Subject:	Leeston Stormwater Bypass Contaminated Land Review
Attention:	Daniel Meehan, Emma Taylor
From:	Louise Wilson
Date	17 August 2022
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1 Introduction

Selwyn District Council (SDC) are undertaking a project called Leeston Stormwater Bypass in Leeston, Canterbury. The stormwater bypass alignment intersects part of 60 Leeston Dunsandel Road (Lot 2 DP 365379), which is listed on Environment Canterbury's Listed Land Use Register (LLUR) as a Hazardous Activities and Industries List (HAIL) site. As part of the Leeston Stormwater Bypass project, SDC is planning to purchase a 17m wide (0.3853 ha) strip of land along the northern boundary of 60 Leeston Dunsandel Road. This land is required for construction of the bypass channel. However, contaminated site investigations undertaken to date report that contamination is present within soil in this 17m wide strip.

SDC has engaged Taylor Collaborations Ltd (Collaborations) to undertake a review of the contaminated site investigation reports currently available for 60 Leeston Dunsandel Road (site map in **Appendix A**).

1.1 Purpose

The purpose of this review is to:

- Assess potential risks to the Leeston Stormwater Bypass project based on the findings of the reviewed contaminated site investigation reports.
- Consider what additional information regarding soil contamination may be required.
- Consider possible options for dealing with the currently identified contaminated soil.
- Recommendations for next steps relating to the assessment and management of contaminated or potentially contaminated soil within 60 Leeston Dunsandel Road.

1.2 Reviewed Documents

The following relevant documents were provided by SDC and reviewed by Collaborations:

- Malloch Environmental Limited Site Contamination Risk Detailed Site Investigation Report and Remedial Action Plan, 60 Leeston Dunsandel Road, dated October 2021.
- Momentum Environmental Limited Site Contamination Risk Supplementary Detailed Site Investigation Report and Remedial Action Plan, 60 Leeston Dunsandel Road, dated May 2022.
- Momentum Environmental Limited Assessment of Environmental Effects for 60 Leeston Dunsandel Road.
- RC225368 Resource Consent Decision Letter.
- RC225368 Planners Report.
- Aurecon Leeston North Stormwater Bypass Stage 4 Design Drawings, 505193-0000-DRG-CC-4000 to -4403, Rev B dated 12 November 2020.
- Stormwater Bypass Requirement on Howson block SDC map dated 08 June 2022.

- Leeston Stormwater Flood Bypass Scheme Draft Land Use Consent Application to Selwyn District Council, prepared by The Planning Consultancy, dated 07 July 2022.

2 Proposed work

It is understood that the following steps are proposed for the Leeston Stormwater Bypass project, within the 60 Leeston Dunsandel Road boundary:

- SDC will purchase a 17m strip across the northern boundary of 60 Leeston Dunsandel Road from the current property owners, John and Sandra Howson and Michael Lay (**Figure 1**).
- The volume of earthworks required within the bypass channel that intersect 60 Leeston Dunsandel Road is estimated by SDC to be approximately 2,500m^3.
- Existing consents for the project restrict time of construction to between October and March. SDC wish to undertake construction during the summer of 2022/2023 summer and estimate that on site construction will take approximately eight weeks.
- An SDC appointed contractor will undertake the following preparation works (as stated on Aurecon drawing number 505193-000-DRG-CC-4101-B and -CC-4400-B, note that these drawings may be subject to changes):
    - Removal of an existing fence on the southern boundary of the 17m strip;
    - Removal of existing trees and stumps from site, approximately 10m south of the southern boundary of the 17m strip; and
    - Creation of a 5m x 5m compacted AP65 hardstand area approximately 1 m south of the southern extent of the 17m strip (on the western site boundary). All topsoil and silt down to sandy gravel to a maximum of 300mm depth will be removed. Pad height is required to be RL 24.1m.
- The SDC appointed contractor will construct the stormwater bypass channel (**Figures 1 and 2**) within the 17m strip (as stated on Aurecon drawing number 505193-000-DRG-CC-4101-B and -CC-4400-B). This will include:
    - Excavation of the existing soils to up to a maximum of 1.2m below existing ground level within the approximately 14m wide bypass channel. The maximum excavation depth will be at the centre point of the low flow channel and the ground profile will slope up on a 1H:4V grade to either side of the channel;
    - The channel surface at Chainage 0-5 (at the western end of the channel near the control gate) will be constructed by placement of geotextile over subgrade (assumed to be in situ soil) and a minimum 300mm thick rip rap layer placed over the surface.
    - The channel surface from Chainage 5-226 (within the 60 Leeston Dunsandel Road boundary) will be constructed using a 100mm topsoil layer over subgrade and hydroseeding of the full channel width.
    - No bund will be created on the northern boundary of the channel as this is an overland flow path for stormwater entering the channel. A bund was proposed on the southern boundary of the channel however the property owners have advised they do not wish this to be constructed due to their planned residential development on site.

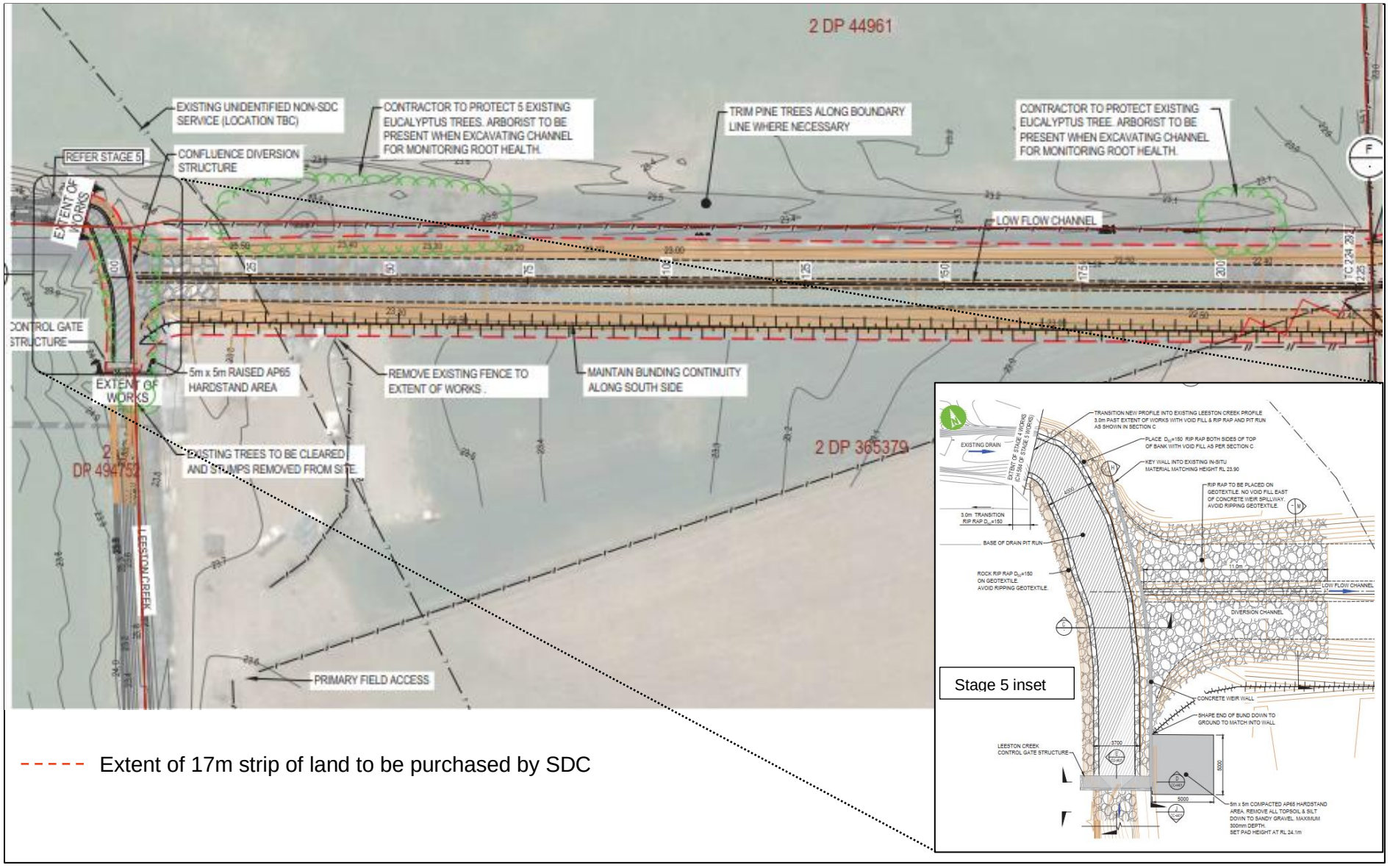
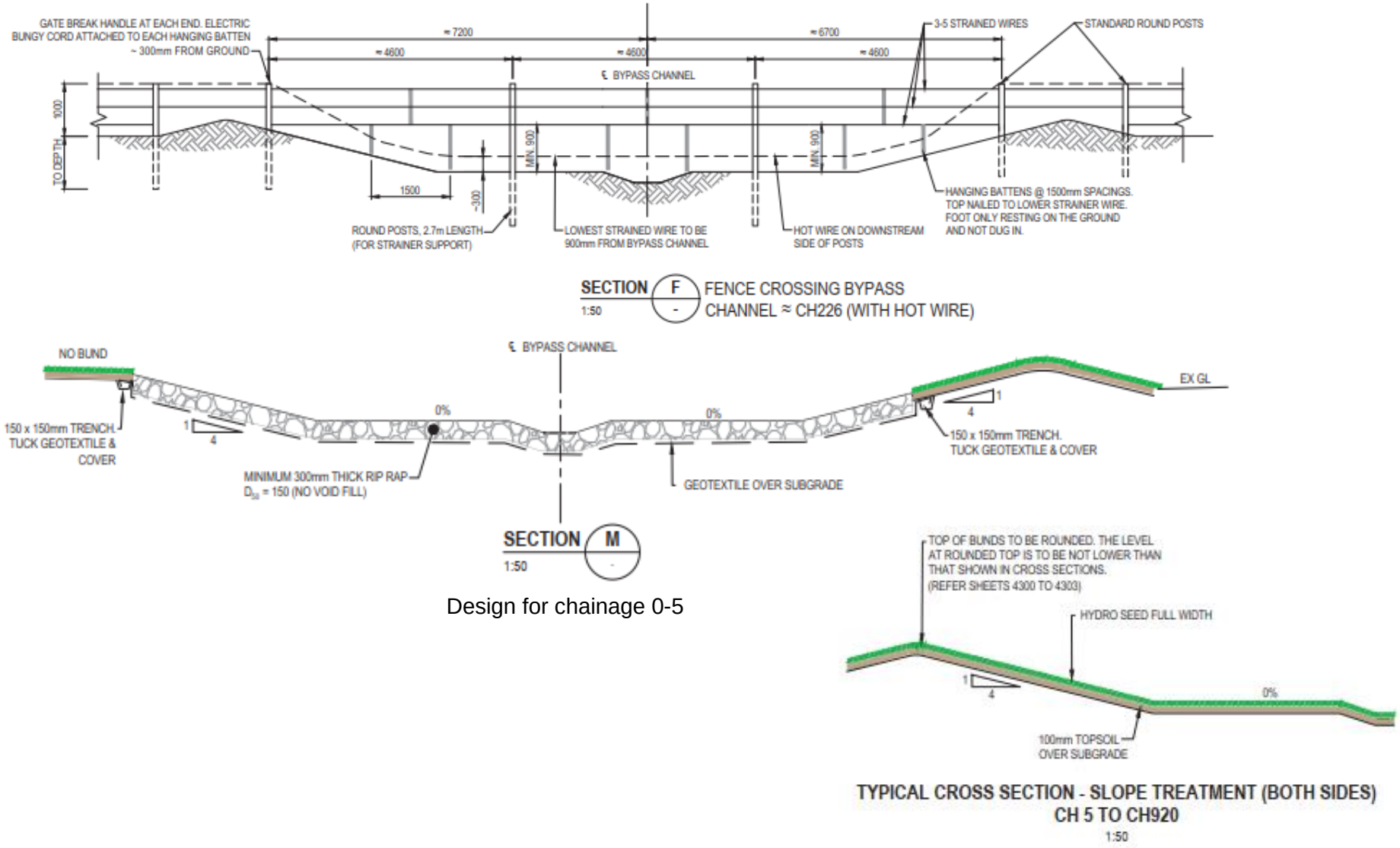


Figure 1 Excerpts from Aurecon design drawings showing the 17m strip of land to be purchased, proposed bypass design within 60 Leeston Dunsandel Road and construction details



Design for chainage 0-5

Figure 2 Proposed channel construction details and final surfaces within 60 Leeston Dunsandel Road property boundary

3 Known contamination summary

The two Detailed Site Investigations[1,2] assessed the land for the purposes of proposed residential development at the site. Soil up to a depth of 250mm below ground level (bgl) was sampled and primarily analysis for heavy metals, with a smaller number of samples analysed for asbestos, polycyclic aromatic hydrocarbons (PAH), semi volatile organic compounds (SVOC) and volatile organic compounds (VOC). The results showed that soil contamination was generally centred around burn pits in the northern part of the site, intersecting the 17m strip of land to be purchased by SDC. A map showing the soil sampling locations and proposed remedial areas is presented in **Figure 3**. The Momentum Environmental DSI states that excavation and off-site disposal is considered to be the most viable remediation option for the contaminated areas, assuming that the goal of remediation is to ensure that the remaining soils are suitable for residential use across the entire area. The main contaminants of concern are arsenic and chromium.

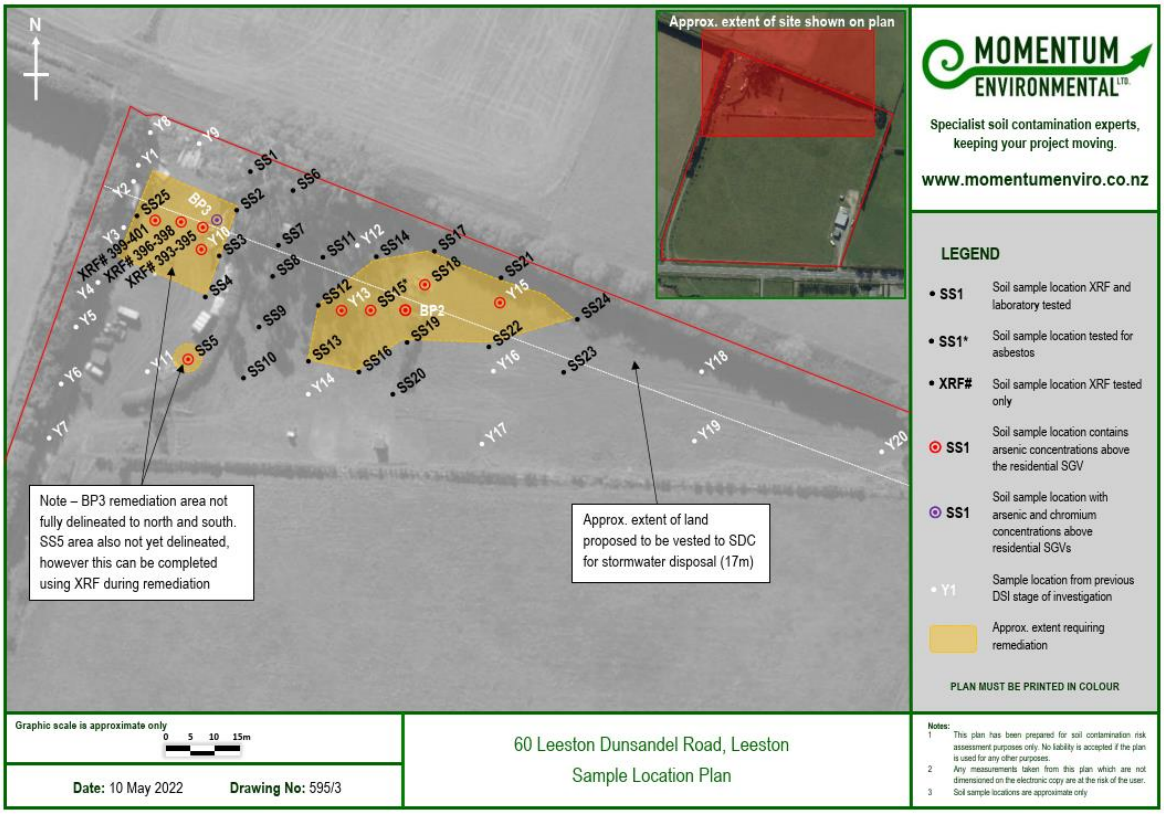


Figure 3 Map from Momentum Environmental DSI showing soil sampling locations, contamination results and the 17m strip of land to be purchased by SDC (white dotted line).

[1] Malloch Environmental Limited Site Contamination Risk Detailed Site Investigation Report and Remedial Action Plan, 60 Leeston Dunsandel Road, dated October 2021.
[2] Momentum Environmental Limited Site Contamination Risk Supplementary Detailed Site Investigation Report and Remedial Action Plan, 60 Leeston Dunsandel Road, dated May 2022.

4 Key considerations for Leeston Bypass Project

4.1 HAIL status, known contamination and potential soil management options

It is considered that the previous investigations were suitable for the purposes of the proposed residential development. However, as the planned excavation for the channel will reach up to 1.2m bgl, further investigation and consenting specifically for the excavation of soil for the bypass channel is required. The following should be noted:

- As 60 Leeston Dunsandel Road is a HAIL site with confirmed contamination, the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS 2012) applies.
- The proposed excavation within the 60 Leeston Dunsandel Road boundary is approximately 2,500m^3 over an area of approximately 3,842m^2. This exceeds the permitted activity threshold for soil disturbance, therefore consent under the NESCS will be required for the works to occur.
- The consent application will require a supporting Detailed Site Investigation which provides results for the soil that will be excavated.
- The DSI should consider the effects to both human health receptors (construction workers and future end users e.g., recreational users) and ecological receptors as the bypass may become habitat for birds and/or aquatic life.
- The excavated 2,500m^3 of soil will need to be managed. This could be via removal to an appropriate offsite location, or retaining the material onsite through the creation of a soil bund or similar on the southern boundary of the channel.
- The appropriate management option will become clear after the DSI is completed and contamination (if present) is understood. Some potential soil management scenarios could include:
    - If soil is contaminated in discrete locations (e.g., the burn pits already identified), these areas could be excavated and disposed of at an appropriately licensed landfill facility. A site validation assessment would then be undertaken to confirm the remaining soil is not contaminated, and this uncontaminated remaining soil then relocated to an adjacent SDC owned site, or retained within the 17m strip of the 60 Leeston Dunsandel Road site.
    - If widespread contamination is present, disposal of all 2,500m^3 to an appropriately licensed facility. The costs for this would be dependent on the levels of contamination.
    - If widespread contamination is present, all 2,500m^3 could potentially be retained on site within the 60 Leeston Dunsandel Road boundary by creating a bund or similar. This would involve the contaminated soils being encapsulated with a suitable cap (e.g. geotextile layer with cover of ~300mm cleanfill/topsoil). A method such as this would break the pathway between the contamination source and potential future receptors (e.g., recreational users walking along the channel).
    - If soil is confirmed to not be contaminated, and is of a silty nature, it could possibly be utilised at SDC's Killinchy Pit (corner Helserton and Kings Roads, 8km from the site) for use as capping material.

- The appointed contractor will be required to follow a Contaminated Site Management Plan (CSMP) for works. The CSMP will contain procedures for managing potentially contaminated soils, including:
    - Site management procedures, including site record keeping and monitoring.
    - Environmental management procedures, including erosion and sediment control measures, management of soil stockpiles and minimisation of the generation of dust.
    - Protocols for discovery of unexpected contamination.
    - Health and safety protection measures, noting that the chosen contractor(s) may also have a separate Safety Plan.
    - An example of the standard controls that would be in place under the CSMP are included in Section 12 of the Momentum Environmental Ltd DSI.

4.2 Effects of planned remediation in residential area on Stormwater Bypass Project

The property owners have consent under the NESCS (RC225368) to undertake the remediation proposed by Momentum Environmental Ltd. It is unknown when this work is planned to occur. The proposed remediation intersects the 17m strip of land to be purchased by SDC in burn pit locations BP2 and BP3 (see **Figure 3**).

The remediation methodology is as follows (as stated on page 19 of Momentum Environmental Ltd DSI):

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.*

Anecdotal information and a photograph (**Figure 4**) provided by Daniel Meehan indicate that the burn pits may be deeper than 250mm bgl, potentially 300-400mm deep. This has not been verified on site.

Figure 4 Excavated burn pit ground profile (source: Daniel Meehan)

4.2.1 Summary of potential effects of remediation

- The Momentum Environmental Ltd DSI notes that *'all remediation of contaminated soils has the risk of extending further out or deeper due to hidden areas of contamination'*. This statement, and the fact that the remedial works will be overseen by a Contaminated Land Specialist who is operating the portable XRF, means that it is considered unlikely that the remediation works would adversely impact the planned earthworks for the bypass channel.
- In addition, the remedial target for the burn pits is the NESCS Residential 10% produce guideline criteria which is more conservative the both the NESCS Recreational and Commercial/industrial outdoor worker guidelines. This means that residual concentrations of contaminants in the remediated areas are unlikely pose a risk to the construction workers or future recreational users of the bypass channel.
- It is recommended that a copy of the Site Validation Report is provided to SDC prior to purchase of the 17m strip of land (if the remedial work has been undertaken by this time).

4.3 Contamination risk for Stage 5

Stage 5 of the Leeston Stormwater Bypass project extends westward to Harmans Road. The alignment intersects the following land parcels, neither of which are recorded as HAIL sites on the LLUR (as at 20 July 2022):

- 178 Harmans Road (comprising Lot 2 DP 494752 and Lot 2 DP 44961).
- 160 Harmans Road (Lot 1 DP 494752).

198 Harmans Road (Lot 1 DP 44961) includes a G3 landfill site, the former Ellesmere Country rubbish dump known as Gilberts Pit. It is located approximately 250m north of the Stage 5 alignment and is therefore not considered to present a risk to the project, as there is no plan to disturb soil within 198 Harmans Road.

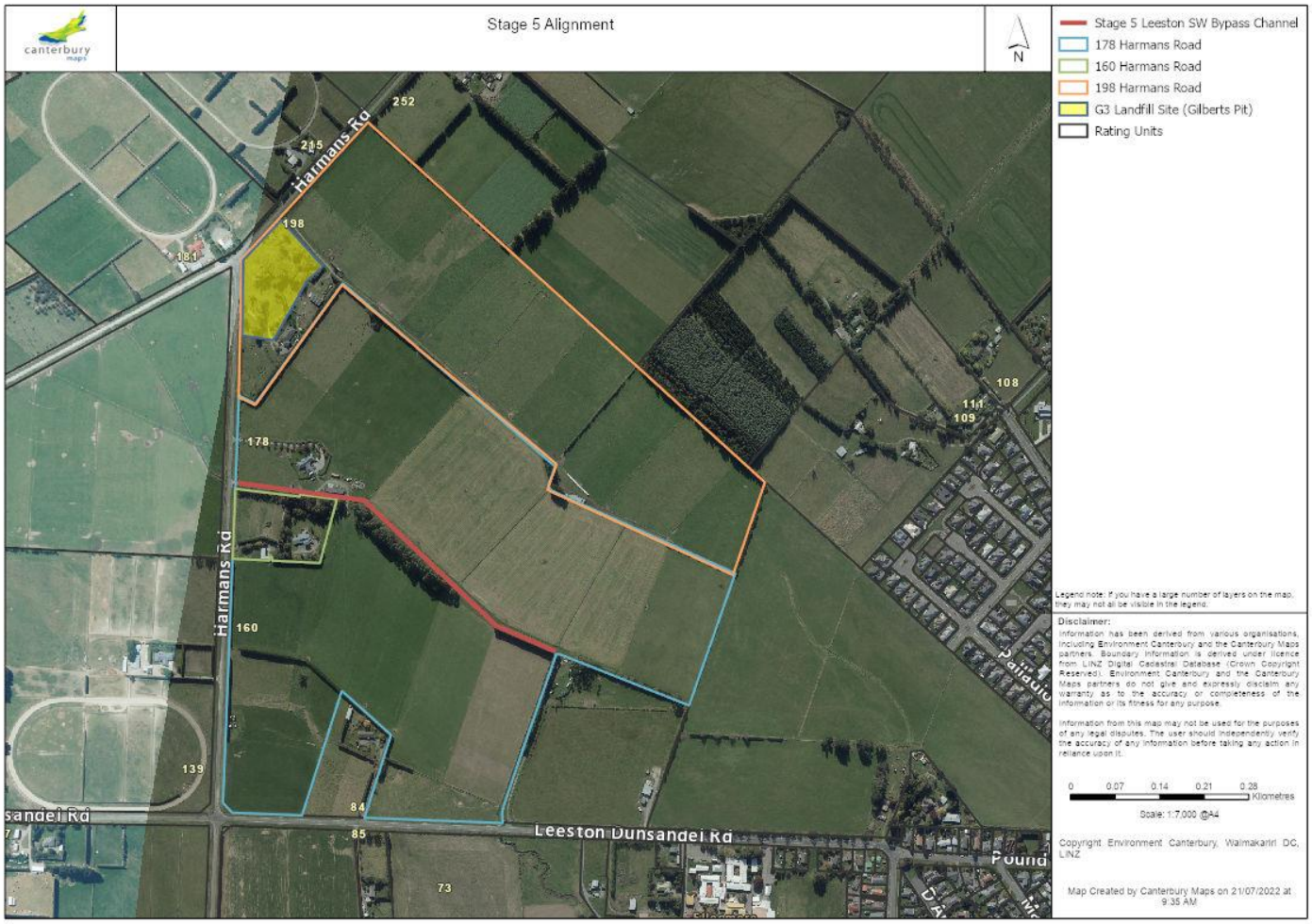


Figure 5 Stage 5 alignment of stormwater bypass channel and boundaries of land parcels intersected, showing closest HAIL site 250m north of the alignment (Gilberts Pit, within 198 Harmans Road).

5 Summary

A summary of this findings of this contaminated site review are as follows:

- The NESCS applies to excavation works for the Leeston Stormwater Bypass.
- A Detailed Site Investigation should be undertaken of the channel area (17m strip within 60 Leeston Dunsandel Road).
- An NESCS consent application is being applied for as part of the overall bypass scheme consent.
- Soil management may include offsite disposal or management onsite (e.g., bunds) depending on the DSI results and costs for various options.

- The remedial works proposed by Momentum Environmental Ltd for residential purposes are not considered likely to adversely affect the planned bypass channel excavation works. A copy of the Site Validation Report should be provided to SDC prior to land purchase if the remedial works are undertaken before this occurs.
- There are no currently listed HAIL sites that are likely to impact the proposed earthworks as part of Stage 5 of the Leeston Stormwater Bypass.

6 Limitations

This report has been produced based on a scope of work agreed between Selwyn District Council and Taylor Collaborations Limited. Revision 1 of this report has been prepared for use by The Planning Consultancy Limited as part of a land use consent application. Use of this report by any other third party is at that party's own risk as it may be outside of the report's intended purpose. Information provided and utilised within this memorandum is for the purposes and level of accuracy as agreed between Taylor Collaborations Limited and Selwyn District Council. Should any additional documents become available to Selwyn District Council that could influence the recommendations made in this memo, the recommendations may need to be updated.

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Appendix A – SDC Stormwater Bypass Requirement Map

the propertygroup

Imagery sourced from: **LINZ Data Services**
Property boundaries sourced from Land Information NZ. Crown Copyright reserved. Property boundaries accuracy: +/-1m in urban areas, +/-30m in rural areas.
Coordinate System: NZGD 2000 New Zealand Transverse Mercator
Datum: NZGD 2000 // This map was produced with ArcGIS Pro (Esri).

J L & S L Howson, M J K Lay

Stormwater Bypass Requirement

Version 2

Selwyn DISTRICT COUNCIL

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