the two identified risk areas. During soil sampling, burn areas in both contractor's yards were identified including areas which contained blackened, ashy soils.

Contractor's Yard A

The results of soil sampling showed heavy metal concentrations below the 'residential 10% produce' soil guideline values (SGV) at all sample locations and within the burn area (BP1). Contaminant concentrations were above expected background values in this area, which was expected given the nature of the land uses occurring. Asbestos was not detected within samples collected from contractor's yard A.

No remediation was deemed necessary for contactor's yard A.

Contractor's Yard B

The results of soil sampling identified arsenic and chromium concentrations exceeding the 'residential 10% produce' SGV in two burn areas, BP2 and BP3. Arsenic concentrations also exceeded the 'residential 10% produce' SGV in three sample locations containing blackened and ashy soils adjacent to the burn areas. Of these exceedances, three arsenic results also exceeded the 'commercial/industrial' SGV. Arsenic concentrations were below the 'residential 10% produce' SGV in the samples taken from 250mm depth.

Table 2 – Summary of exceedances

Sample Location	Arsenic (mg/kg) (SGV = 20)	Chromium (mg/kg) (SGV = 460)
BP2 (XRF tested only, average of readings shown)	73	<SGV
BP3	1,850	719
Y10	51.8	<SGV
Y13	119	<SGV
Y15	30.4	<SGV

The sample taken from BP3 also exceeded the ecological guideline value used as a trigger for further assessment for arsenic, chromium, copper, and zinc. Heavy metal concentrations were above expected background levels in most sample locations within this area.

Arsenic, chromium, copper, lead and zinc levels within BP3.1 and arsenic levels within Y13.1 exceeded the total recoverable concentration acceptance criteria for Kate Valley Landfill. As the sample with the highest level of contaminants, BP3.1 was submitted for heavy metal by TCLP analysis to inform disposal options. The arsenic by TCLP result of 7.98g/m^3 exceeds the Kate Valley leachate acceptance criteria of 5 g/m^3. The other TCLP results were all below the acceptance criteria.

Asbestos was not detected within samples collected from contractor's yard B.

The DSI concluded that the contamination appeared to be restricted to burn areas or areas impacted by burning. However, in-field observations made during sampling, such as extensive digger tracks and burnt soils beneath layers of topsoils at Y15, suggested that there may have been significant movement of soils across this risk area. Therefore, it would not be surprising to find contamination outside of the sampled locations. It was also noted that due to the storage occurring within contractor's yard B, some areas were not fully characterised.

The DSI determined there was a moderate to high risk to human health from the identified contamination and recommended that the contaminated soils within contractor's yard B be remediated prior to the development of the site for residential use. Additional sampling was recommended within contractor's yard B to increase the density of sampling and delineate the extent of contamination following site clearance and prior to any earthworks commencing.

A copy of the DSI Sample Location Plan - Contractor's yard B is included in **Appendix A**. This plan also shows the area recommended for higher density sampling. A full copy of the DSI can be made available upon request.

7.3 Supplementary Detailed Site Investigation and Remediation Action Plan

A combined Supplementary DSI and Remediation Action Plan (RAP) was completed by MEL in May 2022. The DSI was undertaken to increase the sample location density within the portion of contractor's yard B affected by burning of waste and storage.

The soil sampling results assisted with delineating the two areas of contamination identified by the original DSI and identified a third area of arsenic contamination with an isolated result exceeding the 'residential 10% produce' SGV. In total, the area of contaminated soils was estimated to be approximately 1,500m^2 and the contamination was likely limited to the top 200-250mm of soils.

Remediation by excavation and disposal to an authorised facility was considered to be the most viable remediation option for the site. The remediation objective was to remove all material containing arsenic and chromium concentrations above the 'residential 10% produce' SGV of 20mg/kg and 460mg/kg respectively are removed.

Other ancillary objectives included:

- To ensure that appropriate site management measures are in place to protect workers from exposure to contaminants contained in the soils and respirable asbestos fibres.
- To ensure that soil management controls are in place to prevent tracking of contaminants, dust, stormwater runoff erosion.
- To ensure that any contaminated soils removed off-site are disposed of to an appropriate location.

The methodology was for excavation and disposal to an authorised disposal facility. The following methodology was agreed upon with the client:

1. Set up all site controls and equipment as required and in accordance with the General Site Management Plan.
2. If excavation is undertaken in conjunction with XRF testing, each arsenic affected area can be excavated in 100mm layers until XRF testing indicates the arsenic contaminated soils have been removed. Using a portable XRF during remediation will ensure the minimum volume of soil is removed from the site whilst also ensuring the remediation goal is met. This will be particularly important around SS5 which has not been delineated. Alternatively, each arsenic affected area can be excavated to 250mm depth.
3. Dispose of soils to a suitable location.
4. Following excavation works, the excavated area including walls and base, shall be tested by XRF to confirm the remediation goal has been achieved. When the XRF results indicate success, laboratory validation sampling should be undertaken.
5. Decontaminate all equipment prior to commencing other site earthworks.
6. Backfill the excavated bed with imported fill suitable for a residential use.

The Supplementary DSI Sample Location Plan is included in **Appendix B**. A full copy of the supplementary DSI/RAP can be provided upon request.

8 Summary of Remedial Works and Site Validation Investigation

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 (NES). 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 the site would be 'residential 10% produce'. The 'commercial/industrial' land use scenario is used as a proxy for workers involved in disturbing soils.

The adopted trigger value used to determine need for assessment of ecological receptors (including stormwater disposal areas) 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).

For comparison of site concentrations against expected background levels heavy metal concentrations will be assessed against the expected background levels for soils as published in *Background Concentrations in Canterbury soils*, Tonkin and Taylor, July 2007.

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 Summary of Remedial Works

Remediation of contaminated soils commenced in mid-June 2022 with the excavation of soils from the remediation area within the paddock, followed by the two remediation areas within the yard. Soils were excavated to an average 150-250mm depth within the paddock remediation area, 100-150mm depth within the smaller yard remediation area and 150-250mm depth within the larger yard remediation area. The material was stockpiled and mixed before being retested to confirm suitability for disposal at Burwood Landfill. MEL attended site on 16 June 2022 to undertake XRF testing of the walls and base of the excavated area and of the stockpiled material.

The XRF test results showed isolated areas of arsenic contamination at concentrations above the 'residential 10% produce' soil guideline value (SGV) remained in the base of the paddock remediation area. Further excavations occurred and the soils were added to the stockpiled material prior to being mixed and retested. The XRF testing on the stockpiled material showed in general contaminant concentrations were below the 'recreational' SGVs used to show compliance with Burwood Landfill acceptance criteria. Four test locations contained concentrations of arsenic likely to be above Burwood Landfill acceptance criteria. The stockpile was thoroughly mixed again, prior to being retested.

Photographs undertaken during the remediation are shown below. XRF testing locations marked with an 'O' indicate heavy metal concentrations below the 'residential 10% produce' SGVs, while those marked with an 'X' indicate heavy metal concentrations above the 'residential 10% produce' SGVs.


Photo 1 & 2 – XRF testing of remediation area


Photo 3 & 4 – XRF testing of remediation area


Photo 5 & 6 – Stockpiled material

Photo 7 – Small remediation area within yard

MEL attended site a second time on 05 July 2022 to undertake XRF testing of soils that were previously inaccessible within the larger yard remediation area due to the presence of the stockpile. The XRF test results identified an isolated area of elevated arsenic and chromium at concentrations likely to be above the 'residential 10% produce' SGVs. The soils at this location appeared rusted and darker than surrounding soils. Soils were excavated to approximately 500mm depth until visually clear and XRF test results showed arsenic and chromium concentrations below the 'residential 10% produce' SGVs.

An additional area of arsenic contamination was also identified when XRF testing the southern wall of the remediation area. The affected area was excavated to approximately 250mm deep and XRF tested to confirm arsenic concentrations were below the 'residential 10% produce' SGV.

Photo 8 – Deeper excavations required in yard

Photo 9 – Yard remediation area

Photo 10 & 11 – Yard remediation area

8.4 Summary of Site Validation Investigation

The site validation investigation was undertaken on 05 July 2022. Nine validation samples were collected from the walls and base of the paddock remediation area. Six validation samples were collected from the walls and base of the larger yard remediation area and a single validation sample was collected from the smaller yard remediation area. Across the remediation process, a total of 322 XRF tests were conducted.

The Validation Sample Location Plan is attached in **Appendix C.**

9 Site Validation Investigation Results

9.1 Evaluation of Results

The validation sample results showed heavy metal concentrations below the 'residential 10% produce' SGVs in all sample locations. Arsenic concentrations ranged from 4.6-19.7mg/kg, chromium concentrations ranged from 15.8-27.7mg/kg and lead concentrations ranged from 13.3-32.3mg/kg.

Heavy metal concentrations were above expected background values for arsenic and chromium across the majority of sample locations and for cadmium at sample VS4.

A total of 134 tonnes of soils were excavated from the site on 20 June and 18 July 2022 and disposed of at Burwood Landfill under manifest number 22/088.

The Table of Laboratory Validation Results is attached in **Appendix D,** the Table of XRF Validation Results is attached in **Appendix E** and Laboratory Reports are attached in **Appendix F.** Disposal documentation is attached in **Appendix G.**

9.2 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.

10 Summary of Resource Consent and Conditions

Resource consent (RC225368) was obtained from Selwyn District Council on 13 June 2022 for soil disturbance and off-site disposal of soils associated with the remediation of contaminated soils. The resource consent contained several conditions including the requirement to remediate contaminated material in accordance with the approved Remediation Action Plan, disposal of soil to an approved disposal facility and disposal documents to be included in a Site Validation Report which shall be submitted to Selwyn District Council following completion of the remediation process for each stage of the subdivision.

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 conditions of consent.

11 Conclusion

Remediation commenced in mid-June 2022 with the excavation of soils from the remediation area within the paddock, followed by the two remediation areas within the yard. MEL attended site on 16 June 2022 to undertake XRF testing of the walls and base of the excavated area and of the stockpiled material. MEL attended site a second time on 05 July 2022 to undertake XRF testing of soils that were previously inaccessible within the larger yard remediation area due to the presence of the stockpile.

Following successful remediation, a total of 16 validation samples were collected from the three remediation areas. The validation results showed heavy metal concentrations below the 'residential 10%

produce' SGVs. A total of 134 tonnes of soils were excavated from the site on 20 June and 18 July 2022 and disposed of at Burwood Landfill under manifest number 22/088.

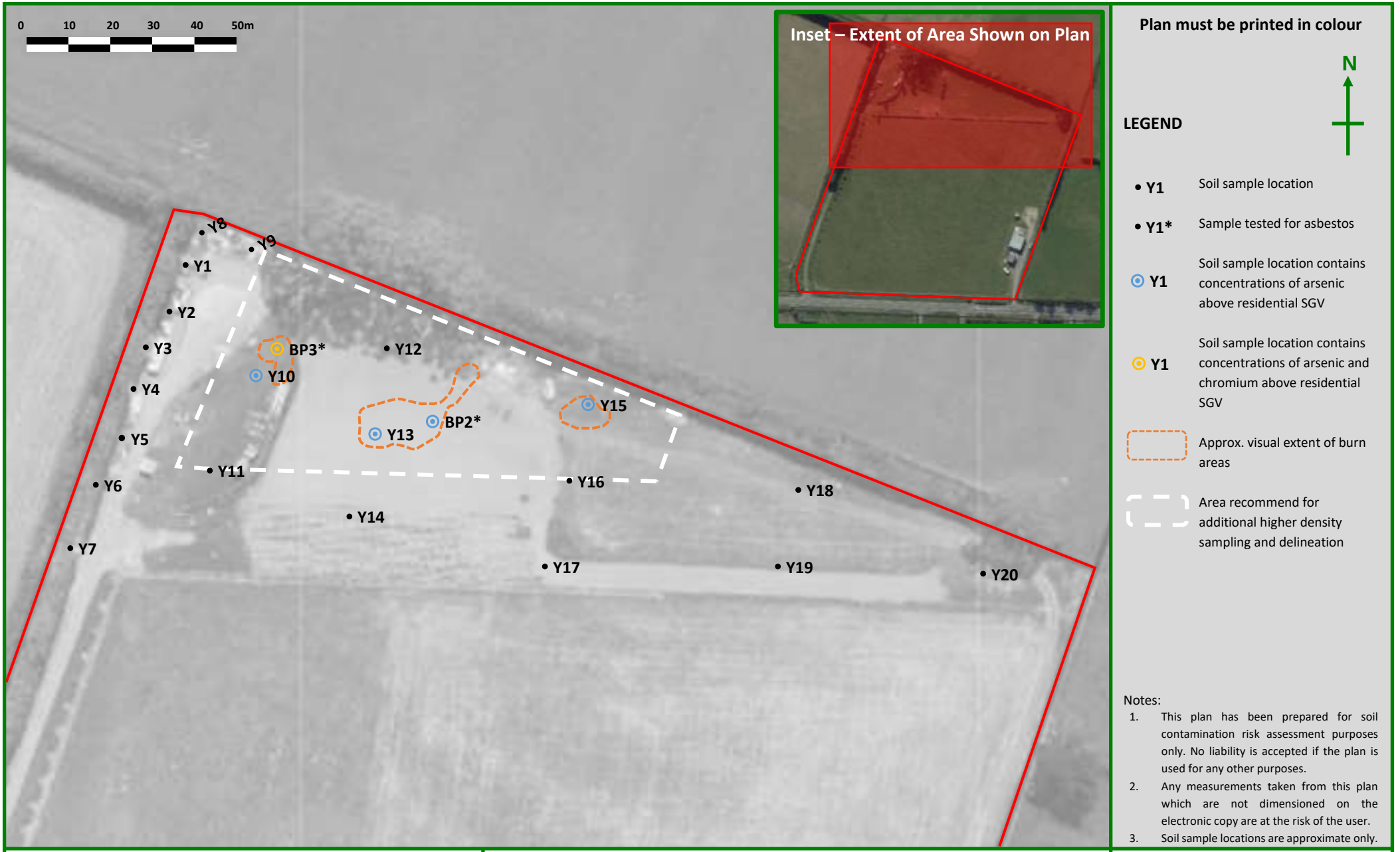
The remediation actions have successfully remediated the identified contaminated areas at the site. Contaminant levels within the remediated areas remain elevated above expected background values. During future earthworks, any material requiring off-site disposal from within this area will not qualify for disposal as cleanfill material.

12 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 – DSI Sample Location Plan – Contractors Yard B



Plan must be printed in colour

N

LEGEND

- • Y1 — Soil sample location
- • Y1* — Sample tested for asbestos
- ⊙ Y1 — Soil sample location contains concentrations of arsenic above residential SGV
- ⊙ Y1 — Soil sample location contains concentrations of arsenic and chromium above residential SGV
- Approx. visual extent of burn areas
- Area recommend for additional higher density sampling and delineation

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.

m.e.l

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

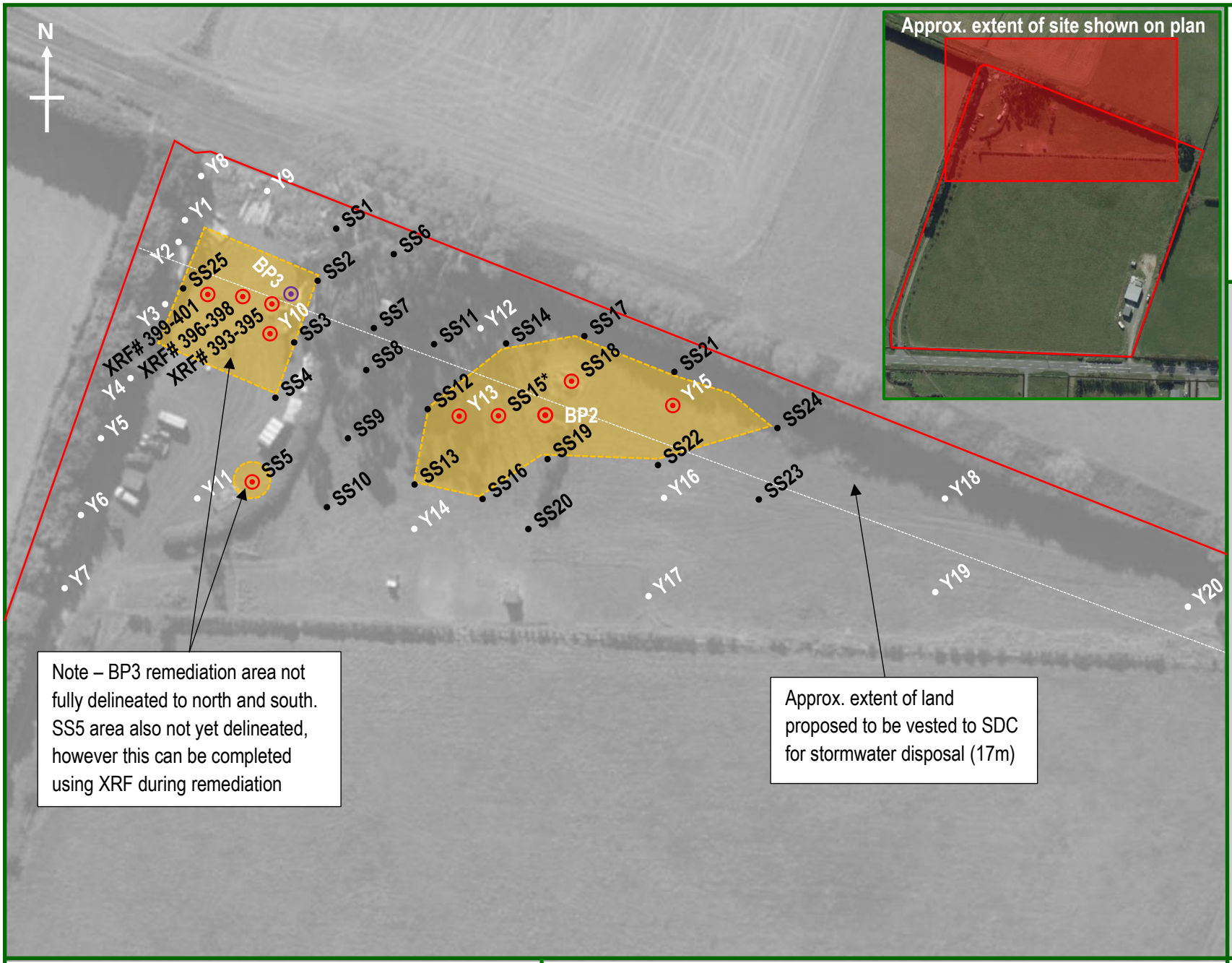
Sample Location Plan – Contractor's Yard B
60 Leeston Dunsandel Road, Leeston

Scale: NTS

Date: 30 September 2021

Drawing No: 01595/2

Appendix B – Supplementary DSI Sample Location Plan



MOMENTUM ENVIRONMENTAL LTD.

Specialist soil contamination experts, keeping your project moving.

www.momentumenviro.co.nz

LEGEND

• SS1	Soil sample location XRF and laboratory tested
• SS1*	Soil sample location tested for asbestos
• XRF#	Soil sample location XRF tested only
⊙ SS1	Soil sample location contains arsenic concentrations above the residential SGV
⊙ SS1	Soil sample location with arsenic and chromium concentrations above residential SGVs
• Y1	Sample location from previous DSI stage of investigation
	Approx. extent requiring remediation

PLAN MUST BE PRINTED IN COLOUR

Graphic scale is approximate only

0 5 10 15m

Date: 10 May 2022 **Drawing No:** 595/3

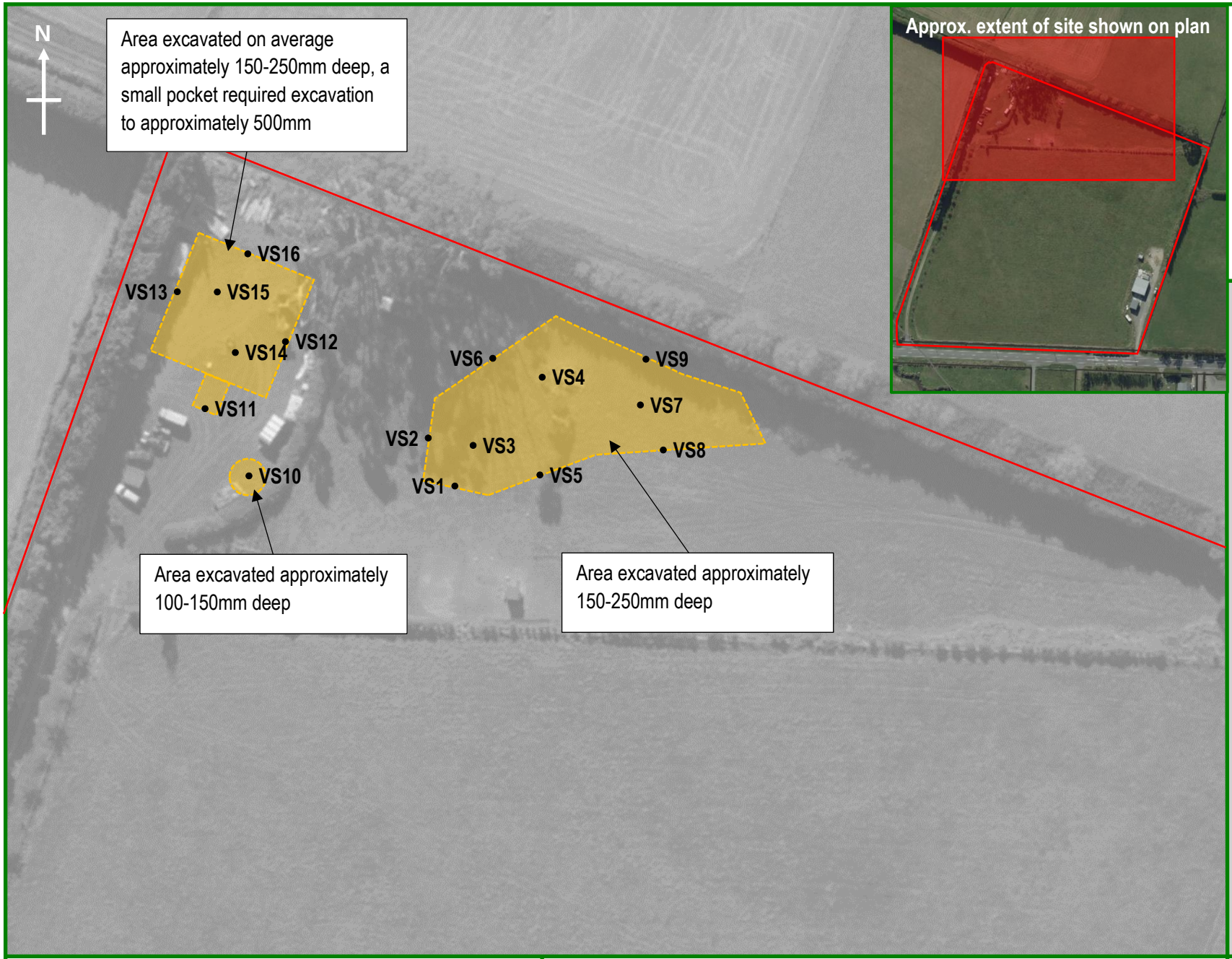
60 Leeston Dunsandel Road, Leeston

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

Appendix C – Validation Sample Location Plan



MOMENTUM ENVIRONMENTAL LTD.

Specialist soil contamination experts, keeping your project moving.

www.momentumenviro.co.nz

LEGEND

• VS1	Soil validation sample location
	Approximate extent of remediation area

PLAN MUST BE PRINTED IN COLOUR

Graphic scale is approximate only

0 5 10 15 20 25m

Date: 30 August 2022 **Drawing No:** 595/4

Validation Sample Location Plan
60 Leeston Dunsandel Road, Leeston

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 D – Table of Laboratory Validation Results

Table of Laboratory Validation Results - 60 Leeston Dunsandel Road, Leeston

Date of sampling: 05 July 2022

Analyte	Sample Name:	VS1	VS2	VS3	VS4	VS5	VS6	VS7	VS8	Soil Guideline Values					
Soil Results	Lab Number:	22-24777-1	22-24777-2	22-24777-3	22-24777-4	22-24777-5	22-24777-6	22-24777-7	22-24777-8	Residential 10% Produce	Commercial/ Industrial	Reference	Ecological Receptors	Reference	Background$_1$
	Position:	wall	wall	base	base	wall	wall	base	wall						
Heavy Metals															
Arsenic	mg/kg dry wt	15	8.9	11	11	12	15.1	15.6	16.4	20	70	NES	70	ANZWQ	12.5
Cadmium	mg/kg dry wt	0.18	0.17	0.16	0.22	0.16	0.19	0.2	0.19	3	1,300	NES	10	ANZWQ	0.21
Chromium	mg/kg dry wt	24.1	19.5	27.7	21.5	20.3	21.7	21.7	22.4	460	6,300	NES	370	ANZWQ	20.3
Copper	mg/kg dry wt	14.2	10.2	11.2	11.5	10.8	14	13.4	12.4	>10,000	>10,000	NES	270	ANZWQ	25
Lead	mg/kg dry wt	30.3	32.3	28.8	23.6	26.7	25.8	24.9	25.2	210	3,300	NES	220	ANZWQ	36.2
Nickel	mg/kg dry wt	14.2	12.6	13.9	13.8	12.4	12.3	12.9	13.4	400	6,000	NEPM	52	ANZWQ	17.5
Zinc	mg/kg dry wt	88	77	83	86	78	91	90	91.5	7,400	400,000	NEPM	410	ANZWQ	145

Analyte	Sample Name:	VS9	VS10	VS11	VS12	VS13	VS14	VS15	VS16	Soil Guideline Values					
Soil Results	Lab Number:	22-24777-9	22-24777-10	22-24777-11	22-24777-12	22-24777-13	22-24777-14	22-24777-15	22-24777-16	Residential 10% Produce	Commercial/ Industrial	Reference	Ecological Receptors	Reference	Background$_1$
	Position:	wall	base	wall	wall	wall	base	base	wall						
Heavy Metals															
Arsenic	mg/kg dry wt	13.9	11	16.5	12	4.6	19.7	6.8	8.3	20	70	NES	70	ANZWQ	12.5
Cadmium	mg/kg dry wt	0.16	0.17	0.14	0.2	0.036	0.16	0.037	0.047	3	1,300	NES	10	ANZWQ	0.21
Chromium	mg/kg dry wt	18.9	20.7	22.5	21.6	15.8	23.3	16.9	20.2	460	6,300	NES	370	ANZWQ	20.3
Copper	mg/kg dry wt	11.5	10.3	10.8	10.5	11.8	12.2	12.7	14	>10,000	>10,000	NES	270	ANZWQ	25
Lead	mg/kg dry wt	22.3	31.6	25.3	20.7	13.3	24	13.5	16.2	210	3,300	NES	220	ANZWQ	36.2
Nickel	mg/kg dry wt	11.4	13.8	14.6	12.1	13.9	13.7	13.7	13.7	400	6,000	NEPM	52	ANZWQ	17.5
Zinc	mg/kg dry wt	81	84	88	78	51	118	51	63.5	7,400	400,000	NEPM	410	ANZWQ	145

Indicates result exceeds 'residential 10% produce' 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, Gley" soil group from Background concentrations in Canterbury soils, Tonkin and Taylor, July 2007

Appendix E – Table of XRF Validation Results

Table of XRF Validation Results - 60 Leeston Dunsandel Road, Leeston

Units: ppm

XRF Reading #	Time	Type/Comment	Test Duration	Total Recoverable Arsenic		Total Recoverable Chromium		Total Recoverable Lead	
				Result	Error	Result	Error	Result	Error
324	16/06/2022 13:50	Soil suitable to remain in-situ	10.92	<LOD	11.57	<LOD	192.4	16.27	10.72
325	16/06/2022 13:50	Soil suitable to remain in-situ	11.72	<LOD	11.91	<LOD	226.3	<LOD	16.52
326	16/06/2022 13:50	Soil suitable to remain in-situ	17.31	<LOD	10.05	<LOD	176.04	<LOD	13.22
327	16/06/2022 13:51	Soil suitable to remain in-situ	20.87	12.22	5.68	<LOD	132.85	11.82	7.2
328	16/06/2022 13:51	Soil suitable to remain in-situ	17.31	<LOD	10.95	<LOD	173.52	<LOD	14.14
329	16/06/2022 13:52	Soil suitable to remain in-situ	17.31	<LOD	10.73	<LOD	190.69	18.46	9.82
330	16/06/2022 13:52	Soil suitable to remain in-situ	30.08	8.46	4.72	<LOD	125.51	<LOD	9.28
331	16/06/2022 13:53	Soil suitable to remain in-situ	30.07	<LOD	7.47	<LOD	136.92	<LOD	10.09
332	16/06/2022 13:54	Soil suitable to remain in-situ	27.27	<LOD	7.69	<LOD	144.92	<LOD	10.3
333	16/06/2022 13:54	Soil suitable to remain in-situ	23.69	<LOD	9.22	<LOD	172.95	<LOD	12.35
334	16/06/2022 13:55	Soil suitable to remain in-situ	16.9	<LOD	10.12	<LOD	169.67	19.08	9.45
335	16/06/2022 13:55	Soil suitable to remain in-situ	20.1	<LOD	8.75	<LOD	142.37	<LOD	11.62
336	16/06/2022 13:56	Soil suitable to remain in-situ	22.09	<LOD	8.12	<LOD	144.58	13.24	7.57
337	16/06/2022 13:56	Soil suitable to remain in-situ	18.51	<LOD	8.91	<LOD	167.33	13.5	8.05
338	16/06/2022 13:57	Soil suitable to remain in-situ	14.11	<LOD	10.15	<LOD	173.98	<LOD	13.14
339	16/06/2022 13:58	Soil suitable to remain in-situ	30.17	<LOD	7.48	<LOD	120.61	<LOD	10.08
340	16/06/2022 13:59	Soil suitable to remain in-situ	30.07	<LOD	6.93	<LOD	128.5	<LOD	9.31
341	16/06/2022 13:59	Soil suitable to remain in-situ	30.08	<LOD	7.29	<LOD	125.68	12.58	6.62
342	16/06/2022 14:01	Soil suitable to remain in-situ	30.08	<LOD	7.3	<LOD	132.45	14.78	6.79
343	16/06/2022 14:02	Soil suitable to remain in-situ	30.08	8.53	4.83	<LOD	120.9	11.08	6.35
344	16/06/2022 14:02	Soil suitable to remain in-situ	30.07	12.3	5.45	<LOD	142.36	11.95	6.94
345	16/06/2022 14:03	Soil suitable to remain in-situ	30.07	<LOD	6.97	<LOD	124.31	12.9	6.4
346	16/06/2022 14:04	Soil suitable to remain in-situ	20.1	<LOD	9.79	<LOD	161.89	20.67	8.65
347	16/06/2022 14:05	Soil suitable to remain in-situ	26.49	7.97	4.84	<LOD	129.74	<LOD	9.54
348	16/06/2022 14:06	Soil suitable to remain in-situ	30.07	8.16	4.96	<LOD	130.95	10.92	6.52
349	16/06/2022 14:06	Soil suitable to remain in-situ	30.07	11.8	5.17	<LOD	137.08	11.46	6.61
350	16/06/2022 14:07	Soil suitable to remain in-situ	30.07	<LOD	7.19	<LOD	125.87	16.83	6.73
351	16/06/2022 14:09	Soil suitable to remain in-situ	17.71	<LOD	7.94	<LOD	135.3	<LOD	10.95
352	16/06/2022 14:10	Soil suitable to remain in-situ	19.3	<LOD	7.98	<LOD	150.81	<LOD	10.63
353	16/06/2022 14:10	Soil suitable to remain in-situ	19.7	<LOD	8.44	<LOD	149.57	<LOD	11.27
354	16/06/2022 14:11	Soil suitable to remain in-situ	24.09	<LOD	7.86	<LOD	140.06	13.01	6.95
355	16/06/2022 14:11	Soil suitable to remain in-situ	30.07	11.29	4.54	<LOD	120.71	<LOD	8.64
356	16/06/2022 14:12	Soil suitable to remain in-situ	30.07	10.53	4.98	<LOD	128.21	12.16	6.43
357	16/06/2022 14:13	Soil suitable to remain in-situ	28.48	<LOD	7.06	<LOD	127.85	10.91	6.43
358	16/06/2022 14:13	Soil suitable to remain in-situ	28.48	<LOD	7.63	<LOD	134.83	14.43	7.09
359	16/06/2022 14:14	Soil suitable to remain in-situ	27.67	<LOD	7.38	<LOD	135.8	11.05	6.61
360	16/06/2022 14:15	Soil suitable to remain in-situ	28.07	<LOD	6.96	<LOD	130.44	13.21	6.61
361	16/06/2022 14:15	Soil suitable to remain in-situ	18.11	<LOD	9.74	<LOD	176.55	<LOD	13.26
362	16/06/2022 14:17	Soil suitable to remain in-situ	19.29	<LOD	8.25	<LOD	149.18	<LOD	11.46
363	16/06/2022 14:17	Soil suitable to remain in-situ	17.31	<LOD	9.05	<LOD	166.58	<LOD	12.22
364	16/06/2022 14:18	Soil suitable to remain in-situ	15.71	<LOD	10.6	<LOD	205.32	<LOD	14.28
365	16/06/2022 14:18	Soil suitable to remain in-situ	13.31	<LOD	10.24	<LOD	190.79	<LOD	13.82
366	16/06/2022 14:18	Soil suitable to remain in-situ	22.49	10.6	6.2	<LOD	163.4	13.96	8.01
367	16/06/2022 14:19	Soil suitable to remain in-situ	18.9	<LOD	8.93	<LOD	152.55	<LOD	12.07
368	16/06/2022 14:19	Soil suitable to remain in-situ	18.1	<LOD	8.91	<LOD	171.82	17.34	8.57
369	16/06/2022 14:20	Soil suitable to remain in-situ	30.08	<LOD	7.57	<LOD	128.83	15.97	6.83
370	16/06/2022 14:20	Soil suitable to remain in-situ	11.32	<LOD	11.28	<LOD	200.67	<LOD	15.35
371	16/06/2022 14:21	Soil suitable to remain in-situ	11.72	<LOD	10.88	<LOD	192.06	<LOD	14.89
372	16/06/2022 14:21	Soil suitable to remain in-situ	12.92	<LOD	11	<LOD	212.28	<LOD	15.17
373	16/06/2022 14:21	Soil suitable to remain in-situ	11.33	<LOD	9.97	<LOD	186.64	<LOD	13.33
374	16/06/2022 14:23	Soil suitable to remain in-situ	21.7	10.23	5.34	<LOD	151.99	<LOD	10.25
375	16/06/2022 14:23	Soil suitable to remain in-situ	15.31	<LOD	10.23	<LOD	196.86	<LOD	14.14
376	16/06/2022 14:23	Soil suitable to remain in-situ	17.31	<LOD	9.61	<LOD	173.77	<LOD	12.5
377	16/06/2022 14:24	Soil suitable to remain in-situ	22.5	10.29	5.87	<LOD	156.6	<LOD	11.38
378	16/06/2022 14:24	Soil suitable to remain in-situ	13.32	<LOD	10.18	<LOD	179.74	<LOD	13.66
379	16/06/2022 14:25	Soil suitable to remain in-situ	15.31	<LOD	10.39	<LOD	183.96	14.18	9.24
380	16/06/2022 14:25	Soil suitable to remain in-situ	15.32	<LOD	9.55	<LOD	180.78	<LOD	13.52
381	16/06/2022 14:25	Soil suitable to remain in-situ	15.71	<LOD	10.08	<LOD	170.26	<LOD	13.21
382	16/06/2022 14:26	Soil suitable to remain in-situ	16.91	9.78	6.51	<LOD	188.86	<LOD	12.59
383	16/06/2022 14:26	Soil suitable to remain in-situ	14.11	<LOD	10.12	<LOD	177.94	<LOD	13.55
384	16/06/2022 14:27	Soil suitable to remain in-situ	17.71	<LOD	8.81	<LOD	169.54	<LOD	12.43
385	16/06/2022 14:27	Soil suitable to remain in-situ	20.9	<LOD	9.03	<LOD	151.74	15.55	7.88
386	16/06/2022 14:28	Soil suitable to remain in-situ	16.51	<LOD	10.04	<LOD	184.16	<LOD	13.41
387	16/06/2022 14:28	Soil suitable to remain in-situ	15.31	<LOD	9.74	<LOD	168.81	<LOD	12.69
388	16/06/2022 14:29	Soil suitable to remain in-situ	15.31	<LOD	9.84	<LOD	191.29	<LOD	13.52
389	16/06/2022 14:29	Soil suitable to remain in-situ	18.91	11.39	6.43	<LOD	171.43	<LOD	12.31

390	16/06/2022 14:30	Soil suitable to remain in-situ	18.51	<LOD	9.34	<LOD	164.75	15.92	8.56
391	16/06/2022 14:30	Soil suitable to remain in-situ	21.7	9.06	5.76	<LOD	148.21	12.07	7.52
392	16/06/2022 14:31	Soil suitable to remain in-situ	16.12	11.62	7.06	<LOD	171.88	<LOD	13.55
393	16/06/2022 14:31	Soil suitable to remain in-situ	23.29	<LOD	7.58	<LOD	139.91	12.8	7.02
394	16/06/2022 14:31	Soil suitable to remain in-situ	16.11	9.92	6.39	<LOD	173.5	<LOD	12.33
395	16/06/2022 14:32	Soil suitable to remain in-situ	16.91	<LOD	10.48	<LOD	186.4	16.47	9.52
396	16/06/2022 14:32	Soil suitable to remain in-situ	17.31	<LOD	9.63	<LOD	178.97	<LOD	13.07
397	16/06/2022 14:33	Soil suitable to remain in-situ	30.07	12.09	4.67	<LOD	125.25	<LOD	8.81
398	16/06/2022 14:33	Soil suitable to remain in-situ	16.91	12.84	6.99	<LOD	165.32	<LOD	13.19
399	16/06/2022 14:34	Soil suitable to remain in-situ	30.56	9.12	5.24	<LOD	129.2	<LOD	10.2
400	16/06/2022 14:35	Soil suitable to remain in-situ	18.1	<LOD	8.86	<LOD	155.92	<LOD	11.99
401	16/06/2022 14:36	Soil suitable to remain in-situ	15.7	<LOD	10.23	<LOD	173.79	14.85	9.21
402	16/06/2022 14:36	Soil suitable to remain in-situ	15.31	<LOD	9.65	<LOD	175.01	<LOD	12.78
403	16/06/2022 14:36	Soil suitable to remain in-situ	16.51	<LOD	9.81	<LOD	170.2	<LOD	13.25
404	16/06/2022 14:37	Soil suitable to remain in-situ	13.71	<LOD	9.41	<LOD	180.86	<LOD	13.49
405	16/06/2022 14:38	Soil suitable to remain in-situ	15.31	<LOD	10.12	<LOD	207.07	<LOD	13.87
406	16/06/2022 14:38	Soil excavated and disposed at Burwood Landfill	30.08	16.08	5.25	<LOD	140.43	<LOD	9.6
407	16/06/2022 14:39	Soil excavated and disposed at Burwood Landfill	19.7	15.35	5.99	<LOD	145.87	<LOD	10.92
408	16/06/2022 14:39	Soil suitable to remain in-situ	14.11	<LOD	9.4	<LOD	172.9	13.88	9.05
409	16/06/2022 14:39	Soil suitable to remain in-situ	15.71	10.21	6.31	<LOD	157.02	<LOD	12.19
410	16/06/2022 14:40	Soil suitable to remain in-situ	16.91	<LOD	11.15	<LOD	197.23	16.93	10.08
411	16/06/2022 14:41	Soil suitable to remain in-situ	25.69	9.6	5.52	<LOD	169.66	<LOD	10.63
412	16/06/2022 14:41	Soil suitable to remain in-situ	15.31	<LOD	9.4	<LOD	174.26	<LOD	12.75
413	16/06/2022 14:41	Soil suitable to remain in-situ	19.3	<LOD	9.98	<LOD	180.43	13.67	8.91
414	16/06/2022 14:42	Soil suitable to remain in-situ	18.91	<LOD	9.43	<LOD	173.43	14.41	9.12
415	16/06/2022 14:42	Soil suitable to remain in-situ	16.5	10.51	6.76	<LOD	175.49	<LOD	12.91
416	16/06/2022 14:43	Soil suitable to remain in-situ	30.07	9.04	4.85	<LOD	134.7	<LOD	9.42
417	16/06/2022 14:44	Soil suitable to remain in-situ	23.69	11.05	5.54	<LOD	141.33	<LOD	10.62
418	16/06/2022 14:44	Soil suitable to remain in-situ	23.69	12.08	5.33	<LOD	140.55	<LOD	10.18
419	16/06/2022 14:45	Soil suitable to remain in-situ	20.89	<LOD	7.85	<LOD	135.53	<LOD	10.44
420	16/06/2022 14:46	Soil suitable to remain in-situ	17.31	<LOD	9.26	<LOD	151.21	12.92	8.52
421	16/06/2022 14:46	Soil suitable to remain in-situ	23.69	9.42	5.04	<LOD	130.27	<LOD	9.78
422	16/06/2022 14:47	Soil excavated and disposed at Burwood Landfill	30.17	18.16	5.84	<LOD	141.89	<LOD	10.57
423	16/06/2022 14:47	Soil suitable to remain in-situ	17.71	10.02	6.19	<LOD	163.28	<LOD	11.98
424	16/06/2022 14:48	Soil excavated and disposed at Burwood Landfill	30.08	17.55	5.19	<LOD	128.02	<LOD	9.38
425	16/06/2022 14:49	Soil suitable to remain in-situ	30.08	11.57	4.34	<LOD	111.74	<LOD	8.24
426	16/06/2022 14:49	Soil suitable to remain in-situ	30.07	14.86	5.16	<LOD	137.66	<LOD	9.34
427	16/06/2022 14:50	Soil suitable to remain in-situ	21.3	10.54	5.56	<LOD	144.35	<LOD	10.68
428	16/06/2022 14:50	Soil suitable to remain in-situ	13.72	<LOD	9.05	<LOD	181.96	<LOD	11.83
429	16/06/2022 14:51	Soil suitable to remain in-situ	14.92	12.9	5.96	<LOD	153.71	<LOD	10.94
430	16/06/2022 14:51	Soil suitable to remain in-situ	12.12	<LOD	10.6	<LOD	183.11	15.52	9.58
431	16/06/2022 14:52	Soil suitable to remain in-situ	14.12	<LOD	9.59	<LOD	178.2	<LOD	13.16
432	16/06/2022 14:52	Soil suitable to remain in-situ	11.33	<LOD	9.96	<LOD	166.22	<LOD	13.57
433	16/06/2022 14:52	Soil suitable to remain in-situ	15.31	9.75	6.41	<LOD	173.65	<LOD	12.48
434	16/06/2022 14:53	Soil suitable to remain in-situ	30.08	14.44	4.88	<LOD	114.84	11.25	6.07
435	16/06/2022 14:53	Soil excavated and disposed at Burwood Landfill	20.1	21.38	5.47	<LOD	123.86	<LOD	9.37
436	16/06/2022 14:57	Stockpile testing - Suitable for disposal at Burwood Landfill	10.12	<LOD	13.07	<LOD	242.38	<LOD	17.37
437	16/06/2022 14:57	Stockpile testing - Suitable for disposal at Burwood Landfill	7.73	<LOD	14.32	<LOD	258.4	<LOD	18.18
438	16/06/2022 14:58	Stockpile testing - Suitable for disposal at Burwood Landfill	8.92	18.8	10.13	<LOD	249.22	<LOD	18.49
439	16/06/2022 14:58	Stockpile testing - Suitable for disposal at Burwood Landfill	9.73	20.91	8.85	<LOD	234.63	<LOD	15.24
440	16/06/2022 14:59	Stockpile testing - Suitable for disposal at Burwood Landfill	12.92	<LOD	12.35	<LOD	211.22	<LOD	15.9
441	16/06/2022 14:59	Stockpile testing - Suitable for disposal at Burwood Landfill	13.32	24.12	9.04	<LOD	213.11	<LOD	15.8
442	16/06/2022 14:59	Stockpile testing - Suitable for disposal at Burwood Landfill	9.33	<LOD	14.83	<LOD	282.33	<LOD	19.85
443	16/06/2022 14:59	Stockpile testing - Suitable for disposal at Burwood Landfill	16.5	31.8	8.47	<LOD	180.73	16.81	9.53
444	16/06/2022 15:00	Stockpile testing - Suitable for disposal at Burwood Landfill	12.11	15.47	8.25	<LOD	231.68	<LOD	15.29
445	16/06/2022 15:00	Stockpile testing - Suitable for disposal at Burwood Landfill	16.12	11.48	6.57	<LOD	165.4	<LOD	12.56
446	16/06/2022 15:00	Stockpile testing - Suitable for disposal at Burwood Landfill	10.13	27.09	9.85	<LOD	225.93	<LOD	16.91
447	16/06/2022 15:01	Stockpile testing - Suitable for disposal at Burwood Landfill	15.7	14.56	8.77	<LOD	223.85	<LOD	16.42
448	16/06/2022 15:01	Stockpile testing - Suitable for disposal at Burwood Landfill	14.12	<LOD	12.41	<LOD	230.2	<LOD	16.51
449	16/06/2022 15:01	Stockpile testing - Suitable for disposal at Burwood Landfill	13.33	16.24	10.03	<LOD	202.89	43.16	12.82
450	16/06/2022 15:02	Stockpile testing - Suitable for disposal at Burwood Landfill	16.91	15.81	7.08	<LOD	178.15	<LOD	13.23
451	16/06/2022 15:02	Stockpile testing - Suitable for disposal at Burwood Landfill	11.73	<LOD	12.44	<LOD	212.05	<LOD	16.82
452	16/06/2022 15:02	Stockpile testing - Suitable for disposal at Burwood Landfill	16.11	<LOD	12.09	<LOD	225.26	<LOD	15.73
453	16/06/2022 15:02	Stockpile testing - Suitable for disposal at Burwood Landfill	18.51	<LOD	10.21	<LOD	167.97	<LOD	13.6
454	16/06/2022 15:03	Stockpile testing - Suitable for disposal at Burwood Landfill	30.36	55.02	6.78	185.08	94.31	20.87	6.83
455	16/06/2022 15:03	Stockpile testing - Suitable for disposal at Burwood Landfill	22.02	25.87	7.02	<LOD	165.2	15.22	8.17
456	16/06/2022 15:04	Stockpile testing - Suitable for disposal at Burwood Landfill	22.87	29.8	6.87	<LOD	159.2	13.19	7.77
457	16/06/2022 15:04	Stockpile testing - Suitable for disposal at Burwood Landfill	17.31	<LOD	9.77	<LOD	183.03	<LOD	13.31
458	16/06/2022 15:05	Stockpile testing - Suitable for disposal at Burwood Landfill	30.07	25.09	5.69	160.81	103.9	<LOD	9.51
459	16/06/2022 15:05	Stockpile testing - Suitable for disposal at Burwood Landfill	20.49	50.51	9.19	290.75	140.4	19.24	9.52
460	16/06/2022 15:06	Stockpile testing - Suitable for disposal at Burwood Landfill	25.62	21.27	6.45	<LOD	142.79	25.27	7.85
461	16/06/2022 15:06	Stockpile testing - Suitable for disposal at Burwood Landfill	30.07	38.97	6.37	<LOD	151.73	<LOD	9.91
462	16/06/2022 15:07	Stockpile testing - Suitable for disposal at Burwood Landfill	20.84	14.98	7.31	<LOD	172.47	27.38	9.31

463	16/06/2022 15:07	Stockpile testing - Suitable for disposal at Burwood Landfill	16.11	12.09	7.32	<LOD	207.95	<LOD	14.01
464	16/06/2022 15:08	Stockpile testing - Suitable for disposal at Burwood Landfill	19.3	14.99	6.24	<LOD	160.57	<LOD	11.58
465	16/06/2022 15:08	Stockpile testing - Suitable for disposal at Burwood Landfill	14.12	16.81	7.82	<LOD	205.98	<LOD	14.38
466	16/06/2022 15:08	Stockpile testing - Suitable for disposal at Burwood Landfill	26.07	46.55	7.04	<LOD	149.98	12.42	7.19
467	16/06/2022 15:09	Stockpile testing - Suitable for disposal at Burwood Landfill	19.3	15.39	6.86	<LOD	170.06	15.18	8.58
468	16/06/2022 15:09	Stockpile testing - Suitable for disposal at Burwood Landfill	21.7	30.49	6.6	<LOD	152.75	<LOD	10.95
469	16/06/2022 15:10	Stockpile testing - Suitable for disposal at Burwood Landfill	18.1	37.58	7.42	<LOD	154.64	<LOD	11.47
470	16/06/2022 15:10	Stockpile testing - Suitable for disposal at Burwood Landfill	21.7	17.82	6.33	<LOD	160.97	13.8	7.74
471	16/06/2022 15:11	Stockpile testing - Suitable for disposal at Burwood Landfill	30.02	58.78	7	<LOD	144.09	12.12	6.72
472	16/06/2022 15:11	Stockpile testing - Suitable for disposal at Burwood Landfill	30.34	31.35	6.55	<LOD	151.97	20.83	7.47
473	16/06/2022 15:12	Stockpile testing - Suitable for disposal at Burwood Landfill	24.44	18.2	6.79	<LOD	174.76	12.83	8.34
474	16/06/2022 15:12	Stockpile testing - Soil remixed and retested	29.77	136.03	10.09	487.85	118.46	35.43	8.3
475	16/06/2022 15:13	Stockpile testing - Suitable for disposal at Burwood Landfill	19.7	<LOD	10.58	<LOD	196.24	<LOD	13.77
476	16/06/2022 15:13	Stockpile testing - Suitable for disposal at Burwood Landfill	19.71	19.04	7.38	<LOD	174.74	20.53	9.07
477	16/06/2022 15:13	Stockpile testing - Suitable for disposal at Burwood Landfill	14.52	17.55	8.35	<LOD	195.05	<LOD	15.19
478	16/06/2022 15:14	Stockpile testing - Soil remixed and retested	30.35	222.83	11.31	709.32	118.33	23.02	7.23
479	16/06/2022 15:14	Stockpile testing - Soil remixed and retested	25.12	98.33	8.51	268.36	103.15	13.86	6.94
480	16/06/2022 15:15	Stockpile testing - Suitable for disposal at Burwood Landfill	14.91	38.22	9.09	<LOD	211.67	14.87	9.75
481	16/06/2022 15:15	Stockpile testing - Suitable for disposal at Burwood Landfill	11.33	15.45	9.74	<LOD	223.34	<LOD	18.07
482	16/06/2022 15:15	Stockpile testing - Suitable for disposal at Burwood Landfill	13.32	<LOD	13.73	<LOD	248.07	<LOD	17.41
483	16/06/2022 15:16	Stockpile testing - Suitable for disposal at Burwood Landfill	19.28	17.12	7.49	<LOD	192.9	15.89	9.23
484	16/06/2022 15:16	Stockpile testing - Suitable for disposal at Burwood Landfill	16.51	22.03	8.83	<LOD	219.01	18.75	10.6
485	16/06/2022 15:16	Stockpile testing - Suitable for disposal at Burwood Landfill	28.44	35.61	6.41	189.48	104.79	14.65	7.02
486	16/06/2022 15:17	Stockpile testing - Suitable for disposal at Burwood Landfill	26.83	41.48	6.83	208.56	103.53	10.94	7.13
487	16/06/2022 15:17	Stockpile testing - Suitable for disposal at Burwood Landfill	27.96	31.49	6.64	188	109.73	12.08	7.36
488	16/06/2022 15:18	Stockpile testing - Suitable for disposal at Burwood Landfill	19.3	14.71	7.28	<LOD	189.48	<LOD	13.34
489	16/06/2022 15:18	Stockpile testing - Suitable for disposal at Burwood Landfill	20.9	<LOD	9.59	<LOD	168.26	<LOD	12.87
490	16/06/2022 15:19	Stockpile testing - Suitable for disposal at Burwood Landfill	18.11	12.81	7.11	<LOD	186.59	<LOD	13.25
491	16/06/2022 15:19	Stockpile testing - Suitable for disposal at Burwood Landfill	21.29	22.83	6.21	<LOD	165.89	<LOD	10.35
492	16/06/2022 15:20	Stockpile testing - Suitable for disposal at Burwood Landfill	30.05	19.5	5.58	143.72	91.57	17.99	6.8
493	16/06/2022 15:20	Stockpile testing - Suitable for disposal at Burwood Landfill	17.31	12.83	6.8	<LOD	162.08	<LOD	12.91
494	16/06/2022 15:20	Stockpile testing - Suitable for disposal at Burwood Landfill	10.13	<LOD	12.03	<LOD	259.68	<LOD	15.66
495	16/06/2022 15:20	Stockpile testing - Suitable for disposal at Burwood Landfill	10.53	<LOD	13.35	<LOD	251.69	<LOD	18.31
496	16/06/2022 15:21	Stockpile testing - Suitable for disposal at Burwood Landfill	23.69	20.87	6.29	<LOD	151.33	15.33	7.54
497	16/06/2022 15:21	Stockpile testing - Suitable for disposal at Burwood Landfill	15.32	14.36	7.69	<LOD	213.46	<LOD	14.41
498	16/06/2022 15:21	Stockpile testing - Suitable for disposal at Burwood Landfill	10.52	<LOD	13.07	<LOD	230.31	<LOD	17.45
499	16/06/2022 15:22	Stockpile testing - Suitable for disposal at Burwood Landfill	16.9	15.31	7.13	<LOD	167.72	16.28	8.89
500	16/06/2022 15:22	Stockpile testing - Suitable for disposal at Burwood Landfill	10.91	16.55	8.89	<LOD	198.95	<LOD	16.41
501	16/06/2022 15:22	Stockpile testing - Suitable for disposal at Burwood Landfill	16.11	13.41	8.05	<LOD	199.16	22.45	10.28
502	16/06/2022 15:23	Stockpile testing - Soil remixed and retested	29.22	75.37	8.15	167.74	96.85	30.54	7.83
503	16/06/2022 15:23	Stockpile testing - Suitable for disposal at Burwood Landfill	24.88	13.23	5.94	<LOD	138.89	19.39	7.59
504	16/06/2022 15:24	Stockpile testing - Suitable for disposal at Burwood Landfill	29.67	48.91	7	<LOD	141.26	17.55	7.16
505	16/06/2022 15:25	Stockpile testing - Suitable for disposal at Burwood Landfill	21.3	18.42	7.52	<LOD	179.83	<LOD	13.58
506	16/06/2022 15:25	Stockpile testing - Suitable for disposal at Burwood Landfill	21.31	29.44	6.4	<LOD	136.81	<LOD	10.52
507	16/06/2022 15:25	Stockpile testing - Suitable for disposal at Burwood Landfill	22.09	9.04	5.95	<LOD	137.23	14.99	7.8
508	16/06/2022 15:26	Stockpile testing - Suitable for disposal at Burwood Landfill	18.5	18.51	6.63	<LOD	153.24	<LOD	11.94
509	16/06/2022 15:26	Stockpile testing - Suitable for disposal at Burwood Landfill	28.48	16.75	5.8	<LOD	151.22	<LOD	10.54
510	16/06/2022 15:27	Stockpile testing - Suitable for disposal at Burwood Landfill	30.16	23.57	6.52	<LOD	166.9	<LOD	11.25
511	16/06/2022 15:27	Stockpile testing - Suitable for disposal at Burwood Landfill	18.11	32.17	6.7	<LOD	140.37	<LOD	10.9
512	16/06/2022 15:28	Stockpile testing - Suitable for disposal at Burwood Landfill	30.07	25.08	5.36	<LOD	129.78	11.6	6.21
513	16/06/2022 15:28	Stockpile testing - Suitable for disposal at Burwood Landfill	19.31	13.88	6.03	<LOD	144.11	13.22	7.54
514	16/06/2022 15:29	Stockpile testing - Suitable for disposal at Burwood Landfill	20.9	<LOD	8.99	<LOD	170.33	17.09	8.28
515	16/06/2022 15:29	Stockpile testing - Suitable for disposal at Burwood Landfill	30.08	17.17	5.2	<LOD	121.03	18.77	6.43
516	16/06/2022 15:30	Stockpile testing - Suitable for disposal at Burwood Landfill	29.28	16.36	5.25	<LOD	132.94	<LOD	9.65
517	16/06/2022 15:31	Stockpile testing - Suitable for disposal at Burwood Landfill	18.5	<LOD	11.39	<LOD	205.39	19	9.94
518	16/06/2022 15:31	Stockpile testing - Suitable for disposal at Burwood Landfill	12.92	<LOD	11.84	<LOD	195.06	16.61	10.29
519	16/06/2022 15:32	Stockpile testing - Suitable for disposal at Burwood Landfill	12.52	<LOD	11.8	<LOD	205.74	<LOD	15.94
520	16/06/2022 15:32	Stockpile testing - Suitable for disposal at Burwood Landfill	14.52	10.54	6.14	<LOD	164.29	<LOD	11.73
521	16/06/2022 15:33	Stockpile testing - Suitable for disposal at Burwood Landfill	18.51	<LOD	8.02	<LOD	145.62	<LOD	10.64
522	16/06/2022 15:34	Stockpile testing - Suitable for disposal at Burwood Landfill	10.92	<LOD	14.13	<LOD	268.22	<LOD	18.52
523	16/06/2022 15:34	Stockpile testing - Suitable for disposal at Burwood Landfill	8.93	<LOD	16.44	<LOD	260.22	<LOD	21.15
524	16/06/2022 15:34	Stockpile testing - Suitable for disposal at Burwood Landfill	10.52	18.17	9.07	<LOD	250.01	<LOD	16.04
525	16/06/2022 15:36	Stockpile testing - Suitable for disposal at Burwood Landfill	16.51	<LOD	9.04	<LOD	165	<LOD	12.14
526	16/06/2022 15:36	Stockpile testing - Suitable for disposal at Burwood Landfill	14.91	<LOD	11.11	<LOD	191.16	<LOD	15.48
527	16/06/2022 15:37	Stockpile testing - Suitable for disposal at Burwood Landfill	24.48	<LOD	7.3	<LOD	140.03	<LOD	10.09
528	16/06/2022 15:37	Stockpile testing - Suitable for disposal at Burwood Landfill	28.09	<LOD	7.5	<LOD	128.11	15.72	6.75
529	16/06/2022 15:38	Stockpile testing - Suitable for disposal at Burwood Landfill	27.29	12.14	4.75	<LOD	126.26	<LOD	8.96
530	16/06/2022 15:39	Stockpile testing - Suitable for disposal at Burwood Landfill	30.06	9.4	4.47	<LOD	122.25	9.13	5.82
531	16/06/2022 15:42	Stockpile testing - Suitable for disposal at Burwood Landfill	30.08	<LOD	4.9	<LOD	103.02	<LOD	7.61
887	5/07/2022 14:17	Soil suitable to remain in-situ	16.11	<LOD	9.29	<LOD	166.86	<LOD	12.53
888	5/07/2022 14:17	Soil suitable to remain in-situ	30.08	11.27	4.42	<LOD	117.51	<LOD	8.39
889	5/07/2022 14:18	Soil suitable to remain in-situ	26.06	10.91	5.05	<LOD	128.88	10.72	6.45
890	5/07/2022 14:18	Soil suitable to remain in-situ	30.08	<LOD	7.59	<LOD	124.23	13.24	6.7

891	5/07/2022 14:19	Soil suitable to remain in-situ	30.08	13.22	4.43	<LOD	112.08	<LOD	8.19
892	5/07/2022 14:19	Soil suitable to remain in-situ	14.51	<LOD	10.45	<LOD	189.22	17.14	9.57
893	5/07/2022 14:20	Soil suitable to remain in-situ	30.07	13.96	4.68	<LOD	119.29	<LOD	8.68
894	5/07/2022 14:20	Soil suitable to remain in-situ	14.11	<LOD	9.67	<LOD	175.14	<LOD	12.53
895	5/07/2022 14:21	Soil suitable to remain in-situ	24.1	<LOD	10.39	<LOD	199.52	<LOD	14.56
896	5/07/2022 14:22	Soil suitable to remain in-situ	13.71	<LOD	11.18	<LOD	222.02	<LOD	15.37
897	5/07/2022 14:23	Soil excavated and disposed at Burwood Landfill	61.39	16.25	3.7	<LOD	93.22	<LOD	6.74
898	5/07/2022 14:24	Soil excavated and disposed at Burwood Landfill	41.33	18.85	4.63	<LOD	116.04	<LOD	8.32
899	5/07/2022 14:25	Soil suitable to remain in-situ	23.29	12.98	5.58	<LOD	137.45	12	7.02
900	5/07/2022 14:26	Soil excavated and disposed at Burwood Landfill	30.07	28.98	5.27	<LOD	122.95	<LOD	8.59
901	5/07/2022 14:26	Soil suitable to remain in-situ	20.1	<LOD	8.85	<LOD	167.54	<LOD	11.59
902	5/07/2022 14:27	Soil suitable to remain in-situ	18.1	<LOD	9.76	<LOD	167.5	<LOD	12.73
903	5/07/2022 14:27	Soil excavated and disposed at Burwood Landfill	23.69	20.64	5.77	<LOD	141.41	12.56	6.89
904	5/07/2022 14:28	Soil excavated and disposed at Burwood Landfill	12.92	44.36	8.26	<LOD	161.42	<LOD	11.99
905	5/07/2022 14:29	Soil excavated and disposed at Burwood Landfill	21.3	20.17	5.14	<LOD	118.28	<LOD	8.87
906	5/07/2022 14:29	Soil excavated and disposed at Burwood Landfill	19.71	22.94	5.34	<LOD	120.25	<LOD	8.94
907	5/07/2022 14:30	Soil suitable to remain in-situ	16.91	13.66	5.52	<LOD	143.98	<LOD	10.18
908	5/07/2022 14:31	Soil excavated and disposed at Burwood Landfill	4.15	60.12	19.04	<LOD	363.59	<LOD	26.03
909	5/07/2022 14:31	Soil excavated and disposed at Burwood Landfill	8.93	22.27	9.85	<LOD	245.01	<LOD	17.15
910	5/07/2022 14:31	Soil excavated and disposed at Burwood Landfill	3.74	66.77	19.37	<LOD	315.45	<LOD	24.51
911	5/07/2022 14:32	Soil excavated and disposed at Burwood Landfill	26.05	25.62	6.28	<LOD	135.7	22.86	7.38
912	5/07/2022 14:33	Soil suitable to remain in-situ	18.91	<LOD	10.67	<LOD	193.43	<LOD	14.5
913	5/07/2022 14:33	Soil suitable to remain in-situ	16.91	<LOD	11.99	<LOD	239.67	<LOD	15.97
914	5/07/2022 14:34	Soil excavated and disposed at Burwood Landfill	30.05	15.28	5.16	<LOD	135.28	<LOD	9.62
915	5/07/2022 14:34	Soil suitable to remain in-situ	21.3	<LOD	8.86	<LOD	167.87	<LOD	12.11
916	5/07/2022 14:35	Soil suitable to remain in-situ	22.89	<LOD	8.06	<LOD	165.72	<LOD	10.71
917	5/07/2022 14:35	Soil suitable to remain in-situ	14.51	<LOD	10.44	<LOD	197.31	<LOD	13.68
918	5/07/2022 14:36	Soil suitable to remain in-situ	22.89	<LOD	8.01	<LOD	158.57	<LOD	10.59
919	5/07/2022 14:36	Soil suitable to remain in-situ	11.72	<LOD	10.77	<LOD	223.9	<LOD	15.22
920	5/07/2022 14:36	Soil suitable to remain in-situ	13.32	<LOD	11.19	<LOD	217.45	<LOD	14.8
921	5/07/2022 14:37	Soil suitable to remain in-situ	16.11	<LOD	9.01	<LOD	183.58	<LOD	11.68
922	5/07/2022 14:37	Soil suitable to remain in-situ	14.51	<LOD	10.12	<LOD	180.54	<LOD	13.36
923	5/07/2022 14:38	Soil suitable to remain in-situ	22.89	<LOD	7.85	<LOD	155.49	<LOD	10.33
924	5/07/2022 14:38	Soil suitable to remain in-situ	13.33	<LOD	10.71	<LOD	205.55	<LOD	14.09
925	5/07/2022 14:39	Soil suitable to remain in-situ	24.09	10.53	5.04	<LOD	148.29	<LOD	9.64
926	5/07/2022 14:40	Soil suitable to remain in-situ	18.9	<LOD	10.94	<LOD	186.61	<LOD	14.42
927	5/07/2022 14:40	Soil excavated and disposed at Burwood Landfill	8.52	41.65	13	<LOD	253.13	23.11	14.04
928	5/07/2022 14:40	Soil suitable to remain in-situ	15.31	<LOD	10.98	<LOD	224.77	<LOD	14.62
929	5/07/2022 14:41	Soil excavated and disposed at Burwood Landfill	6.54	34.15	14.94	<LOD	321.65	<LOD	24.4
930	5/07/2022 14:41	Soil suitable to remain in-situ	12.92	<LOD	11.21	<LOD	257.2	<LOD	14.26
931	5/07/2022 14:42	Soil suitable to remain in-situ	23.69	<LOD	8.08	<LOD	174.88	<LOD	11.62
932	5/07/2022 14:42	Soil suitable to remain in-situ	16.11	<LOD	10.81	<LOD	188.86	<LOD	13.84
933	5/07/2022 14:43	Soil excavated and disposed at Burwood Landfill	16.83	21.88	10.33	<LOD	224.44	38.4	12.76
934	5/07/2022 14:43	Soil suitable to remain in-situ	24.48	8.97	5.36	<LOD	138.99	<LOD	10.35
935	5/07/2022 14:44	Soil suitable to remain in-situ	22.5	11.69	5.96	<LOD	155.57	<LOD	11.25
936	5/07/2022 14:44	Soil suitable to remain in-situ	16.11	<LOD	8.55	<LOD	162.44	<LOD	11.14
937	5/07/2022 14:45	Soil suitable to remain in-situ	12.92	<LOD	8.9	<LOD	156.88	<LOD	12.1
938	5/07/2022 14:45	Soil suitable to remain in-situ	18.1	<LOD	10.39	<LOD	202.97	<LOD	14.44
939	5/07/2022 14:45	Soil suitable to remain in-situ	16.11	10.4	6.51	<LOD	206.19	<LOD	12.29
940	5/07/2022 14:46	Soil suitable to remain in-situ	20.9	<LOD	8.25	<LOD	155.21	<LOD	11
941	5/07/2022 14:46	Soil suitable to remain in-situ	15.31	<LOD	9.48	<LOD	152.97	<LOD	12.91
942	5/07/2022 14:47	Soil suitable to remain in-situ	15.31	<LOD	6.91	<LOD	125.13	<LOD	9.27
943	5/07/2022 14:47	Soil suitable to remain in-situ	25.29	<LOD	10.36	<LOD	182.83	<LOD	13.88
944	5/07/2022 15:09	Soil suitable to remain in-situ	32.09	<LOD	5.39	<LOD	110.84	<LOD	8.22
945	5/07/2022 15:11	Soil suitable to remain in-situ	26.88	<LOD	7.4	<LOD	129.37	11.48	6.63
946	5/07/2022 15:12	Soil suitable to remain in-situ	20.5	<LOD	8.18	<LOD	136.41	<LOD	11.02
947	5/07/2022 15:13	Soil suitable to remain in-situ	26.49	<LOD	7.26	<LOD	133.77	10.68	6.99
948	5/07/2022 15:15	Soil suitable to remain in-situ	16.91	<LOD	8.38	<LOD	165.92	<LOD	11.2
949	5/07/2022 15:18	Soil suitable to remain in-situ	11.32	<LOD	11.38	<LOD	217.99	<LOD	14.37
950	5/07/2022 15:18	Soil suitable to remain in-situ	22.1	<LOD	7.97	<LOD	146.68	<LOD	10.58
951	5/07/2022 15:19	Soil suitable to remain in-situ	16.51	<LOD	9.21	<LOD	167.38	<LOD	12.6
952	5/07/2022 15:19	Soil suitable to remain in-situ	19.7	<LOD	9.23	<LOD	204.45	<LOD	12.57
953	5/07/2022 15:20	Soil suitable to remain in-situ	29.28	8.42	5.2	<LOD	139.68	<LOD	10.22
954	5/07/2022 15:20	Soil excavated and disposed at Burwood Landfill	30.37	14.01	5.92	<LOD	145.94	13.73	7.45
955	5/07/2022 15:21	Soil excavated and disposed at Burwood Landfill	14.12	24.7	7.81	<LOD	198.24	<LOD	13.37
956	5/07/2022 15:21	Soil excavated and disposed at Burwood Landfill	2.11	79.14	28.46	<LOD	606.02	<LOD	34.43
957	5/07/2022 15:21	Soil excavated and disposed at Burwood Landfill	7.73	18.87	10.55	<LOD	304.58	<LOD	18.4
958	5/07/2022 15:22	Soil suitable to remain in-situ	10.92	<LOD	12.89	<LOD	223.99	<LOD	17.63
959	5/07/2022 15:22	Soil suitable to remain in-situ	16.11	13.49	7.49	<LOD	201	<LOD	13.98
960	5/07/2022 15:23	Soil excavated and disposed at Burwood Landfill	16.51	22.49	7.58	<LOD	186.92	<LOD	13.09
961	5/07/2022 15:24	Soil excavated and disposed at Burwood Landfill	30.08	14.51	5.03	<LOD	131.39	<LOD	9.41
962	5/07/2022 15:25	Soil suitable to remain in-situ	14.91	<LOD	10.23	<LOD	200.07	<LOD	13.52
963	5/07/2022 15:25	Soil suitable to remain in-situ	19.7	<LOD	8.98	<LOD	160.74	12.54	8.01

964	5/07/2022 15:26	Soil excavated and disposed at Burwood Landfill	26.89	26.68	6.11	<LOD	141.91	<LOD	10.3
965	5/07/2022 15:27	Soil suitable to remain in-situ	30.07	<LOD	8.87	<LOD	185.04	<LOD	12.31
966	5/07/2022 15:28	Soil suitable to remain in-situ	23.29	<LOD	10.06	<LOD	199.55	<LOD	13.06
967	5/07/2022 15:28	Soil suitable to remain in-situ	18.5	<LOD	10.11	<LOD	193.55	<LOD	13.33
968	5/07/2022 15:29	Soil suitable to remain in-situ	20.5	<LOD	9.44	<LOD	174.86	<LOD	12.28
969	5/07/2022 15:33	Soil excavated and disposed at Burwood Landfill	4.14	19.12	11.6	<LOD	293.21	<LOD	19.64
970	5/07/2022 15:33	Soil excavated and disposed at Burwood Landfill	4.14	43.03	19.64	<LOD	527.21	<LOD	28.6
971	5/07/2022 15:34	Soil excavated and disposed at Burwood Landfill	13.72	70.49	13.55	381.64	203.45	<LOD	18.42
972	5/07/2022 15:35	Soil excavated and disposed at Burwood Landfill	8.12	31.78	13.37	<LOD	293.62	<LOD	21.4
973	5/07/2022 15:35	Soil excavated and disposed at Burwood Landfill	5.73	73.48	30.28	<LOD	575.21	<LOD	41.93
974	5/07/2022 15:37	Soil excavated and disposed at Burwood Landfill	6.53	88.05	18.68	423.88	277.34	<LOD	21.9
975	5/07/2022 15:37	Soil excavated and disposed at Burwood Landfill	5.34	106.35	26.86	<LOD	467.38	<LOD	33.04
976	5/07/2022 15:37	Soil suitable to remain in-situ	12.92	<LOD	14.19	<LOD	245.93	19.78	12.74
977	5/07/2022 15:40	Soil suitable to remain in-situ	16.5	<LOD	11.14	<LOD	193	19.05	9.96
978	5/07/2022 15:40	Soil suitable to remain in-situ	14.91	<LOD	11.09	<LOD	203.45	16.35	9.9
979	5/07/2022 15:41	Soil suitable to remain in-situ	10.53	<LOD	14.36	<LOD	250.8	<LOD	19.05
980	5/07/2022 15:43	Soil suitable to remain in-situ	23.69	<LOD	7.04	<LOD	130.28	<LOD	9.31
981	5/07/2022 15:43	Soil suitable to remain in-situ	12.51	<LOD	9.72	<LOD	188.53	<LOD	13.42
982	5/07/2022 15:45	Soil suitable to remain in-situ	30.08	8.81	4.23	<LOD	108.41	<LOD	8.27
983	5/07/2022 15:47	Soil suitable to remain in-situ	15.31	<LOD	8.94	<LOD	166.24	<LOD	11.48
984	5/07/2022 15:48	Soil suitable to remain in-situ	19.7	<LOD	7.06	<LOD	131.14	<LOD	9.59
985	5/07/2022 15:54	Soil excavated and disposed at Burwood Landfill	22.1	14.58	6.45	<LOD	178.93	<LOD	11.89
986	5/07/2022 15:54	Soil excavated and disposed at Burwood Landfill	10.52	21.15	9.31	<LOD	217.66	<LOD	16.55
987	5/07/2022 15:54	Soil suitable to remain in-situ	9.72	<LOD	14.46	<LOD	261.01	<LOD	18.27
988	5/07/2022 15:58	Soil suitable to remain in-situ	16.51	<LOD	10.15	<LOD	196.72	<LOD	13.8
989	5/07/2022 15:58	Soil suitable to remain in-situ	14.92	11.31	6.9	<LOD	201.24	<LOD	12.97
990	5/07/2022 15:59	Soil suitable to remain in-situ	24.49	<LOD	7.86	<LOD	156.11	<LOD	10.48
991	5/07/2022 15:59	Soil suitable to remain in-situ	30.07	<LOD	7.35	<LOD	134.85	13.82	6.79
992	5/07/2022 16:07	Soil suitable to remain in-situ	12.51	<LOD	10.11	<LOD	175.35	<LOD	13.94
993	5/07/2022 16:15	Soil suitable to remain in-situ	13.71	<LOD	10.35	<LOD	191.61	<LOD	13.81
994	5/07/2022 16:16	Soil suitable to remain in-situ	12.11	<LOD	11.75	<LOD	223.85	<LOD	15.46
995	5/07/2022 16:17	Soil suitable to remain in-situ	16.12	9.48	6.19	<LOD	159.41	<LOD	12
996	5/07/2022 16:18	Soil suitable to remain in-situ	23.3	<LOD	9.04	<LOD	174.98	<LOD	12.64
997	5/07/2022 16:19	Soil suitable to remain in-situ	20.89	<LOD	9.06	<LOD	198.58	<LOD	12.55
998	5/07/2022 16:20	Soil suitable to remain in-situ	14.11	18.47	9.28	<LOD	218.44	19.94	11.38
999	5/07/2022 16:21	Soil suitable to remain in-situ	16.51	<LOD	10.77	<LOD	239.51	<LOD	15.38
1000	5/07/2022 16:22	Soil suitable to remain in-situ	30.08	<LOD	4.69	<LOD	98.59	<LOD	6.81

Appendix F – Laboratory Reports

Analytica Laboratories Limited
Ruakura Research Centre
10 Bisley Road
Hamilton 3214, New Zealand
Ph +64 (07) 974 4740
sales@analytica.co.nz
www.analytica.co.nz

Certificate of Analysis

Momentum Environmental Ltd
19 Robertsons Road, Kirwee
Christchurch 7671

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

Lab Reference: 22-24777
Submitted by: Hollie Griffith
Date Received: 07/07/2022
Testing Initiated: 7/07/2022
Date Completed: 13/07/2022
Order Number:
Reference: 595

Sampling Site: 60 Leeston Dunsandel Road, Leeston

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		VS1 wall	VS2 wall	VS3 base	VS4 base	VS5 wall
	Date Sampled		05/07/2022	05/07/2022	05/07/2022	05/07/2022	05/07/2022
Analyte	Unit	*Reporting Limit*	22-24777-1	22-24777-2	22-24777-3	22-24777-4	22-24777-5
Arsenic	mg/kg dry wt	*0.125*	15.0	8.9	11	11	12
Cadmium	mg/kg dry wt	*0.005*	0.18	0.17	0.16	0.22	0.16
Chromium	mg/kg dry wt	*0.125*	24.1	19.5	27.7	21.5	20.3
Copper	mg/kg dry wt	*0.075*	14.2	10.2	11.2	11.5	10.8
Lead	mg/kg dry wt	*0.25*	30.3	32.3	28.8	23.6	26.7
Nickel	mg/kg dry wt	*0.05*	14.2	12.6	13.9	13.8	12.4
Zinc	mg/kg dry wt	*0.05*	88.0	76.6	83.2	85.7	77.5

Heavy Metals in Soil

	Client Sample ID		VS6 wall	VS7 base	VS8 wall	VS9 wall	VS10 base
	Date Sampled		05/07/2022	05/07/2022	05/07/2022	05/07/2022	05/07/2022
Analyte	Unit	*Reporting Limit*	22-24777-6	22-24777-7	22-24777-8	22-24777-9	22-24777-10
Arsenic	mg/kg dry wt	*0.125*	15.1	15.6	16.4	13.9	11
Cadmium	mg/kg dry wt	*0.005*	0.19	0.20	0.19	0.16	0.17
Chromium	mg/kg dry wt	*0.125*	21.7	21.7	22.4	18.9	20.7
Copper	mg/kg dry wt	*0.075*	14.0	13.4	12.4	11.5	10.3
Lead	mg/kg dry wt	*0.25*	25.8	24.9	25.2	22.3	31.6
Nickel	mg/kg dry wt	*0.05*	12.3	12.9	13.4	11.4	13.8
Zinc	mg/kg dry wt	*0.05*	91.2	90.1	91.5	80.8	83.6

Heavy Metals in Soil

	Client Sample ID		VS11 wall	VS12 wall	VS13 wall	VS14 base	VS15 base
	Date Sampled		05/07/2022	05/07/2022	05/07/2022	05/07/2022	05/07/2022
Analyte	Unit	*Reporting Limit*	22-24777-11	22-24777-12	22-24777-13	22-24777-14	22-24777-15
Arsenic	mg/kg dry wt	*0.125*	16.5	12	4.6	19.7	6.8
Cadmium	mg/kg dry wt	*0.005*	0.14	0.20	0.036	0.16	0.037
Chromium	mg/kg dry wt	*0.125*	22.5	21.6	15.8	23.3	16.9
Copper	mg/kg dry wt	*0.075*	10.8	10.5	11.8	12.2	12.7
Lead	mg/kg dry wt	*0.25*	25.3	20.7	13.3	24.0	13.5
Nickel	mg/kg dry wt	*0.05*	14.6	12.1	13.9	13.7	13.7
Zinc	mg/kg dry wt	*0.05*	88.2	78.1	50.7	118	50.8

Heavy Metals in Soil

	Client Sample ID		VS16 wall
	Date Sampled		05/07/2022
Analyte	Unit	*Reporting Limit*	22-24777-16
Arsenic	mg/kg dry wt	*0.125*	8.3
Cadmium	mg/kg dry wt	*0.005*	0.047
Chromium	mg/kg dry wt	*0.125*	20.2
Copper	mg/kg dry wt	*0.075*	14.0
Lead	mg/kg dry wt	*0.25*	16.2
Nickel	mg/kg dry wt	*0.05*	13.7
Zinc	mg/kg dry wt	*0.05*	63.5

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.

Sandra Mathews, B.Eng.
Laboratory Technician

Appendix G – Disposal Documentation

Christchurch City Council

Christchurch City Council
Special Waste Permit

Permit number 22/088

To be completed by Environmental Health Team

Permission is given to (Company Name)	Palmers Transport Ltd
to dispose of	200 (Units) m3
Of product description	Soil
Received from (source/company)	60 Leeston Dunsandel Road
At	Burwood Landfill Site
Resource Consent Number (if applicable)	Selwyn RC225368
Suitable for surface cover?	☑ Yes ☐ No
Time	To be confirmed with the Landfill Kiosk Operator 03 383 1331, no less than 2 working days before commencement of disposal.
Date	17/06/2022
Signature	Agnes van der Erf

122-040

660518

140.34

Charge Palmers

660518

Christchurch City Council

CHRISTCHURCH CITY COUNCIL

Civic Offices: 53 Hereford Street, Christchurch 8011
AccountsReceivable ,
P O Box 73015, Christchurch, 8154
Telephone (03)941-8999 Fax (03)941-8984
Email debtmanagement@ccc.govt.nz Web www.ccc.govt.nz

G.S.T. Reg. No. 53-198-554

TAX INVOICE

PALMERS TRANSPORT LIMITED
PALMERS TRANSPORT LIMITED
6 Wilson Street
Southbridge 7602

Date:	29.07.2022
Customer No:	4176976
Account No:	900000456467
Invoice No:	100004503515
Payment Due By:	20.08.2022
Page No:	1 of 1

REFERENCE No.	DESCRIPTION	AMOUNT
22/1001053	Burwood Landfill Weighbridge Dumping Charges at Burwood Landfill for the period 1/07/2022 to 31/07/2022 as per attached schedule Enquiries to Grant Gillard on DDI 941 8272 grant.gillard@ccc.govt.nz	1,176.91

Where the amount invoiced has not been paid by the stated due date, the Council may commence debt recovery action.
The Council reserves the right to charge interest, payable from the date the debt became due, and recover costs incurred in pursuing recovery of the debt as outlined in the Fees and Charges Schedule of the Council's Long Term Plan.

You can pay the total now payable by internet banking to the following account:
02 0800 0044765 03

Please enter your invoice number in the particulars field, your account number in the code field, and your customer number in the reference field.

TOTAL (inclusive of GST)	1,176.91
GST content of this invoice	153.51

Christchurch City Council

CHRISTCHURCH CITY COUNCIL

REMITTANCE ADVICE

Civic Offices: 53 Hereford Street, Christchurch 8011
AccountsReceivable ,
P O Box 73015, Christchurch, 8154
Telephone (03)941-8999 Fax (03)941-8984
Email debtmanagement@ccc.govt.nz

PALMERS TRANSPORT LIMITED
PALMERS TRANSPORT LIMITED
6 Wilson Street
Southbridge 7602

Customer No.	4176976
Account No.	900000456467
Invoice No.	100004503515
Payment Due By	20.08.2022
Total Now Payable	1,176.91

CHRISTCHURCH CITY COUNCIL

Civic Offices: 53 Hereford Street, Christchurch 8011
AccountsReceivable ,
P O Box 73015, Christchurch, 8154
Telephone (03)941-8999 Fax (03)941-8984
Email debtmanagement@ccc.govt.nz Web www.ccc.govt.nz

G.S.T. Reg. No. 53-198-554

TAX INVOICE

PALMERS TRANSPORT LIMITED
PALMERS TRANSPORT LIMITED
6 Wilson Street
Southbridge 7602

Date:	30.06.2022
Customer No:	4176976
Account No:	900000456467
Invoice No:	100004319160
Payment Due By:	20.07.2022
Page No:	1 of 1

REFERENCE No.	DESCRIPTION	AMOUNT
22/858275	Burwood Landfill Weighbridge Dumping Charges at Burwood Landfill for the period 1/06/2022 to 30/06/2022 as per attached schedule Enquiries to Grant Gillard on DDI 941 8272 grant.gillard@ccc.govt.nz	9,122.51

flow 510

Where the amount invoiced has not been paid by the stated due date, the Council may commence debt recovery action.
The Council reserves the right to charge interest, payable from the date the debt became due, and recover costs incurred in pursuing recovery of the debt as outlined in the Fees and Charges Schedule of the Council's Long Term Plan.

You can pay the total now payable by internet banking to the following account:
02 0800 0044765 03

Please enter your invoice number in the particulars field, your account number in the code field, and your customer number in the reference field.

TOTAL (inclusive of GST)	9,122.51
GST content of this invoice	1,189.89

CHRISTCHURCH CITY COUNCIL
REMITTANCE ADVICE

Civic Offices: 53 Hereford Street, Christchurch 8011
AccountsReceivable ,
P O Box 73015, Christchurch, 8154
Telephone (03)941-8999 Fax (03)941-8984
Email debtmanagement@ccc.govt.nz

PALMERS TRANSPORT LIMITED
PALMERS TRANSPORT LIMITED
6 Wilson Street
Southbridge 7602

Customer No.	4176976
Account No.	900000456467
Invoice No.	100004319160
Payment Due By	20.07.2022
Total Now Payable	9,122.51

BURWOOD RESOURCE RECOVERY PARK

This is a Tax Invoice

GST Number : 106-854-270

Docket Number : 465710
Date In : 20/06/2022 12:40:41 pm
Date Out : 20/06/2022 01:19:59 pm

Transporter : Palmers Transport Ltd
Vehicle : PTL03T

Product : CCC Special Soil Class

First Weight : 25,420 Kg
Second Weight : 6,460 Kg
Net Weight : 18,960 Kg

Job Number: CCC
Job Address: Misc
Billing Customer: CCC Landfill Customer
Manifest Number: 660518

Thankyou.
For all account enquiries,
please phone 03 941 8999

BURWOOD RESOURCE RECOVERY PARK

This is a Tax Invoice

GST Number : 106-854-270

Docket Number : 465686
Date In : 20/06/2022 09:17:29 am
Date Out : 20/06/2022 10:17:13 am

Transporter : TPI Unknown Customer
Vehicle : PTL04
Product : CCC Special Soil Class

First Weight : 23,600 Kg
Second Weight : 12,420 Kg
Net Weight : 11,180 Kg

Job Number: CCC
Job Address: Misc
Billing Customer: CCC Landfill Customer
Manifest Number: 660518

Thankyou.
For all account enquiries,
please phone 03 941 8999

BURWOOD RESOURCE RECOVERY PARK

This is a Tax Invoice

GST Number : 106-854-270

Docket Number : 465687
Date In : 20/06/2022 09:21:08 am
Date Out : 20/06/2022 10:18:22 am

Transporter : TPI Unknown Customer
Vehicle : PTL04T
Product : CCC Special Soil Class

First Weight : 24,680 Kg
Second Weight : 7,060 Kg
Net Weight : 17,620 Kg

Job Number: CCC
Job Address: Misc
Billing Customer: CCC Landfill Customer
Manifest Number: 660518

Thankyou.
For all account enquiries,
please phone 03 941 8999

BURWOOD RESOURCE RECOVERY PARK

This is a Tax Invoice

GST Number : 106-854-270

Docket Number : 465688
Date In : 20/06/2022 09:22:01 ar
Date Out : 20/06/2022 10:19:52 ar

Transporter : TPI Unknown Customer
Vehicle : PTL07
Product : CCC Special Soil Class

First Weight : 25,000 Kg
Second Weight : 12,340 Kg
Net Weight : 12,660 Kg

Job Number: CCC
Job Address: Misc
Billing Customer: CCC Landfill Customel
Manifest Number: 660518

Thankyou.
For all account enquiries,
please phone 03 941 8999

BURWOOD RESOURCE RECOVERY PARK

This is a Tax Invoice

GST Number : 106-854-270

Docket Number : 465709
Date In : 20/06/2022 12:39:50 pr
Date Out : 20/06/2022 01:19:21 pr

Transporter : Palmers Transport Ltd
Vehicle : PTL03

Product : CCC Special Soil Class

First Weight : 24,740 Kg
Second Weight : 11,420 Kg
Net Weight : 13,320 Kg

Job Number: CCC
Job Address: Misc
Billing Customer: CCC Landfill Customel
Manifest Number: 660518

Thankyou.
For all account enquiries,
please phone 03 941 8999

BURWOOD RESOURCE RECOVERY PARK

This is a Tax Invoice

GST Number : 106-854-270

Docket Number : 465684
Date In : 20/06/2022 08:54:03 ar
Date Out : 20/06/2022 09:29:53 ar

Transporter : Palmers Transport Ltd
Vehicle : PTL01T

Product : CCC Special Soil Class

First Weight : 26,160 Kg
Second Weight : 7,040 Kg
Net Weight : 19,120 Kg

Job Number: CCC
Job Address: Misc
Billing Customer: CCC Landfill Customel
Manifest Number: 660518

Thankyou.
For all account enquiries,
please phone 03 941 8999

BURWOOD RESOURCE RECOVERY PARK

This is a Tax Invoice

GST Number : 106-854-270

Docket Number : 466393
Date In : 18/07/2022 07:46:08 ar
Transporter : Palmers Transport Ltd
Vehicle : PTL07
:
Product : CCC Special Soil Class

First Weight : 12,340 Kg
Second Weight : 24,380 Kg
Net Weight : 12,040 Kg

Job Number: CCC
Job Address: Misc
Billing Customer: CCC Landfill Customer
Manifest Number: 660518

Thankyou.
For all account enquiries,
please phone 03 941 8999

BURWOOD RESOURCE RECOVERY PARK

This is a Tax Invoice

GST Number : 106-854-270

Docket Number : 465689
Date In : 20/06/2022 [illegible]:18 ar
Date Out : 20/06/2022 10:20:20 ar

Transporter : TPI Unknown Customer
Vehicle : PTL07T
Product : CCC Special Soil Class

First Weight : 25,300 Kg
Second Weight : 6,980 Kg
Net Weight : 18,320 Kg

Job Number: CCC
Job Address: Misc
Billing Customer: CCC Landfill Customer
Manifest Number: 660518

Thankyou.
For all account enquiries,
please phone 03 941 8999

BURWOOD RESOURCE RECOVERY PARK

This is a Tax Invoice

GST Number : 106-854-270

Docket Number : 465683
Date In : 20/06/2022 08:53:31 ar
Date Out : 20/06/2022 09:29:16 ar

Transporter : Palmers Transport Ltd
Vehicle : PTL01
:
Product : CCC Special Soil Class

First Weight : 23,020 Kg
Second Weight : 12,160 Kg
Net Weight : 10,860 Kg

Job Number: CCC
Job Address: Misc
Billing Customer: CCC Landfill Customer
Manifest Number: 660518

Thankyou.
For all account enquiries,
please phone 03 941 8999