4SIGHT CONSULTING

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CMW Geosciences

TUUMATA PROPOSED PLAN CHANGE

For CMW Geosciences Limited

Contamination Assessment

November 2022

REPORT INFORMATION AND QUALITY CONTROL

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EXECUTIVE SUMMARY

4Sight Consulting Ltd (4Sight) has been engaged by CMW Geosciences Ltd (CMW or the client) to undertake a contamination assessment (CA) of an area known as the Ruakura-Tuumata Structure Plan Area in Ruakura, Hamilton (herein referred to as 'the Site'), to assess potential implications for a proposed plan change (PPC). The PPC is seeking to rezone the Site from industrial to provide a mixed use zone for medium density urban residential development, a suburban centre and associated infrastructure. The key findings of this assessment are:

- The Site has been used for as an agricultural research farm over the period for which historical records are available (1938 – present). This includes livestock grazing, livestock management, hay/silage growing and specific areas of agricultural research including animal investigation and weed management. Additionally, landfilling, waste disposal and solvent disposal to ground have also been undertaken associated with the farming activity. The potential for isolated impacted areas associated with these activities is considered to be high;
- A variety of investigations have been conducted across the Site from 2013 to 2021. These historic investigations have included desk based assessments, preliminary site investigations and detailed site investigations. These investigations have confirmed the presence of contaminants at selected locations across the Site, including historic landfills and historic building removals, however investigations undertaken to date are considered limited in scope and have not fully addressed all potential contaminating activities;
- There is the potential that ongoing use of the Site for AgResearch pasture/vegetation trials has resulted in additional areas of potential environmental concern since the previous investigations undertaken;
- Further investigation will be required to identify known data gaps and to characterise areas of potential human health and environmental concern through targeted soil sampling, and to prepare reports to support the consent process associated with the future land use change, subdivision and development, following the PPC;
- On the basis of known and potential contamination at the Site, and the likely soil disturbance associated with residential development following the PPC, resource consent under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) will be required. The activity status of the consent will be dependent on the extent of investigation completed. Based on the historic investigations completed to date, and assuming further investigation is completed to address data gaps, it is considered likely that the application can be made as a restricted discretionary activity;
- It is considered likely that remediation will be required at selected locations across the Site to facilitate future land use change, subdivision and development following the PPC. The scope and nature of remediation will be confirmed following completion of DSI report/s at the Site, and is considered likely to be achieved using standard remediation practices (i.e. offsite disposal, on Site encapsulation, reuse in suitable land use areas, or a combination of these approaches). On this basis, known and potential contamination at the Site is considered highly unlikely to restrict or preclude a change of land use from rural to residential, commercial and/or open space following remediation; and
- Consent under the Waikato Regional Plan will be required if remedial work is undertaken. It is considered likely that this will be necessary to support the proposed development.

1 INTRODUCTION

4Sight Consulting Ltd (4Sight) has been engaged by CMW Geosciences Ltd (CMW or the client) to undertake a contamination assessment (CA) of an area known as the Ruakura-Tuumata Structure Plan Area in Ruakura, Hamilton (herein referred to as 'the Site'), to assess potential implications for the proposed plan change (PPC). The PPC is seeking to rezone the Site from industrial to provide a mixed use zone for medium density urban residential development, a suburban centre and associated infrastructure.

The Site has been used for activities listed on the Ministry for the Environment's Hazardous Activities and Industries List (HAIL), and on this basis, the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) is considered applicable to the PPC at the Site. Land covered in the NESCS is defined in regulation 5(7) as:

A piece of land that is described by one of the following:

a) An activity or industry described in the HAIL is being undertaken on it:

b) An activity or industry described in the HAIL has been undertaken on it:

c) It is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it.

This report has been prepared in general accordance with Ministry for Environment (MfE) Contaminated Land Management Guidelines No.1 Reporting on Contaminated Sites in New Zealand (revised 2021) (CLMG No. 1) and is intended to fulfil the requirements of a Preliminary Site Investigation (PSI).

1.1 Scope of Works

The scope of this CA has included the following:

- Conduct an assessment to determine the nature and extent of potentially contaminating activities that have occurred or currently are occurring at the Site, including:
  - A review of selected publicly available information for the Site, including council files and aerial photographs to determine whether or not any activities or industries on the HAIL are, have been, or might have been undertaken on the Site;
  - Complete a Site visit to observe key areas of potential environmental concern; and
  - A review of existing environmental reports for the Site.
- Preparation of this CA to:
  - Summarise the findings of the previous contaminated site assessment reports;
  - Comment on the adequacy, suitability, and technical robustness of the reports, and identify potential gaps (if any) in understanding of contaminated land matters relevant to the Site;
  - Identify and map areas of potential environmental concern that may influence the suitability of the proposed PPC;
  - Identify potential consent requirements under the NESCS and Waikato Regional Plan; and
  - Provide recommendations for further contaminated land investigation to support development of the Site.

1.2 Report Structure

The report has been structured in the following way:

- **Section 2** presents Site details, including a list of land parcels that comprise the Site and a summary of geology and hydrology;
- **Section 3** presents a summary of Site history obtained through review of selected background information, including council records, and historic aerial imagery;

- **Section 4** presents a summary of existing environmental reports in tabular format. This includes an assessment of relevance to the Site and technical robustness of the reports, and identification of potential data gaps;
- **Section 5** summarises the findings of the Site visit**;**
- **Section 6** summarises areas of known and potential contamination across the Site;
- **Section 7** presents recommendations for further work;
- **Section 8** provides a high level regulatory assessment; and
- **Section 9** presents report conclusions.

2 SITE DETAILS

The Site includes two existing Lots and is bound to the west by Wairere Drive, to the north by existing residential dwellings, to the east by the proposed eastern transport corridor roading network and to the south by farmland associated with the AgResearch Ruakura campus. Table 1 presents a summary of land parcels, and these are also shown in Figure 1. The Site is approximately 58.3 ha in area.

Table 1: Address and Site information

Address	Legal Description	Lot Area (ha)
0 Wairere Drive	LOT 2 DP 548526	196.3067
0 Powells Road	LOT 1 DP 548526	9.5493
The Site (approximately)		58.3

2.1 Land Use – Current and Proposed

The Site is zoned Ruakura Industrial Park zone in the Hamilton City Council (HCC) Operative District Plan (2017), and is currently in use for agricultural and farming operations.

The Site is proposed for rezoning to provide for medium density urban residential development (Tuumata Residential Zone), with a suburban centre (Tuumata Neighbourhood Centre), adjoining mixed use areas, greenspaces, stormwater ponds and associated access roads.

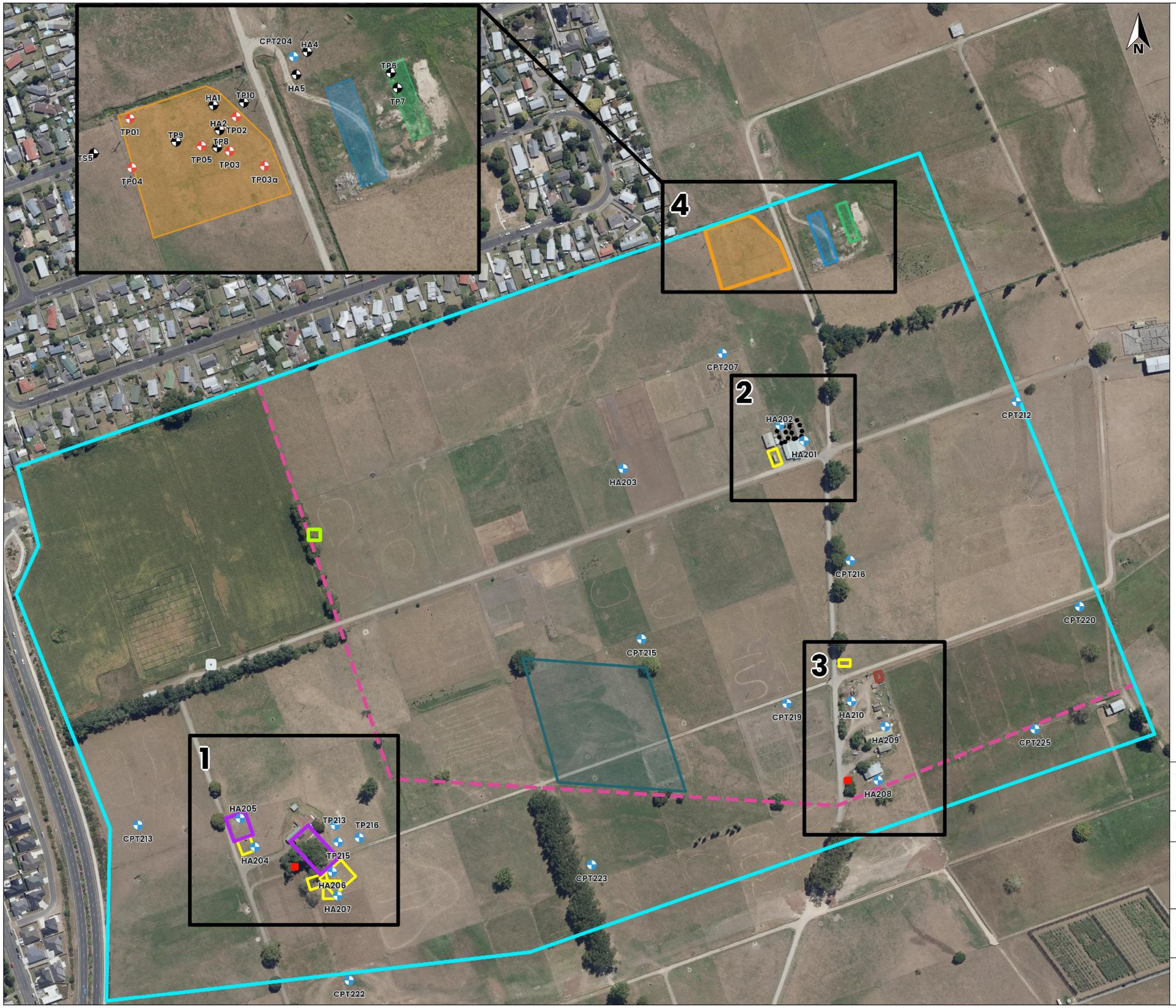
2.2 Geology and Hydrology

The Institute of Geological and Nuclear Sciences (GNS) 1:250,000 online geological map shows the regional geology consists of:

- Majority of the Site: Late Pleistocene river deposits described as cross-bedded pumice sand, silt and gravel with interbedded peat; and
- Isolated areas in the south and east: Neogene sedimentary rocks described as pumiceous mud, silt, sand and gravel with muddy peat beds; rhyolite pumice, including non-welded ignimbrite, tephra and alluvial.

The closest surface water body is the Waikato River approximately 2.2 km west of the Site.

WRC ground water maps identified four groundwater bores present within the Site, with bore depths ranging from 15 m to 22.87 m. An additional four groundwater bores are present within 500 m of the Site, ranging from 4 m to 16.95 m. The use of these bores is not specified in the WRC ground water maps.



Legend

- Focus Areas
- Soil Sampling Locations (T&T, 2016)
- Soil Sampling Locations (T&T, 2018)
- Soil sampling locations (AECOM, 2019)
- Approximate Site Boundary
- Potential Former Sheep Dips
- Potential Filling/Farm Dumping Location
- Infilled Former Drain
- Green Waste Disposal Pit
- Timber Burial Pit
- Southern Landfill Area
- Transformer Building
- Transmission Tower
- Former Potential Trial Area
- Greenhouses
- Waste Burning Areas
- Former Buildings

0 50 m 100 m

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Produced by **Datanest.earth**

Title: Site Location Plan, Focus Areas and Features

Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1 Size: A3
Date: 21-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:3470	Version: Final

3 SITE HISTORY

To understand the history of the Site and particularly the nature and location of any potentially contaminating activities, a review of publicly available information for the site was undertaken. This included searches of:

- Current and historic titles;
- Property files from Hamilton City Council (HCC);
- Land Use Information Register (LUIR) from Waikato Regional Council (WRC);
- Selected historical aerial photographs available through Retrolens and Google Earth; and
- Hazardous Substances and Incidents report, provided by the Environmental Protection Agency (EPA).

3.1 Council Records

3.1.1 Current and Historic Titles

Title information from current and historic titles which is relevant to this investigation is summarised in Table 2. Copies of the titles are provided in Appendix A.

Table 2. Current and Historic Title Information

Address	CT Identifier	Legal Description	Relevant Title Information
0 Wairere Drive	939233	Lot 2 Deposited Plan 548526 and Section 4 Survey Office Plan 519316	▪ Fee Simple Title; ▪ Original owners Ruakura Limited. ▪ Subject to Part IV A Conservation Act 1987. ▪ Subject to Section 11 Crown Minerals Act 1991. ▪ Subject to Section 241(2) Resource Management Act 1991 (affects DP548526). ▪ Transfer to TGH Property Limited on 5/11/2021; and ▪ Transfer to TGH Ruakura Industrial Development Limited on 23/12/2021.
0 Powells Road	939232	Lot 1 Deposited Plan 548526	▪ Fee Simple Title; ▪ Original owners Ruakura Limited; ▪ Subject to Part IV A Conservation Act 1987; ▪ Subject to Section 11 Crown Minerals Act 1991; ▪ Transfer to TGH Property Limited on 5/11/2021; and ▪ Transfer to TGH Ruakura Industrial Development Limited on 23/12/2021.

3.1.2 Land Use Information Register

A search of the LUIR, maintained by WRC, was requested and results were provided on 15 March 2021. The LUIR provides a detailed register of properties known to be contaminated on the basis of chemical measurements, or potentially contaminated on the basis of past land use and is provided in Appendix B.

WRC confirmed that the wider property associated with the Site appears on the LUIR with a classification of 'Verified HAIL - Limited Sampling' due to past and current land use for HAIL activities including:

- G3. Landfill sites;
- A10. Persistent pesticide bulk storage or use;
- F4. Motor vehicle workshops;
- A3. Commercial analytical laboratory sites;
- A17. Storage tanks or drums for fuel, chemicals or liquid waste;

- A1. Agrichemicals including spray contractors commercial premises; and
- A6. Fertiliser manufacture or bulk storage.

These activities are associated with the Ruakura Research Station, Ag Research Ruakura Campus and AgriQuality. The response did not indicate which of these activities were associated with the Site.

The LUIR identified a number of Site investigation reports including the following:

- Ruakura Hub Site Wide T&T Management Plan 2021 (DOC# 21993179);
- Ruakura Hub Spine Road T&T DSI 2021 (DOC# 21991010);
- 310 Ruakura Rd Expressway DSI 2016 (DOC# 11087206);
- Ruakura LDP Contaminated Land Report 2017 (DOC# 10493713);
- 310 & 215 Ruakura Rd T&T Report (2) 2015 (DOC# 10396577);
- 310 & 215 Ruakura Rd T&T Report 2015 (DOC# 10396439); and
- 310 & 215 Ruakura Rd Site Management Plan 2015 (DOC# 10395372).

Of the reports listed, the Ruakura Hub Site Wide Management Plan (T&T, 2021) and Ruakura Hub Spine Road DSI (T&T, 2021) were considered relevant to the Site and a review and summary of these reports are provided in Section 4 below.

3.1.3 Property File Review

The property file and associated property information for both 0 Wairere Drive and 0 Powells Road was requested by 4Sight, however a response by HCC on 14 March 2022 identified that the property files did not contain any Building Permits/Consents. However, consent 011.2020.00007161.001 (dated 25 March 2020) for the subdivision of 0 Powells Road from 0 Wairere Drive was noted.

3.1.4 HCC HAIL Register

HAIL information for the Site was requested and received from HCC on 18 March 2022. The response can be found in Appendix C and identified the following:

<u>0 Wairere Drive</u>

Status – Contaminated Land

- HAIL category A10 (use of horticultural chemicals during general pastoral use, cropping, or orchards);
- HAIL category I (multiple, including: fertiliser use, isolated infilling and presence of fill, use of lead based paints and use of asbestos containing materials);
- HAIL category A8 (former spray race use, a potential sheep dip);
- HAIL category G5 (waste pits, potential for unknown offal pit locations);
- HAIL categories A17 and D5 (yard area associated with engineering workshop use);
- HAIL category A6 (historic fertiliser or agrichemical storage);
- HAIL category B2 (presence of electrical transformers);
- HAIL category A18 (aboveground storage of treated timber); and
- HAIL category H (offal pits, engineering workshop, asbestos in buildings, use of lead- based paints and galvanisation, abattoir activities and spray drift from horticultural, pastoral and orchard activities).

These identified HAIL activities were associated with the following reports:

- Preliminary Site Investigation for Ground Contamination, Eastern Transport Corridor – Ruakura Inland Port Development (T&T, 2021); and
- Detailed Site Investigation for Ground Contamination, Spine Road – Ruakura Inland Port Development (T&T, 2021).

0 Powells Road

Status – Partially Investigated

- G3 - Landfill sites;
- G5 - Waste disposal to land (excluding where biosolids have been used as soil conditioners);
- A10 - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds; and
- A1 - Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application.

These identified HAIL activities were associated with the report Powells Road Residential Development, Ground Contamination investigation (T&T, 2016).

3.1.5 Hazardous Substances and Incidents Report

The Environmental Protection Agency (EPA) maintained a list of reported hazardous substance incidents over the period July 2006 – December 2011. A review of this information identified one incident on Ruakura Road that had the potential to be associated with the Site:

- Ruakura Road, Newstead, 26 February 2010 – Mercury spill of less than 10 litres at an Agricultural Laboratory, associated with improper movement of a hazardous material container. The information identified that the spill was attended by the fire service and media.

A search of local media sources found an article from the Waikato Times identifying the spill of up to 10 mls of mercury spilt requiring three staff to be decontaminated at the Dairy NZ Ruakura Research Centre at 605 Ruakura Road approximately 3.5 km southeast of the Site.

3.2 Historic Aerial Photograph Review

The aerial photograph review summary is presented in Table 3 below, and copies of historic aerials are presented in Appendix D. Areas of specific focus and detail as described in the review below are identified on Figure 1.

Table 3. Aerial Photograph Review

Year and Reference	Observations
1938 - Retrolens (black & white, earliest available image)	▪ One small building is present at Focus Area 1, with a small dark depression present directly north of the building; ▪ Focus Area 2 is vacant and in pasture; ▪ Focus Area 3 is generally vacant and in pasture; ▪ A dark pond/depression is located within the area of the Southern Landfill in Focus Area 4, some soil disturbance is noted at the western and southern sides of the depression; ▪ The remaining area of the Site is primarily in pasture; ▪ A farm drain is present laterally across the Site; and ▪ The area surrounding the Site is primarily in rural agricultural use. Residential development is present further to the west and north of the Site, while orcharding is present to the southwest. The AgResearch centre appears to be present to the south of the Site consisting of a number of grouped buildings.
1948 - Retrolens (black & white)	▪ Animal pens have been constructed to the north-western side of the building in Focus Area 1, with a channelised race present. The small depression is no longer present in this area, however some minor soil disturbance is noted east of the pens, with a small ground structure present in this area too; ▪ A small building is present to the north of Focus Area 1, with a transmission tower now present east of the building. A small area of soil disturbance is present further north of Focus Area 1; ▪ No significant change to Focus Area 2;

	▪ A small structure is present in the north of Focus Area 3; ▪ The pond within the area of the Southern Landfill in Focus Area 4 appears to have been enlarged with some additional disturbance on the western side; ▪ No significant change across the wider Site; and ▪ The area surrounding the Site is still primarily in rural agricultural use. Residential development is present further to the west.
1953 - Retrolens (black & white)	▪ The minor soil disturbance and small ground structure are no longer present east of the pens in Focus Area 1; ▪ The small area of soil disturbance further north of Focus Area 1 is no longer visible; ▪ No significant change to Focus Area 2; ▪ The small structure is no longer present in the north of Focus Area 3; ▪ A new small building is located in the corner of a paddock to the east of Focus Area 3; ▪ The pond within the area of the Southern Landfill in Focus Area 4 appears to have been partially drained. There appears to be some disturbance to the east of this area likely associated with a new drainage channel; and ▪ The area surrounding the Site is still primarily in rural agricultural use. Residential development is present further to the west.
1967 - Retrolens (black & white)	▪ A new large building has been constructed at the northern end of the animal pens in Focus Area 1. Another small building and further animal pens with a channelised race have also been constructed to the north-west of the existing ones, with a small structure to the east of the original pens; ▪ A new building is present at the end of the farm track to the north of Focus Area 1; ▪ No significant change to Focus Area 2; ▪ A small building is now located in Focus Area 3, with small animal pens attached to the south of the building; ▪ The former pond area and area to the north in Focus Area 4 has been subject to earthworks (potential for use as the landfill), with stockpiled material present at this area; and ▪ Residential development has started to occur south of Powells Road to the north of the Site and west of Wairere Drive adjacent the north-west portion of the Site. The AgResearch Centre has increased in size significantly with a number of additional buildings.
1971 - Retrolens (black & white)	▪ No significant change to Focus Area 1, 2 and 3; ▪ The landfilling activity in Focus Area 4 appears to have ceased and appears to be grassed; and ▪ Further residential development has occurred north and west of the Site. The AgResearch Centre has increased in size with a number of additional buildings.
1974 - Retrolens (black & white)	▪ The main pen area and the building and the southern end of the main pens are no longer present in Focus Area 1, with the removal appearing relatively recent. Smaller new pens replaced them on the southern side of the northern building; ▪ A small building has been constructed in Focus Area 2; ▪ The drain within and to the east of Focus Area 3, and in the north-west of the Site has been infilled and is no longer present; ▪ No significant change to Focus Area 4; ▪ Further residential development has occurred north, west and south of the Site. The AgResearch Centre has increased in size with a number of additional buildings.
1979 - Retrolens (black & white)	▪ The smaller new pens on the southern side of the northern building in Focus Area 1 appear to have been closed in, and a small building is present to the south; ▪ A new long building has been constructed on the western side of the existing building in Focus Area 2;

	▪ Focus Area 3 is being developed with a cleared area directly north the existing building; ▪ No significant change to Focus Area 4; ▪ The remaining drain between Focus Areas 1 and 3 has been infilled and is no longer present; and ▪ Further residential development has occurred north, west and south of the Site with the rest of the area surrounding the site is still primarily in rural agricultural use.
1981 - Retrolens (black & white)	▪ No significant change to Focus Area 1; ▪ A new building has been constructed on the eastern side of the long building in Focus Area 2; ▪ A new long building is now present within Focus Area 3. The cleared area appears to now contain stockpiled material; ▪ No significant change to Focus Area 4; and ▪ Residential land use north, west and south of the Site with the rest of the area surrounding the site is still primarily in rural agricultural use.
1991 - Retrolens (black & white)	▪ The small building in the south of Focus Area 1 has been covered by a tree and is not visible; ▪ Two new buildings have been constructed on the western side of the buildings in Focus Area 2. ▪ A new building is now present within Focus Area 3 just south of the long building. The cleared yard area still appears to contain stockpiles of material; ▪ No significant change to Focus Area 4; and ▪ The AgResearch Centre has increased in size with a number of additional buildings.
1995 – Retrolens (black & white)	▪ The pens and building on the western side of Focus Area 1 are no longer present, with a very small patch of soil disturbance present in the east; ▪ An additional building has been constructed slightly west of the existing buildings in Focus Area 2; ▪ No significant changes to Focus Areas 3 and 4; and ▪ The AgResearch Centre has a number of additional buildings. Residential land use north, west and south of the Site with the rest of the area surrounding the Site is still primarily in rural agricultural use.
2008 – Google Earth (Colour)	▪ The small patch of soil disturbance in the east of Focus Area 1 is more visible; ▪ A small cleared area is present in the east of Focus Area 2; ▪ Miscellaneous equipment is now being stored in the north of Focus Area 3; ▪ No significant change to Focus Area 4; and ▪ No significant changes to the Site surroundings.
2015 – Google Earth (Colour)	▪ No significant change to Focus Areas 1, 2 and 3; ▪ A new area of disturbance and stockpiling of material is occurring in the east of Focus Area 4; and ▪ The AgResearch Centre has increased in size significantly with a number of additional buildings to the north west and south.
2020 – LINZ (Colour)	▪ No significant change to Focus Areas 1 and 2; ▪ Miscellaneous equipment is still being stored in the north of Focus Area 3; ▪ The area of disturbance and stockpiled material in Focus Area 4 has been vegetated; ▪ Several areas across the Site appear to have been subject to have been recently subject to AgResearch vegetation trials; and ▪ No significant change to the Site surroundings.

3.3 Oblique Photograph Review

Oblique aerial photographs sourced from the Alexander Turnbull Library are presented in Appendix E, and are described in Table 4 below.

Table 4. Oblique Photograph Review

Year and Reference	Observations
1958 - Ruakura, Waikato Region. Whites Aviation Ltd: Photographs. Ref: WA-46228. Alexander Turnbull Library, Wellington, New Zealand. /records/32054537 1958	▪ This photograph depicts Focus Area 1 and shows the small and large animal pens with channelised runs in the middle of each and associated buildings. Soil disturbance/ground structures are noted on the left side of the large pens (eastern side); and ▪ A barn is noted in the foreground of the image (north of Focus Area 1).
1959 - Ruakura, Waikato Region. Whites Aviation Ltd: Photographs. Ref: WA-51678. Alexander Turnbull Library, Wellington, New Zealand. /records/32972198 1959	▪ Buildings and associated pens are present on the far right hand side of the image at Focus Area 1; ▪ A demarcated plot is present in the centre of the image (between Focus Areas 1 and 3); ▪ Focus Area 4 is identified on the bottom left hand side of the image, with a pond present in this area (Southern Landfill); and ▪ The remaining area of the Site is generally in pasture with many small paddocks noted in the foreground utilised for sheep grazing.

4 EXISTING REPORT REVIEW

A number of technical reports have been prepared in relation to the Site. 4Sight has been provided with copies of the following:

- Ruakura Development Preliminary Site Inspection Report (OPUS, June 2013);
- Powells Road Residential Development, Ground Contamination investigation (T&T, September 2016);
- Tramway SHA, Preliminary Geotechnical and Ground Contamination Assessment (T&T, November 2018);
- Ruakura Northern Development Contamination Assessment (4Sight, August 2019);
- Proposed Powells Road Subdivision, Additional Contaminated Land Investigation (AECOM, October 2019);
- Ruakura Inland Port Development, Detailed Site Investigation for Ground Contamination – Spine Road (T&T, October 2021); and
- Ruakura Inland Port Development, Site Management Plan for Ground Contamination (T&T, October 2021).

A detailed summary of each of these technical reports, as they apply to potential contamination at the Site, is presented in Table 5. Our assessment and gap analysis of the information is also presented in a tabular format in Table 5. A summary of soil sampling analytical data is present in Table 6. A summary of the areas for some of the specific reports is presented in Figure 1.

Overall, the following is noted in relation to actual and potential soil contamination at the Site based on review of historic environmental investigations, and potential data gaps:

- The Site has been used for as an agricultural research farm over the period for which historical records are available (1938 – present). This includes livestock grazing, livestock management, hay/silage growing and specific areas of agricultural research including animal investigation and weed management. Additionally, landfilling, waste disposal and solvent disposal to ground have also been undertaken associated with the farming activity. The potential for isolated impacted areas associated with these activities is considered to be high;
- A variety of investigations have been conducted across the Site from 2013 to 2021. These historic investigations have included desk based assessments, preliminary site investigations and detailed site investigations. These investigations have confirmed the presence of contaminants at selected locations across the Site, including historic landfills and historic building removals, however investigations undertaken to date are considered limited in scope and have not fully addressed all potential contaminating activities;
- There is the potential that ongoing use of the Site for AgResearch pasture/vegetation trials has resulted in additional areas of potential environmental concern since the previous investigations undertaken;
- There are a number of localised activities which have been conducted at the Site which are known to have resulted in contamination of soil. These include:

- Historic landfill activities, with deposited materials including general farm refuse and construction wastes.

- There are a number of activities which have been historically conducted or are currently being conducted across the Site with the potential to have resulted in contamination of soil. These activities include:
  - Use of the Site for agricultural research trials with potential for persistent pesticide and heavy metal contamination;
  - Filling of the former farm drain at the Site, and within a small area in the north of the Site;
  - Existing buildings and farm buildings where there is potential for impact to soil associated with hazardous building materials (asbestos and lead) or hydrocarbons or other chemicals associated with workshop and laboratory activities;
  - Greenhouses, with potential for persistent pesticide and heavy metal contamination;
  - Sheep dips, with potential for pesticide and heavy metal contamination;
  - Electricity transformers, with potential for hydrocarbon and potential use of PCB containing oils;
  - Electrical transmission tower, with potential for contaminants associated with tower maintenance activities (heavy metals);
  - Storage and use of agricultural and horticultural chemicals;
  - Solvent disposal areas (within the Southern Landfill);
  - Historic building demolition and removals, with potential for use of hazardous building material; and
  - Burn pile within concrete bunkers at the Site, with potential for heavy metal, hydrocarbon and asbestos contamination.

Table 5. Historic Report and Gap Analysis Summary

Report	Report Summary	Gap Analysis/4Sight Assessment
Ruakura Development Preliminary Site Inspection Report (OPUS, June 2013)	A Preliminary Site Investigation was undertaken by OPUS international in June 2013 across a 600 ha area as part of a proposed Ruakura development, which included the entirety of the Site. The key area investigated during the Opus PSI associated with this CA was identified as the 'Business Zone north of AgResearch', and encompassed the entire Site. Key findings relevant to the Site are as follows: ▪ The Site is mainly comprised of open level pasture with some rolling hills, agricultural farmland, farming related structures and facilities; ▪ The Site has been in operation as a farming research centre since around the 1940's. AgResearch predominantly use the land to support farm livestock. Insecticides / pesticides / herbicides have been utilised on site as part of farming operations. Storage and mixing of these chemicals is primarily within the AgResearch centre workshops area, outside of the Site boundary; ▪ A Selected Land Use Register (SLUR) and HAIL search through WRC and HCC, respectively, identified the AgResearch Centre and Farm area as verified HAIL – Limited Sampling; ▪ There is a cordoned off burial pit for waste timbers / vegetation in the northern part of the Site (Focus Area 4). The pit is approximately 30 m long by 12 m wide and 4 m deep and contains a variety of timbers, both treated / untreated, and wood shavings. There is undulating ground south of the pit up to a fence line; ▪ A paddock area west of the current burial pit had formerly been used as both a landfill and for solvent burning operations. The solvent burning operations comprised excavating a short shallow trench, pouring in liquid solvent type wastes and then burning them off in the pit / backfilling. This was apparently an accrued historical process (not done since prior 1980); ▪ An area of open pasture in the west part of the Site bordering Wairere Drive (formerly Hamilton Ring Road) was formerly utilised as orchards; ▪ A former weed laboratory is present in the northern part of the TGH land (Focus Area 2). The laboratory includes a chemical store area and enclosed laboratory units. The laboratory was no longer in use but was utilised as a weed kill testing area; ▪ Other structures present on the farmed areas of the Site are generally farm type outbuildings such as hay barns, sheds. The following potential contaminant sources were identified for the Site: ▪ Burial pit, including metal equipment, oil and solvent containers / drums, ashes, painted timbers with the potential for TPH, PAH, SVOCs and heavy metals; ▪ Solvent burn trenches including potential for TPH, PAH, SVOCs and heavy metals (Focus Area 4); ▪ Landfill in northern portion, including potential for TPH, PAH, SVOCs, heavy metals, asbestos, herbicides and pesticides (Focus Area 4); ▪ Weed kill test laboratory including potential for pesticides; herbicides; heavy metals and asbestos (Focus Area 2); ▪ Pasture fields, with potential for cadmium, herbicides and pesticides; and ▪ Farm buildings, with potential for heavy metals, TPH, asbestos. The Opus PSI recommended a DSI is conducted to establish the potential risks for the proposed development and human health and environmental receptors, including the following in relation to the Site: ▪ A Site wide assessment of pasture fields and areas of horticulture; ▪ Assessment of burial pits / solvent burn pits / landfills; and ▪ Assessment of farm buildings / store areas.	The following is noted in relation to the Opus report: ▪ The Opus scope included a targeted Site walkover and observations, and discussions with on-site representatives. The report notes that there is the potential contaminants or contaminating activities are present which were not identified; ▪ The Opus PSI only included a review of two historical aerial photographs providing only limited coverage; ▪ The orchard identified in the western part of the Site in the report was identified to be outside of the Site boundary following a review of historic aerial photographs by 4Sight; ▪ No building surveys were undertaken to assess the presence/absence of contaminants on the site resulting from hazardous building materials (lead and asbestos); ▪ The Opus PSI was undertaken nine years ago, and there is the potential for ongoing rural activities to have created potential contaminants sources, such as new farm dumps, burn piles; ▪ Subsequent contamination investigations identified a range of other activities across the Site with the potential to result in ground contamination. While the Opus report provides a high level assessment of potentially contaminating activities at the Site, there are a number of information gaps which should be addressed. These include: ▪ Conducting a detailed Site walkover and interviews with landowners and operators to better understand historic activities, and to confirm the nature of historic activities identified in review of aerial imagery; ▪ Conducting detailed investigation of any areas of potential environmental concern that have not previously been investigated; ▪ Conducting building asbestos and lead surveys; ▪ Potential for ongoing rural activities to have created potential contaminants sources, such as new farm dumps, burn piles.
Powells Road Residential Development, Ground Contamination investigation (T&T, September 2016	T&T carried out a ground contamination investigation of Tainui Group Holdings Ltd (TGH)'s proposed Powells Road Residential Development. This investigation included an assessment of the entire 0 Powells Road property. It is noted however that only the southern portion of this investigation area is relevant to the Site (covering the very north-eastern section of the Site). A number of historical activities were identified that may have resulted in ground contamination within the northern portion of the Site including: ▪ Solvent burning in trenches; ▪ Landfilling; ▪ Timber burial in pits; ▪ Agricultural Site use; and ▪ Green waste disposal pit. The portion of the investigation relevant to the Site included: ▪ Visual observations; ▪ Excavation of six test pits, a trench orientated east-west across the investigation boundary, five hand augers and the collection of soil samples;	The following is noted in relation to the T&T report: ▪ Although an intrusive investigation was not conducted within the southern portion of the southern landfill area, this assessment has delineated the extent using historic aerial photographs; ▪ Soil samples were not analysed within the top 0.0-0.4 m bgl or >1.0 m bgl within the southern landfill area; ▪ Only one soil sample was analysed for asbestos (presence/absence only). While the T&T report provides an indication of general contamination within the southern landfill area, there are a number of information gaps which should be addressed. These include: ▪ Additional intrusive investigation in the southern portion of the southern landfill area to determine the depth of fill material and levels of contaminants present;

	▪ Laboratory analysis of a total of 13 samples across this area, with selected samples analysed for at least one of heavy metals, OCPs, PAH, VOCs and asbestos (presence/absence); ▪ A visual inspection across the investigation area for potential asbestos-containing material (ACM), and collection of a fibreboard sample for laboratory analysis. The investigation confirmed: ▪ A green waste disposal pit was identified along the southern boundary of the investigation area (in the north of the Site). Green waste was encountered to a depth of 2.5 m bgl, and included green waste bags and compost across an area of approximately 280 m^2; ▪ No evidence of the timber burial pit identified in the Opus PSI report was observed; ▪ The Southern Landfill area was confirmed and included approximately 0.5-1.0 m of topsoil overlying orange brown silt and general refuse (i.e. concrete, scrap metal, steel, plastic, tyres and organic waste). The extent was determined to be approximately 1,600 m^2, with an average depth of approximately 3.1 m of fill. The volume (solid measure) was estimated to be 5,000 m^3; ▪ Pockets of suspected fibreboard ACM, with a volume of approximately 0.4 m^3 to 0.8 m^3 were observed in TP8 and part of the trench within the Southern Landfill; ▪ Groundwater was observed between 1.0 m and 1.3 m below ground surface with perched groundwater observed to intercept the fill layer; ▪ In general, the analytical results identified low levels of heavy metals, hydrocarbons and pesticides in the solvent disposal areas (natural), waste disposal pit and general pasture field. The results summary included: – All results were below the human health criteria, indicating they do not present a risk to human health for the intended Site use; – A number of heavy metals (arsenic, cadmium, copper, lead, mercury, nickel and zinc) exceed background concentrations for the Waikato Region; – All pesticides (organochlorine, organonitrogen and organophosphorus pesticides) were below laboratory reporting limit, with the exception of minor detections of 4,4'-DDE and 4,4'-DDT in TS5 to the west of the Southern Landfill area; – All VOC were below laboratory reporting limit; – PAH concentrations detected were within both human health and environmental criteria; and – Asbestos was detected within soil at sample location TP9 1.0m. The main findings of the investigation were: ▪ Historical activities within the investigation area have resulted in ground contamination on a portion of the investigation area; ▪ The ground contamination is limited to the area of the historic landfill/filling area only. The balance of the investigation area is not restricted for proposed residential development, based on assessment of historic land use practices, in terms of ground contamination; ▪ The area of fill was identified to be more extensive than previously reported; ▪ Asbestos was confirmed to be present in the southern landfill area; ▪ There was a low potential for landfill gas to be present in the fill areas and at a green waste disposal pit (odour was noted during investigations); ▪ All results were below relevant NESCS human health acceptance criteria (residential and recreational), indicating they do not present a risk to human health for the intended use. However, asbestos has been found in the fill area. While it may be possible to retain asbestos containing material onsite, this could require management such as encapsulation so that the area is safe for the intended future use. This, would also restrict future earthworks in the area where the asbestos is contained; ▪ Topsoil and natural soils, outside of the identified fill areas is suitable for re-use (provided it is geotechnically suitable); ▪ Topsoil and natural soils requiring offsite disposal is likely to be accepted at a cleanfill site, however this will require approval from the cleanfill site.	▪ Conducting further soil sampling and analysis at 0.0-0.4 m bgl and >1.0 m bgl to further characterise the potential risk to human health and the environment and to determine potential re-use suitability; and ▪ Conducting further soil sampling and analysis for asbestos (semi-quantitative method) across the southern landfill area as this was not undertaken during this assessment.
Tramway SHA, Preliminary Geotechnical and Ground Contamination Assessment (T&T, November 2018)	T&T was engaged by Tainui Group Holdings Ltd (TGH) to provide specialist geotechnical and contaminated land related services for the proposed Tramway Special Housing Area (SHA) at Ruakura (which covers the entire Site). A number of historical activities were identified that may have resulted in ground contamination within the investigation area, including: ▪ A former landfill area (southern landfill) in the north-east of the Site. T&T identified this landfill in a previous investigation (Powells Road) for TGH; ▪ A weed research laboratory and adjacent trial plots in the eastern portion of the Site; ▪ Existing and former agricultural buildings and structures in the south-eastern and southwestern portions of the Site; ▪ Possible offal pits adjacent to buildings in the south-western portion of the Site; and ▪ Possible solvent burning trenches in the north-eastern portion of the Site. A total of 24 near surface samples (depths of between 0.0 to 0.5 m bgl) were analysed for potential contaminates of concern. Based on the understanding of the historic and current use of the Site and Site observations, the following programme of testing was carried out: ▪ All 24 samples were analysed for a suite of heavy metals; ▪ Two samples (where building rubble was identified within fill soils) were tested for semi-quantitative asbestos content;	The following is noted in relation to the T&T report: ▪ Only two samples near the weed research laboratory buildings in north-eastern portion of investigation area, including none within the greenhouses or at the drainage sumps at the rear of the greenhouses; ▪ No sampling was conducted near other buildings in west or south east; ▪ No sampling was conducted near the transformer building adjacent to the buildings in the south west or south-east; ▪ The possible solvent burning trenches were not investigated due to uncertainty of their location, and on the basis that contamination associated with solvents is most likely to be volatile, and therefore any residual contamination in the soils at the Site is likely to be limited; and ▪ The extent of heavy metal contamination (vertically and laterally) has not been assessed. Overall, due to the size of the Site, sampling numbers across the areas of concern were limited. It is considered that further investigation of the above areas of interest should be undertaken.

	▪ Five samples were tested for asbestos presence/absence; ▪ Eight samples (including samples from around the weed research laboratory) were tested for organochlorine pesticides (OCP); ▪ Three samples (from around the weed research laboratory) were tested for organo-nitrogen and organo-phosphorus pesticides (ONOP); ▪ Two samples (from around the weed research laboratory) were tested for acid herbicides. The results of the ground contamination investigation indicate that the surface soils (and deeper natural soils) across the majority of the Site would not present development constraints from a contamination perspective. However, elevated levels of metals were identified in near surface soils in a localised area around the former and existing Site buildings/structures (in the west and south-east of the Site). Some form of remediation or management was recommended to be required to facilitate development of these areas. Additional soil testing would be required to assess the extent of contamination in these areas. The landfill area in the north-eastern portion of the Site would also require some form of remediation or management to facilitate development in this area. It was expected that council would require a Site management plan (SMP) or remediation action plan (RAP) to be prepared prior to any development earthworks. The SMP/RAP would outline the management/remediation approach specific controls that would need to be in place to minimise potential exposure to, and discharges of, contaminants during development earthworks.	
Ruakura Northern Development Contamination Assessment (4Sight, August 2019)	4Sight was engaged by CMW to undertake a CA of the proposed Ruakura Inland Port Northern Development area located in Ruakura, Hamilton, of which the entire Site was included in the western portion of the investigation area. The purpose of the CA was to assess potential implications for the proposed commercial/industrial development. The key findings of this assessment relevant to the Site were: ▪ The Site has been used for as part of an agricultural research farm over the period for which historical records are available (1938 – present). This includes livestock grazing, livestock management, landfilling, hay/silage growing, disposal of solvents ground, and specific areas of agricultural research including animal investigation, weed management and waste disposal; ▪ The CA involved reviewing several reports associated with the Site. In addition, some of the investigations have been limited and not fully assessed the potential risks in the areas they were investigating. There is also the potential that ongoing use of the site has resulted in additional areas of potential environmental concern since historic investigations were undertaken; ▪ These investigations have confirmed the presence of contaminants at selected locations across the Site, including historic landfills and impact to groundwater from disposal of solvents to ground. Although the potential for widespread contamination across the site from these activities is considered to be low, it is considered highly likely that there will be isolated areas of contamination in soil associated with historic activities. ▪ Focus areas 5, 7, 8 and the southern portion of Focus Area 2 investigated in this report are present within the Site boundary; ▪ A contamination risk assessment was undertaken. The following is summarised in translation to current Focus Areas at the Site; – **Focus Area 1**: Soil contamination was confirmed as elevated levels of heavy metals arsenic, lead and zinc which exceeded the residential criteria to which they were compared. A targeted DSI to confirm the lateral and vertical extent of the contamination in the area was recommended, and to investigate the transformer building; – **Focus Area 2**: Soil contamination was considered likely. Investigations undertaken to date in this area have been limited with only two samples undertaken in the area including none from within the footprint of the glass houses. Potential for contamination with heavy metals (arsenic, copper and lead) and OCP's associated with the operation of the weed lab and glasshouses and potential for lead and asbestos contamination from existing buildings and during former buildings removal. A targeted DSI was recommended with specific focus on glass houses, chemical storage and use areas, adjacent to current and former buildings; – **Focus Area 3:** Soil contamination was confirmed. Elevated levels of heavy metals arsenic, lead and zinc which exceeded the residential criteria for arsenic and lead to which they were compared. A targeted DSI to confirm the lateral and vertical extent of the contamination in the area was recommended; – **Focus Area 4**: Soil contamination was confirmed. Confirmed landfill area containing a range of organic and inorganic waste including asbestos. No further investigation was considered to be required as the existing investigation has adequately assessed that area and identified the risks. ▪ Asbestos survey of all buildings constructed prior to 2000 was recommended to determine the nature and extent of asbestos present; ▪ Further investigation will be required to assess identified areas of potential environmental concern through targeted soil sampling, and to prepare reports to support the consent process associated with the proposed redevelopment; and ▪ On the basis of known and potential for contamination at the site, and the likely soil disturbance associated with the redevelopment, consent under the NESCS will likely be required. The activity status of the consent will be dependent on the information provided to support the consent application, and the concentrations of contaminants identified in soils. The requirement for consent under the Waikato Regional Plan cannot be determined at this stage, although is also considered likely.	The following is noted in relation to the 4Sight report: ▪ The report generally characterised the potential risk across majority of the potential contaminating activities at the Site; ▪ Following the review of historic aerial photographs for the Site, a former farm drain extending across much of the lateral extent of the Site was identified to have been infilled, which was not considered as part of the report; and ▪ The report identified that no further investigation was considered to be required for the southern landfill area in the north-east of the Site (Focus Area 4). However, an in-depth review of data across this area has identified data gaps associated with lateral and vertical delineation of contamination and analytical suite (asbestos).
Proposed Powells Road Subdivision, Additional Contaminated Land Investigation (AECOM, October 2019)	AECOM undertook a contaminated land investigation at 0 Powells Road following the investigation undertaken by T&T in this area. The objectives were to further delineate the areas and depths of the two fill areas (Northern Landfill and the Southern Landfill), to further characterise the contaminant conditions of the waste in the fill areas, especially for the presence of asbestos and to further characterise the nature of the waste in the fill areas and to ascertain if the waste was placed in any organised or layered manner. Information relevant to the Southern Landfill at the Site (Focus Area 4) is summarised below:	The following is noted in relation to the AECOM report: ▪ Surface and depth soil analytical data for heavy metals and asbestos are still limited; ▪ The southern portion of the Southern Landfill was not investigated; ▪ The investigation did not consider potential soil reuse on the Site.

	▪ Six test pits were advanced within the Southern Landfill area, with the collection of soil samples to represent the different types of material encountered; ▪ Soil types generally comprised topsoil underlain by anthropogenic fill overlying sand and gravels; ▪ Asbestos cement board and a blue crystalline material (copper sulphate) was identified in TP01; ▪ Six soil samples were analysed across this area, with selected samples analysed for at lest one of heavy metals and asbestos; The analytical results identified: ▪ Overall concentrations contaminants while above background concentrations and the WRC cleanfill criteria, were below the NESCS SCS and NEPM for Heavy Metals; ▪ Lead in sample TP03_0.7 (1,280 mg/kg) exceeded the NESCS SCS for residential (210 mg/kg) and recreation (880 mg/kg) land use scenarios; ▪ Blue crystalline material noted in TP01 was analysed and the copper concentration was elevated. TP01_1.35 recorded a concentration of 2,510 mg/kg; ▪ TP01_0.1 contained asbestos fibres and asbestos containing material (ACM) above the BRANZ recreation and residential landuse criteria. Based on the concentrations detected, soil removal from this area would be considered 'Class B works' and would therefore need to be completed by licensed contractors; ▪ TP01_1.5 contained ACM above the BRANZ recreation and residential landuse criteria. Based on the concentrations detected, soil removal from this area would be considered 'Asbestos Related Work' and would therefore need to be completed by licensed contractors. The main findings were: ▪ No organised or layered manner to the fill was noted during the excavation of the test pits. Fill was noted to have been placed in a 'as required' manner causing the waste to have been placed very freely; and ▪ As the majority of analytical results in the Southern Landfill exceed Waikato background concentrations, WRC cleanfill criteria and asbestos fibres and ACM were detected, excess soil generated during the development works requiring offsite disposal will need to be disposed of at an acceptable landfill.	While the AECOM report further delineated the Southern Landfill area following the T&T investigation in 2016, there are a number of information gaps which should be addressed. These include: ▪ Additional intrusive investigation in the southern portion of the southern landfill area to determine the depth of fill material and levels of contaminants present; ▪ Conducting further soil sampling and analysis at 0.0-0.4 m bgl and >1.0 m bgl to further characterise the potential risk to human health and the environment and to determine potential re-use suitability; and ▪ Conducting further soil sampling and analysis for asbestos (semi-quantitative method) across the southern landfill area.
Ruakura Inland Port Development, Detailed Site Investigation for Ground Contamination – Spine Road (T&T, October 2021)	T&T carried out a ground contamination investigation at the proposed development of the Eastern Transport Corridor (ETC) and Far Eastern Interceptor (FEI), collectively referred to as 'Spine Road') as part of the wider Ruakura Inland Port development in Hamilton. The central portion of this investigation area was identified as bounding the Site to the east. The following is noted in relation to the Site: ▪ Soil samples were not collected across any of the Site area and were limited to the investigation area only; ▪ A former farm drain which was potentially infilled in the 1970's was noted to extend across the central portion of the investigation area and into the south-western corner of the Site, ending to the east of the existing shed; ▪ The report noted that Contamination (if any) would be expected to be present in fill soils and potentially the immediately underlying soils; and ▪ No other potentially contaminating activities investigated in this report were identified to extend onto the Site.	The following is noted in relation to the T&T report: ▪ Although identified as a potentially contaminating activity in the report, an intrusive investigation or soil sampling was not undertaken within the investigation area or Site at the location of the former farm drain that was infilled in the 1970's; ▪ The review of historic aerial photographs has identified that this former farm drain extended across much of the lateral extent of the Site; and ▪ On this basis, further investigation should be undertaken across the infilled farm drain.
Ruakura Inland Port Development, Site Management Plan for Ground Contamination (T&T, October 2021).	A SMP was developed by T&T in 2021 for the Ruakura Inland Port, which encompasses the entire Site area. The SMP was developed to provide procedures for managing potential ground contamination related effects on human health and the environment during the proposed earthworks for the Ruakura Inland Port development. The SMP provided ground contamination-related procedures for earthworks, soil quality characterisation, soil disposal, Site management, unexpected contamination discovery protocols, health and safety during soil disturbance works and compliance documentation post the works. Appended within the SMP are the following: ▪ Asbestos SMP: for asbestos-specific controls and procedures in isolated areas within the whole investigation area, particularly relevant to the Southern Landfill Area at the Site; ▪ Landfill SMP: for additional controls and procedures associated when landfill material is encountered; and ▪ RAP: for the encapsulation of asbestos contaminated soils and ACM retained on-site. The following was outlined in regard to the southern landfill area in the Asbestos SMP: ▪ Based on the results to date, works in the southern landfill Area below 0.2 m bgl can be completed as asbestos related works, and the SMP outlined asbestos specific controls such as: – Erect fencing to separate the asbestos works area; – Decontamination zones; – Asbestos air monitoring during the first three working days of asbestos related works; and – PPE requirements (i.e. disposable coveralls, disposable gloves, P2 dust mask, overshoes/dedicated gumboots). ▪ Should further asbestos be identified during earthworks and/or further sampling, works may need to be considered licensed works to be assessed by a SQEP.	The following is noted in relation to the T&T SMP: ▪ The SMP is generally comprehensive; ▪ The SMP outlines that works in the southern landfill area below 0.2 m bgl can be completed as asbestos related works. However as an absence of asbestos in soil data <0.5 m bgl was identified, all soil disturbance of this area should be undertaken as asbestos related works at minimum (subject to visual confirmation); and ▪ Based on the identification of discrete pockets of ACM fibreboard (0.4 m^3-0.8 m^3) as identified in the Powells Road Residential Ground Contamination investigation (T&T, September 2016), removal of this and similar encountered materials should be undertaken as Class B asbestos works.

	▪ If material containing higher concentrations of asbestos is identified through accidental discovery protocols and/or disturbed onsite (i.e. Class A or Class B Licensed Asbestos Works), this should be managed under an Asbestos Removal Control Plan (ARCP) prepared by a Licensed Asbestos Removalist. The following was outlined in regard to the Southern Landfill Area in the Landfill SMP: ▪ This detailed general procedures for separating and sorting fill materials following excavation; and ▪ Guidance regarding methodology of the proposed remediation and validation processes, including testing of stockpiled fill material to determine suitability for onsite reuse or offsite disposal.	

Sample Name	Depth (m)	Focus Area	Location	Date	Heavy Metals (mg/kg)								Asbestos				OCPs (mg/kg)							ONOPs (mg/kg)	Acid Herbicide	PAH (mg/kg)																				VOCs (excluding PAH)
					Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Presence / Absence	Description of Asbestos Present	% W/W ACM	% W/W Fibrous Asbestos or Asbestos Fines	2,4'-DDD	4,4'-DDD	2,4'-DDE	4,4'-DDE	2,4'-DDT	4,4'-DDT	Total DDT Isomers	All other OCP Compounds			Total of Reported PAHs in Soil	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthylene	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene (BaP)	Benzo(a)pyrene Potency Equivalency Factor (PEF) NES	Benzo(a)pyrene Toxic Equivalence (TEF)	Benzo(b)fluoranthene + benzo(j)fluoranthene	Benzo(b)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Perylene	Phenanthrene	Pyrene	
Tonkin & Taylor (2016)																																														
TP8 1.0m	1.0	Focus Area 4	Southern Landfill	28/07/2016	10	1.1	15	200	220	-	12	810	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP9 0.5m	0.5		Southern Landfill	28/07/2016	6	0.4	11	17	25	-	5	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP9 1.0m	1.0		Southern Landfill	28/07/2016	-	-	-	-	-	-	-	-	Amosite and Chrysotile detected (ACM debris).	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP10 0.5m	0.5		Southern Landfill	28/07/2016	5	< 0.10	7	6	10	-	3	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP8A 0.5m (bulk)	0.5		Southern Landfill	28/07/2016	-	-	-	-	-	-	-	-	Chrysotile detected (fibre board).	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA1 0.5m	0.5		Solvent disposal	26/07/2016	5	< 0.10	9	8	15.5	0.21	3	28	-	-	-	-	-	-	-	-	-	-	-	-	BDL	-	-	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	-	< 0.6	-	< 0.6	< 0.6	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	-	< 0.5	< 0.5	BDL
HA2 0.1m	0.1		Solvent disposal	26/07/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	BDL	-	-	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	< 1.21	-	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	BDL
HA2 1.0m	1.0		Solvent disposal	26/07/2016	30	2	28	410	560	1	19	1050	-	-	-	-	-	-	-	-	-	-	-	-	BDL	-	-	-	-	< 0.5	< 0.5	< 0.5	0.6	0.7	1.46	-	0.8	-	0.5	< 0.5	0.6	< 0.5	1.4	< 0.5	0.5	< 0.5	-	< 0.5	1.2	BDL
TS5 0.1m	0.1		Topsoil	26/07/2016	4	0.41	9	16	11.9	< 0.10	3	98	-	-	-	-	< 0.010	< 0.010	< 0.010	0.011	< 0.010	0.017	< 0.06	BDL	BDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA4 0.1m	0.1		Solvent disposal	26/07/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	BDL	-	-	-	-	< 0.5	< 0.5	< 0.5	< 0.5	0.6	1.32	-	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	1.2	< 0.5	< 0.5	< 0.5	< 0.5	-	0.9	1.2	BDL
HA5 0.1m	0.1		Solvent disposal	26/07/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	BDL	-	-	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1.21	-	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	BDL
TP6 2.6m	2.6		Greenwaste	26/07/2016	< 2	< 0.10	7	4	3.9	< 0.10	2	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonkin & Taylor (2018)																																														
TP213	0.5	Focus Area 1	Former disturbance	27/08/2018	62.2	0.81	23.2	470	2870	0.16	8.53	766	NAD	-	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP215	0.5	Focus Area 1	Former small structure	27/08/2018	61.7	0.8	23.3	433	3290	0.17	8.6	688	NAD	-	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP216	0-0.3	Focus Area 1	Former disturbance	27/08/2018	4.87	0.29	7.15	11	19	0.19	2.94	30.4	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA204	0.0-0.3	Focus Area 1	Former small pens	27/08/2018	6.71	0.16	12.6	21.8	34.1	0.098	5.22	102	-	-	-	-	<0.005	<0.005	<0.005	<0.003	<0.005	<0.005	<0.02	BDL	BDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA205	0.0-0.4	Focus Area 1	Former small pens	27/08/2018	4.72	0.077	8.79	11.1	11.4	0.038	4.04	59.2	NAD	-	-	-	<0.005	<0.005	<0.005	<0.003	<0.005	<0.005	<0.02	BDL	BDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA206	0.0-0.15	Focus Area 1	Former large pens/building	27/08/2018	13.7	0.27	16.5	175	131	0.13	7.46	148	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA207	0.0-0.2	Focus Area 1	Former large pens/building	27/08/2018	16.4	0.47	17.9	41.1	554	0.095	5.34	417	-	-	-	-	<0.005	<0.005	<0.005	<0.003	<0.005	<0.005	<0.02	BDL	BDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT213	0-0.1	West of Focus Area 1	Paddock	27/08/2018	6.39	0.51	18.7	24.3	29.9	0.17	6.86	86.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT222	0-0.1	South of Focus Area 1	Paddock	27/08/2018	7.8	0.34	13.3	17.8	25.6	0.11	5.06	104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA201	0.0-0.3	Focus Area 2	Existing weed laboratory	27/08/2018	6.37	0.17	10.4	13.4	11.8	0.068	4.62	59.2	-	-	-	-	<0.005	<0.005	<0.005	<0.003	<0.005	<0.005	<0.02	BDL	BDL	BDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA202	0.0-0.3	Focus Area 2	Existing glass house	27/08/2018	11.2	0.3	7.72	18.6	11.5	0.11	3.05	44.9	-	-	-	-	<0.005	<0.005	<0.005	<0.003	0.01	<0.005	<0.02	BDL	BDL	BDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA203	0.0-0.3	West of Focus Area 2	Paddock	27/08/2018	3.63	0.48	5.26	14.8	9.54	0.13	2.84	31.5	-	-	-	-	<0.005	<0.005	0.031	0.017	0.205	0.201	0.45	BDL	BDL	BDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT207	0-0.1	North of Focus Area 2	Paddock	27/08/2018	3.25	0.32	7.08	9.02	12.6	0.089	3.01	44.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT212	0-0.1	East of Focus Area 2	Paddock	27/08/2018	7.4	0.39	16	19.1	25.6	0.12	5.86	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA208	0.0-0.3	Focus Area 3	Former small pens	27/08/2018	28	0.45	18.7	25.3	18.1	0.2	3.97	97	-	-	-	-	<0.005	<0.005	<0.005	<0.003	<0.005	<0.005	<0.02	BDL	BDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA209	0.0-0.5	Focus Area 3	Existing implement shed	27/08/2018	6.33	0.031	7.39	8.9	9.59	0.095	3.14	49.6	NAD	-	-	-	<0.005	<0.005	<0.005	<0.003	<0.005	<0.005	<0.02	BDL	BDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA210	0.0-0.4	Focus Area 3	Yard	27/08/2018	42.7	0.15	19	30.2	34.5	0.15	8.27	371	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT219	0-0.1	West of Focus Area 3	Paddock	27/08/2018	5.55	0.37	6.7	19.9	13.6	0.13	3.2	34.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT225	0-0.1	East of Focus Area 3	Former drain	27/08/2018	6.08	0.21	9.8	8.94	15	0.21	5.13	47.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT220	0-0.1	East of Focus Area 3	Paddock	27/08/2018	3.48	0.28	4.94	6.92	9.31	0.078	2.45	18.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT223	0-0.1	Between Focus Area 1 and 3	Paddock	27/08/2018	3.48	0.48	6.75	12.5	11.9	0.12	2.82	42.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT215	0-0.1	Between Focus Area 1 and 3	Paddock	27/08/2018	6.32	0.49	6.67	14	10.4	0.11	2.77	50.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT216	0-0.1	Between Focus Area 2 and 3	Paddock	27/08/2018	6.3	0.27	5.38	9.69	12.5	0.081	2.67	44.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CPT204	0-0.1	Focus Area 4	Solvent disposal	27/08/2018	5.72	0.33	15.4	18.1	32.1	0.15	4.3	80.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AECOM (2019)																																														
TP01 0.1	0.1	Focus Area 4	Southern Landfill	11/09/2018	-	-	-	-	-	-	-	-	Chrysotile, Amosite and Crocidolite detected.	-	0.119	0.1168	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP01 1.35	1.35		Southern Landfill	11/09/2018	7.2	0.892	43	2,510	145	0.3	11.4	536	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP01 1.5	1.5		Southern Landfill	11/09/2018	-	-	-	-	-	-	-	-	Chrysotile detected.	-	0.731	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP02 1.1	1.1		Southern Landfill	11/09/2018	4.4	0.068	8.3	7.3	26.3	0.12	2.8	63.5	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP03 0.7	0.7		Southern Landfill	11/09/2018	9.2	1.46	16.3	154	1,280	0.27	12.8	1,100	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP05 0.3	0.3		Southern Landfill	11/09/2018	5.6	0.18	16.2	12.4	20.3	0.062	4.5	112	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Background Concentrations[1] (WRC)					6.8	0.22	30	25	20	0.23	7.6	53	NAD	-	-	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
WRC Cleanfill Criteria[2]					17	0.8	56	120	78	1	33	175	-	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NESCS SCS – Residential[3]					20	3	> 10,000	> 10,000	210	310	-	-	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEPM - Residential A[4]					-	-	-	-	-	-	400	7,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GAMAS- Semi Quantitative Asbestos Guidelines[5]					-	-	-	-	-	-	-	-	NAD	-	0.05	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MfE Petroleum Guidelines - Residential use[6]					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MfE Petroleum Guidelines – Maintenance/excavation workers[7]					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
All metal, OCP, ONOP, adic herbicide and PAH results and criteria are expressed in mg/kg dry weight
Asbestos results and criteria are expressed in % weight for weight
Any results exceeding adopted criteria are shaded accordingly.
NAD = No Asbestos Detected
ACM = Asbestos Containing Material
PAH = Polycyclic Aromatic Hydrocarbons
OCP = Organochlorine Pesticide
ONOP = Organonitro&phosphorus Pesticides
VOC = Volatile Organic Compounds
BDL = Below Detection Limit

a: Adopted from Auckland Unitary Plan: Operative in Part E30 Contaminated Land Table E30.6.1.4.1 Permitted Activity Soil Acceptance Criteria for Heavy Metals - Used as a proxy in the absence of Waikato tier 1 environmental values.

1: Typical Background Concentrations for selected elements in soil associated with natural background land use in the Waikato region, 95% upper limit, as provided by Waikato Regional Council September 2017.
2: Waikato Regional Council Cleanfill Guidelines.
3: 'National Environmental Standards for Managing and Assessing Contaminants in Soil to Protect Human Health' - Soil Contaminant Standards (SCS), (MfE, 2012) Residential land use scenario.
4: National Environment Protection (Assessment of Site Contamination) Measure, (NEPC, 2011) Residential - Table 1A(1) Health investigation levels for soil contaminants -Residential A.
5: GAMAS- New Zealand Guidelines for Assessing and Managing Asbestos in Soils. Residential use.
6: MfE Petroleum Guidelines (Tables 4.11) - Residential use - All Pathways (<1m bgl) – Sand. The following notes the limiting pathway for each criterion: v - volatilisation, s - soil ingestion, d - dermal, m - maintenance/excavation worker, p - produce, x - PAH surrogate. Brackets denote values exceed the threshold likely to correspond to formation of residual separate phase hydrocarbons.
7: MfE Petroleum Guidelines (Table 4.19) - Maintenance/excavation workers – Sand. NA - Indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered onsite . Values are taken from Tables 4.19.

5 SITE VISIT OBSERVATIONS

A site visit was undertaken on 8 March 2022 and photos of the Site visit are presented in Appendix E. Table 7 provides a summary of the primary observations made during the Site visit:

Table 7. Site Visit Observations Summary

Location	Observations
Focus Area 1	▪ This area contained a sheltered former sheep handling area, with several associated wooden sheep holding pens; ▪ Attached to this sheltered area was an associated former sheep handing building; ▪ The former sheep handling building was primarily constructed of wooden boards, sheet iron, and some concrete blocks. Some cement fibre board was present particularly on the eastern side of the building (PACM), identified to be in good to average condition; ▪ Paint on the exterior of wooden boards was identified to be in degraded condition; ▪ A small former workshop area was identified on the western portion of the sheep handling building, containing a concrete floor in good condition; ▪ A small former sheep investigation lab was present north of the sheep handling building, constructed of concrete blocks, with paint on the exterior of the wooden fascia in degraded condition; ▪ A small transformer building was located in the south west corner of the building area; and ▪ A concrete pad was located in the paddock to the east of the building area.
Focus Area 2	▪ This area contained a building identified to be used as a former weed laboratory, with a second smaller weed laboratory present northwest of the main building; ▪ Poison and agricultural chemical warning signs were present to the Gable end of the main building; ▪ The main building was constructed of a concrete block base with wooden boards. Some fibre cement sheeting was identified generally in good condition on the northern and southern gable ends and soffits of the building (PACM); ▪ Paint on the exterior surfaces of the main building was degraded in some places; ▪ The main building contained miscellaneous household items; ▪ Fibre cement cladding, gables and soffits (PACM) were identified on the smaller weed laboratory, with a small localised area (< 1m^2) of broken fragments identified on the ground on the eastern side of the building; ▪ A small garage was located east of the smaller weed laboratory, constructed of wood with a corrugated iron roof; ▪ Two glasshouses were present north of main former weed laboratory building, both of which had concrete floors in good condition, with each of them draining into a concrete sump on the northern side of each glasshouse, likely draining to ground soakage. Drainage pipes within the sumps were constructed of PACM; ▪ The western glass house was constructed of glass, metal framing and concrete and was generally vacant; ▪ The eastern glasshouse was of general fibreglass construction and contained several tables and some timber; and ▪ Some small concrete walls were present east of the main former weed laboratory building.
Focus Area 3	▪ This area contained a small transformer building in the south west of the building area; ▪ A shearers quarters and associated wooden pen area was located in the southern area. The shearers quarters had a concrete block base, with wooden boards. Paint of the exterior of the building was identified to be degraded in some places. Soffits (PACM) were identified to be in good condition; ▪ A vacant shed was present north of the shearers quarters, and was constructed of a solid concrete base, with corrugated iron cladding and roofing. A very small (< 1 m^2) area of staining

	(hydrocarbon odour) was present on soil and on the side of the concrete base of the southern side of the shed; ▪ An implement shed was present to the north, constructed of corrugated iron with a bare ground floor and was generally vacant. A small 50L empty container displaying a biological hazard sticker was present on the ground of the implement shed; ▪ A yard area was present to the north. It was generally vacant however the following features were identified: – The yard was generally grassed with a concrete loading ramp in the centre; – The north-eastern section of the yard contained two concrete bunkers, with evidence of burning activities undertaken, both of contained PACM fragments; – PACM fragments were identified on surface soils south of the bunker, the extent of these are unknown; – An area of soil disturbance (across an area of approximately 15 m^2) was identified approximately 15 m west of the concrete bunkers. PACM fragments were identified on surface soils at this location, however the lateral and vertical extent of PACM fragments is unknown; – A broken 100L barrel partially containing miscellaneous green/black liquid with a hydrocarbon odour was identified between the soil disturbance and concrete bunkers. The liquid was also present on soil directly beneath the barrel; ▪ Miscellaneous farm equipment was stored west of the building areas.
Focus Area 4	▪ The area of Focus Area 4 identified to be the Southern Landfill Area was in pasture and had a slight undulating surface; ▪ A dust suppression pond associated with the development of the northern portion of the Powells property was present at the location of the former timber and green waste pits; and ▪ A plastic lined drainage channel was present south of the dust suppression pond.
General observations	▪ A vacant barn with a bare soil floor, constructed of corrugated iron with a wooden frame was present to the north of Focus Area 1, with a transmission tower present to the east of the barn; ▪ A sheep shed was identified to the east of Focus Area 3, identified to be constructed of corrugated iron wooden boards. A former sheep drenching area was present on the western side of the sheep shed. Some slightly brown grass was present within the sheep drenching area; ▪ The remaining areas of the Site outside of the Focus Areas identified were generally in use for sheep and cattle grazing. The majority of the Site was in pasture cover, with the centre of the Site in chicory and the north-western corner in maize; and ▪ There was no surficial onsite evidence of former building locations identified as part of the historic aerial review, with the exception of a concrete pad as described in Focus Area 1.

6 SUMMARY OF KNOWN AND POTENTIAL CONTAMINATION

This investigation has used a multiple lines of evidence approach to identify known and potential contamination at the Site. This includes a review of selected background information, and a detailed review of readily available historic environmental investigations. Collectively, this information has identified a range of HAIL activities that are known to have been undertaken, or are considered likely to have been undertaken at selected locations within Site. A summary of these HAIL activities, potential contaminants, a risk assessment, and recommendations for investigations are presented in Table 8 below.

Table 8. Summary of Known and Potential Contamination

Location	Activities Identified	Potential Contaminants	HAIL References	Contamination Risk Assessment	Recommended Further Investigation
Focus Area 1	▪ Current buildings and associated use; ▪ Historic buildings and building removals; ▪ Sheep dipping; ▪ Former workshop; ▪ Electricity transformer; ▪ Electricity transmission tower; and ▪ Potential farm dumping.	▪ Heavy Metals; ▪ OCPs; ▪ Polychlorinated Biphenyls (PCBs); ▪ Petroleum Hydrocarbons; ▪ Asbestos	▪ A8 - Livestock dip or spray race operations; ▪ B2 - Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment; ▪ I - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.	**Confirmed:** Elevated levels of heavy metals arsenic, lead and zinc which exceeded the residential criteria for arsenic and lead to which they were compared. Potential for contamination with heavy metals and OCPs associated with potential historic sheep dipping activities at this location. Potential for contamination with heavy metals, OCPs, PAH and asbestos associated with a small potential farm dumping location in the north of the Site north of Focus Area 1. Low level potential for contamination with heavy metals and TPH from the identified former workshop in Focus Area 1, with a concrete floor in good condition. Low level potential for contamination with PCB's and TPH from operation and maintenance of the transformer and the transmission tower north of Focus Area 1.	A targeted DSI to confirm the lateral and vertical extent of the contamination in the area, and investigate the transformer building and tower. Comparison against the residential land use criteria. Asbestos surveying of all buildings.
Focus Area 2	▪ Chemical storage; ▪ Analytical laboratory; ▪ Glass houses; ▪ Former garden area; ▪ Current buildings and associated use; ▪ Historic buildings and building removals.	▪ Heavy Metals; ▪ OCPs; ▪ Asbestos.	▪ A1 – Agrichemicals; ▪ A3 - Commercial analytical laboratory sites. ▪ A10 - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds; and ▪ I - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.	**Likely:** Investigations undertaken to date in this area have been limited with only two samples undertaken in the area and none of these were from within the footprint of the glass houses. Potential for contamination with heavy metals (arsenic, copper and lead) and OCP's associated with the operation of the weed lab, glasshouses and former garden area. Potential for lead and asbestos contamination from existing buildings and during former buildings removal.	A targeted DSI with specific focus on: ▪ Glass houses; ▪ Garden area; ▪ Chemical storage and use areas, ▪ Adjacent to current and former buildings. Comparison against the residential land use criteria. Asbestos surveying of all buildings.
Focus Area 3	▪ Current buildings and associated use; ▪ Historic buildings and building removals; and ▪ PACM fragments on surface soils; ▪ Waste burning areas; ▪ Two small spills areas of miscellaneous green/black liquid with a hydrocarbon odour; ▪ Electricity transformer; and ▪ Potential historic oral sheep drenching.	▪ Heavy Metals; ▪ OCPs; ▪ Polychlorinated Biphenyls (PCBs); ▪ Petroleum Hydrocarbons; ▪ PAHs; and ▪ Asbestos.	▪ A8 - Livestock dip or spray race operations; ▪ B2 - Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment; ▪ I - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.	**Confirmed:** Elevated levels of heavy metals arsenic, lead and zinc which exceeded the residential criteria for arsenic and lead to which they were compared. Likely contamination with asbestos at the location of PACM fragments identified on surface soils. Likely contamination with TPH/PAH at the location of two very small spill areas of miscellaneous green/black liquid with a hydrocarbon odour. Low level potential for contamination with PCB's and TPH from transformer operation and maintenance. Low level potential for contamination with heavy metals and OCPs from potential historic oral sheep drenching at the sheep shed east of this Focus Area.	A targeted DSI to confirm the lateral and vertical extent of the contamination in the area, and investigate the transformer building. Comparison against the residential land use criteria. Asbestos surveying of all buildings.

Location	Activities Identified	Potential Contaminants	HAIL References	Contamination Risk Assessment	Recommended Further Investigation
Focus Area 4	▪ Solvent burning area; and ▪ Landfilling	▪ Heavy Metals; ▪ OCPs; ▪ VOC's and SVOC's; ▪ PAHs; ▪ Asbestos.	▪ G3 - Landfill sites; ▪ G5 - Waste disposal to land; ▪ I - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.	**Confirmed:** Confirmed landfill area containing a range of organic and inorganic waste including asbestos.	Further investigation across the Southern Landfill to determine the depth of fill material and levels of contaminants present in the southern portion, and to further characterise contaminants present at the near surface (0.0-0.5 m bgl) and at depth (>1.0 m bgl).
Across the Site	▪ Agricultural research; ▪ Potential filling of the former drain across the Site.	▪ Heavy Metals; ▪ PAH; ▪ OCPs; ▪ ONOPs; ▪ Asbestos.	▪ A10 - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds; ▪ I - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.	**Possible:** Investigations undertaken to date across the Site have been limited with discrete samples collected and analysed within selected paddocks. Based on the former use of the Site being utilised as an agricultural research farm, there is potential for contamination with heavy metals, OCPs and ONOPs. Potential for contamination associated with filling of the former drain at the Site, with only one sample collected from this location.	A targeted DSI to confirm the lateral and vertical extend (if present) of the potential contamination arising from use as an agricultural research farm and from the potential filling of the former drain, and comparison against the residential land use criteria.

7 RECOMMENDED FURTHER INVESTIGATION

Further targeted investigation is recommended across the Site to assess all potentially contaminating activities, to determine the nature and extent of soil contamination (if any) at these locations, and to prepare reports to support the consent process associated with the proposed redevelopment. Specifically, these further investigations should include:

- Asbestos survey of all buildings conducted prior to 2000 to determine the nature and extent of asbestos present;
- Undertaking Detailed Site Investigations as set out in Table 7 with scope to include:
  - Targeted investigations around areas of potential environmental concern which will include (but should not be limited to) laboratory activities, glass houses, potential sheep dip locations, chemical storage areas, former buildings where there is potential for impact to soil associated with hazardous building materials (asbestos and lead), chemical disposal areas, burn pile, farm dumps and landfills, intensive agricultural farming areas (research trials), transformers and electrical transmission towers.
  - Preparation of DSI report(s) to present the results of all soil sampling and to support consent applications.

8 REGULATORY ASSESSMENT

8.1 NESCS Assessment

On the basis of known contamination at the Site, and the likely soil disturbance associated with residential development following the PPC, resource consent under the NESCS will be required. The activity status of the consent will be dependent on the extent of investigation completed. Based on the historic investigations completed to date, and assuming further investigation is completed to address data gaps, it is considered likely that the application can be made as a restricted discretionary activity.

As a minimum, we would anticipate the following investigations and reports will be required to manage contaminated soil under the NESCS and likely consent conditions:

- DSI report/s;
- Remedial Action Plan/s (RAP), to establish the proposed method to remediate contaminated areas of the Site;
- Updated Contaminated Site Management Plan (CSMP), to set out environmental management and health and safety controls during remediation and general soil disturbance activities;
- Validation soil sampling, following completion of any remedial works necessary; and
- Site Validation Report (SVR), or reports, following completion of any remedial work to confirm the Site is suitable for the intended land use and does not present an unacceptable risk to human health.

It is considered likely that remediation will be required at selected locations across the Site to facilitate future land use change, subdivision and development following the PPC. The scope and nature of remediation will be confirmed following completion of DSI report/s at the Site, and is considered likely to be achieved using standard remediation practises (i.e. offsite disposal, encapsulation, reuse in suitable land use areas or a combination of these approaches). On this basis, known and potential contamination at the Site is considered highly unlikely to restrict or preclude a change of land use from rural to residential, commercial and/or open space following remediation.

8.2 Waikato Regional Plan Assessment

The Waikato Regional Plan (WRP) Section 5.3 provides for the remediation of contaminated land. The rules pertained within this section are specific to remediation. Therefore, should any contamination remediation be required the rules and provisions of the Section 5.3 of the WRP will need to be addressed. At this stage confirmation of remediation requirements are not known (although considered likely). Consent will be required if the permitted activity standards in Section 5.3 are not met.

Any discharge arising from remediation of contaminated land that does not comply with Rule 5.3.4.6 is a controlled activity so long as a detailed site investigation report, site remedial action plan, site validation report and ongoing monitoring and management plan are provided.

Any discharge arising from remediation of contaminated land that does not comply with permitted activity and controlled activity Rules is a discretionary activity (requiring resource consent). This will be the case should any of the above reporting requirements are not met.

Permitted Activity Rule 5.3.4.6 – Discharges from Remediation of Contaminated Land

Any discharge arising from remediation of contaminated land is a permitted activity, subject to the following conditions:

a) any discharge to air arising from the activity shall comply with the conditions and standards and terms in Section 6.1.8 except where the matters addressed in Section 6.1.8 are already addressed by conditions on resource consents for the site.

b) No contaminants from the remediation of the contaminated land shall be discharged into water or onto land unless discharged to a landfill authorised in Section 5.2.7.

c) The Waikato Regional Council shall be provided with the following reports prepared in compliance with Contaminated Land Management Guideline No.1: Reporting on Contaminated Sites in New Zealand (Ministry for the Environment, Wellington, NZ, updated October 2003) prior to commencement of land remediation:

   i. detailed site investigation report

   ii. site remedial action plan

d) After remediation is completed, copies of the following reports prepared in compliance with Contaminated Land Management Guideline No.1: Reporting on Contaminated Sites in New Zealand (Ministry for the Environment, Wellington, NZ, updated October 2003) must be provided to the Waikato Regional Council:

   i. site validation report

   ii. ongoing monitoring and management plan.

e) Any updates of these reports shall be provided to the Waikato Regional Council if a change in investigation, remediation and monitoring strategy occurs.

9 CONCLUSIONS

4Sight Consulting Ltd (4Sight) has been engaged by CMW Geosciences Ltd (CMW or the client) to undertake a contamination assessment (CA) of an area known as the Ruakura-Tuumata Structure Plan Area in Ruakura, Hamilton (herein referred to as 'the Site'), to assess potential implications for a proposed plan change (PPC). The PPC is seeking to rezone the Site from industrial to provide a mixed use zone for medium density urban residential development, a suburban centre and associated infrastructure. The assessment included:

- Conducting a desk top assessment to determine the nature and extent of potentially contaminating activities that have occurred or currently are occurring at the Site, including:
  - A review of selected publicly available information for the site, including council files and aerial photographs to confirm the nature and extent of activities or industries on the HAIL that are, have been, or might have been undertaken on the Site; and
  - A review of existing environmental reports for the Site.
- A Site visit to identify current areas of potential environmental concern, and to confirm potential historic environment risk areas;
- Summarising the findings of the previous contaminated site assessment reports;
- Comment on the adequacy, suitability, and technical robustness of the reports, and identify potential gaps (if any) in understanding of contaminated land matters relevant to the Site;

- Identify and map areas of potential environmental concern that may influence the suitability of the proposed PPC;
- Identification of potential consent requirements under the NESCS and WRP; and
- Provide recommendations for further contaminated land investigation to support development of the Site.

The key findings of this assessment are:

- The Site has been used for as an agricultural research farm over the period for which historical records are available (1938 – present). This includes livestock grazing, livestock management, hay/silage growing and specific areas of agricultural research including animal investigation and weed management. Additionally, landfilling, waste disposal and solvent disposal to ground have also been undertaken associated with the farming activity. The potential for isolated impacted areas associated with these activities is considered to be high;
- A variety of investigations have been conducted across the Site from 2013 to 2021. These historic investigations have included desk based assessments, preliminary site investigations and detailed site investigations. These investigations have confirmed the presence of contaminants at selected locations across the Site, including historic landfills and historic building removals, however investigations undertaken to date are considered limited in scope and have not fully addressed all potential contaminating activities;
- There is the potential that ongoing use of the Site for AgResearch pasture/vegetation trials has resulted in additional areas of potential environmental concern since the previous investigations undertaken;
- Further investigation will be required to identify known data gaps and to characterise areas of potential human health and environmental concern through targeted soil sampling, and to prepare reports to support the consent process associated with the future land use change, subdivision and development, following the PPC. The activities requiring further investigation include:
  - Historic landfill activities (Southern Landfill Area);
  - Use of the Site for agricultural research trials with potential for persistent pesticide and heavy metal contamination;
  - Filling of the former farm drain at the Site, and within a small area in the north of the Site;
  - Existing buildings and farm buildings where there is potential for impact to soil associated with hazardous building materials (asbestos and lead) or hydrocarbons or other chemicals associated with workshop and laboratory activities;
  - Greenhouses, with potential for persistent pesticide and heavy metal contamination;
  - Sheep dips and an oral drenching area, with potential for pesticide and heavy metal contamination;
  - Electricity transformers, with potential for hydrocarbon and potential use of PCB containing oils;
  - Electrical transmission tower, with potential for contaminants associated with tower maintenance activities (heavy metals);
  - Storage and use of agricultural and horticultural chemicals;
  - Solvent disposal areas (within the Southern Landfill);
  - Historic building demolition and removals, with potential for use of hazardous building material; and
  - Burn pile within concrete bunkers at the Site, with potential for heavy metal, hydrocarbon and asbestos contamination.
- On the basis of known and potential contamination at the Site, and the likely soil disturbance associated with residential development following the PPC, resource consent under the NESCS will be required. The activity status of the consent will be dependent on the extent of investigation completed. Based on the historic investigations completed to date, and assuming further investigation is completed to address data gaps, it is considered likely that the application can be made as a restricted discretionary activity;
- It is considered likely that remediation will be required at selected locations across the Site to facilitate future land use change, subdivision and development following the PPC. The scope and nature of remediation will be confirmed following completion of DSI report/s at the Site, and is considered likely to be achieved using standard remediation practices (i.e. offsite disposal, on Site encapsulation, reuse in suitable land use areas, or a combination of these approaches). On this basis, known and potential contamination at the Site is considered

highly unlikely to restrict or preclude a change of land use from rural to residential, commercial and/or open space following remediation; and

- Consent under the WRP will be required if remedial work is undertaken. It is considered likely that this will be necessary to support the proposed development.

9.1 SQEP Statement

I, Aaron Graham of 4Sight Consulting Ltd certify that this Contamination Assessment meets the requirements of the NESCS because it has been:

- Reviewed and certified by a suitably qualified and experienced practitioner (SQEP);
  - Evidence of my qualifications as a SQEP include the completion of a Post Graduate Diploma in Environmental Science and 13 years of experience in environmental management, eight of which including specialising in contaminants land management.
- The report has been prepared in general accordance with CLMG No. 1 (revised 2021).

LIMITATIONS

This report is based solely on the scope of work described in 4Sight Consulting's proposal dated 22 November 2021.

During this assessment, 4Sight Consulting has reviewed the findings of a number of third party environmental assessment reports. Site conditions may have changed since the date of writing these reports. While normal assessments of data reliability have been made, 4Sight Consulting assumes no responsibility or liability (expressed or implied) for errors in any data or statements from sources outside of 4Sight (i.e., third party reports) or developments resulting from situations outside the scope of this project. Specifically, 4Sight has not been provided with or reviewed asbestos management surveys, asbestos management plans, or other information relating to asbestos in buildings at the Site.

From a technical perspective, the subsurface environment at any site may present substantial uncertainty. It is a heterogeneous, complex environment, in which small subsurface features or changes in geologic conditions can have substantial impacts on water, vapour and chemical movement. In addition, it is assumed that no significant spills, leaks, or releases, or process changes, have occurred at the site since the writing of this report. If this assumption is not correct, then the advice in this report should be reassessed.

This report is based upon the application of scientific principles and professional judgment to certain facts with resultant subjective interpretations. Professional judgments expressed in this report are based on the currently available information within the limits of the existing data, scope of work, budget, and schedule.

This document does not include any assessment or consideration of potential health and safety issues under the Health and Safety at Work Act 2015. This document may be transmitted, reproduced or disseminated only in its entirety.

REFERENCES

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Appendix A:

Current and Historic Land Titles

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **939232**
Land Registration District **South Auckland**
Date Issued 14 August 2020

Prior References
845252

Estate Fee Simple
Area 9.5493 hectares more or less
Legal Description Lot 1 Deposited Plan 548526
Original Registered Owners
Ruakura Limited

Interests

Subject to Part IV A Conservation Act 1987

Subject to Section 11 Crown Minerals Act 1991

Appurtenant hereto is a right to convey electricity specified in Easement Certificate B219175.8 - 29.7.1994 at 2.58 pm

Appurtenant hereto is a right to convey gas specified in Easement Certificate B219175.10 - 29.7.1994 at 2.58 pm

Appurtenant hereto is a right of way specified in Easement Certificate B219175.12 - 29.7.1994 at 2.58 pm

Subject to a right (in gross) to convey electricity, telecommunications and computer media over part marked K and L on DP 548526 in favour of WEL Networks Limited created by Easement Instrument 9522523.4 - 25.9.2014 at 2:35 pm

Land Covenant in Easement Instrument 10301397.13 - 16.2.2016 at 9:09 am

10402846.1 Notice pursuant to Section 18 Public Works Act 1981 - 19.4.2016 at 7:00 am

10447119.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by Her Majesty the Queen - 27.5.2016 at 7:00 am

12246489.2 Transfer to TGH Property Limited - 5.11.2021 at 9:28 am

12246489.4 Mortgage to Westpac New Zealand Limited - 5.11.2021 at 9:28 am

12346011.11 Transfer to TGH Residential Development Limited - 23.12.2021 at 9:55 am

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **939233**
Land Registration District **South Auckland**
Date Issued 14 August 2020

Prior References
845252

Estate Fee Simple
Area 196.3067 hectares more or less
Legal Description Lot 2 Deposited Plan 548526 and Section 4 Survey Office Plan 519316

Original Registered Owners
Ruakura Limited

Interests

Subject to Part IV A Conservation Act 1987

Subject to Section 11 Crown Minerals Act 1991

Appurtenant hereto is a right to convey electricity specified in Easement Certificate B219175.8 - 29.7.1994 at 2.58 pm

Subject to a right to drain stormwater over part Lot 2 DP 548526 marked D, E, F, G and H on DP 548526 specified in Easement Certificate B219175.9 - 29.7.1994 at 2.58 pm

Appurtenant hereto is a right to convey gas specified in Easement Certificate B219175.10 - 29.7.1994 at 2.58 pm

Appurtenant hereto is a right of way specified in Easement Certificate B219175.12 - 29.7.1994 at 2.58 pm

Subject to a right (in gross) to convey electricity, telecommunications and computer media over part Section 4 SO 519316 marked CA and CD on SO 519316 and over part Lot 2 DP 548526 marked CA, CB, CC, NB, ND, E, G, I, J, A, and B on DP 548526 in favour of WEL Networks Limited created by Easement Instrument 9522523.4 - 25.9.2014 at 2:35 pm

Land Covenant in Easement Instrument 10301397.13 - 16.2.2016 at 9:09 am

10402846.1 Notice pursuant to Section 18 Public Works Act 1981 - 19.4.2016 at 7:00 am

10447119.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by Her Majesty the Queen - 27.5.2016 at 7:00 am

Subject to Section 241(2) Resource Management Act 1991 (affects DP 548526)

Subject to a right (in gross) to drain sewage over part Lot 2 DP 548526 marked NA, NB, NC, ND and NE on DP 548526 in favour of Hamilton City Council created by Easement Instrument 11865372.1 - 13.9.2021 at 9:45 am

Subject to a right (in gross) to right to convey water over part Lot 2 DP 548526 marked NA, NB, NC, ND, NE and O marked on DP 548526 in favour of Hamilton City Council created by Easement Instrument 11865372.2 - 13.9.2021 at 9:45 am

Subject to a right (in gross) to drain water over part Lot 2 DP 548526 marked O on DP 548526 in favour of Hamilton City Council created by Easement Instrument 11865372.3 - 13.9.2021 at 9:45 am

12246489.3 Transfer to TGH Property Limited - 5.11.2021 at 9:28 am

12246489.4 Mortgage to Westpac New Zealand Limited - 5.11.2021 at 9:28 am

12346011.10 Transfer to TGH Ruakura Industrial Development Limited - 23.12.2021 at 9:55 am

Appendix B:

WRC LUIR

Zara Troskot

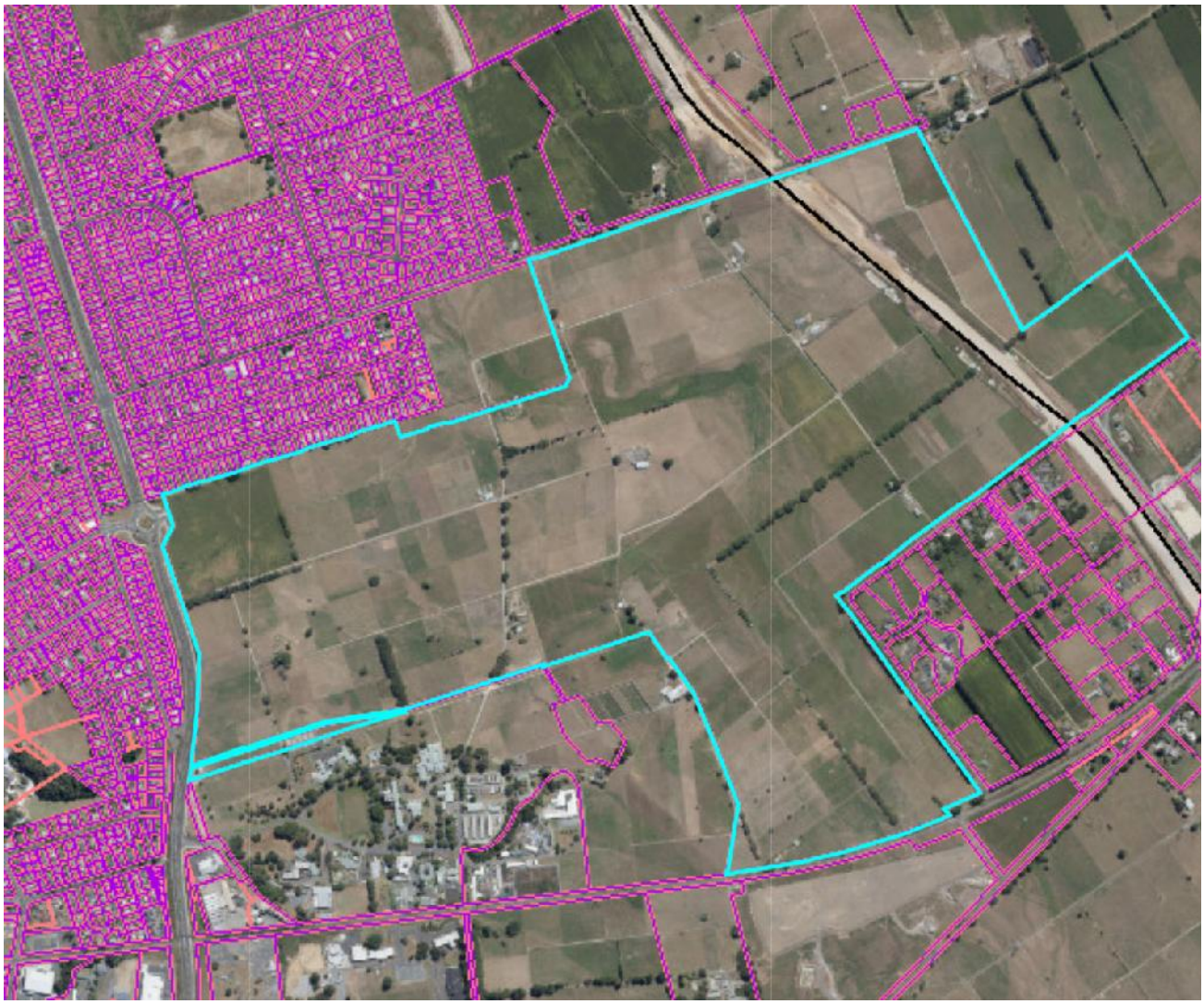
From: Guy Sowry <Guy.Sowry@waikatoregion.govt.nz>
Sent: Tuesday, 15 March 2022 11:43 am
To: Jarrod Hall
Subject: Land Use Information Register enquiry 0 Wairere Drive and 0 Powells Road, Hamilton (REQ184171) LUI03419

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Jarrod

Thank you for your enquiry regarding information the Waikato Regional Council may hold relating to potential contamination at the properties indicated below:

0 Wairere Drive, Hamilton: LOT PT 2 DP 548526 SEC 4 SO 519316 (VRN 04233/054/25)



0 Powells Road, Hamilton: LOT 1 DP 548526 (VRN 04233/054/24)

Background: The Waikato Regional Council maintains a register of properties known to be contaminated on the basis of chemical measurements, or potentially contaminated on the basis of past land use. This register (called the Land Use Information Register) is still under development and should not be regarded as comprehensive. The 'potentially contaminated' category is gradually being compiled with reference to past or present land uses that have a greater than average chance of causing contamination, as outlined in the Ministry for the Environment's Hazardous Activities and Industries List (HAIL): http://www.mfe.govt.nz/sites/default/files/hazards/contaminated-land/is-land-contaminated/hazardous-activities-industries-list.pdf

This property: I can confirm that your areas of interest **do** appear on the Land Use Information Register, as part of the area shaded blue on the map below.

WRC REF	Site name	Classification	HAIL Code & Description	Comments and files or documents held	Consent file #
LUI03419	Ruakura Research Station/Ag Research/Ruakura Campus/AgriQuality	Verified HAIL - Limited Sampling	• **G3.** Landfill sites • **A10.** Persistent pesticide bulk storage or use • **F4.** Motor vehicle workshops • **A3.** Commercial analytical laboratory sites • **A17.** Storage tanks or drums for fuel, chemicals or liquid waste • **A1.** Agrichemicals including spray contractors commercial premises • **A6.** Fertiliser manufacture	We currently hold the following documents which are available upon request: • • Ruakura Hub Site Wide T&T Management Plan 2021 (DOC# 21993179) • Ruakura Hub Spine Road T&T DSI 2021 (DOC# 21991010) • 310 Ruakura Rd Expressway DSI 2016 (DOC# 11087206) • Ruakura LDP Contaminated Land Report 2017 (DOC# 10493713) • 310 & 215 Ruakura Rd T&T Report (2) 2015	61 22 68A

			or bulk storage	(DOC# 10396577) • 310 & 215 Ruakura Rd T&T Report 2015 (DOC# 10396439) • 310 & 215 Ruakura Rd Site Management Plan 2015 (DOC# 10395372)	

Documents are also held under consent file number in the table above. If you are interested in sighting the consent documentation relating to this land use record please send a new online request for this information specifically using the Request for Service form for 'Regulatory, Consents and Compliance.' Please note that consent file requests are handled by the Resource Use Department and any which require 3 hours or more time to review will incur charges.

City Councils: Our records are not integrated with those of territorial authorities, so it would also be worth contacting the Hamilton City Council to complete your audit of Council records if you have not already done so. In general, information about known contaminated land will be included on a property LIM produced by the territorial authority. You may not be aware that we have an information sharing agreement with Hamilton City Council, which acknowledges that their database of HAIL sites is considered the 'master copy' for their area.

Rural Land Considerations: Examples of sites that are "more likely than not" to have soil contamination (HAIL sites) include timber treatment activities, service stations and/or petroleum storage, panel beaters, spray painters, etc. Whilst pastoral farming is not included on this list, typical farming activities of horticulture, sheep dipping, chemical storage, petroleum storage and workshops are; but are more difficult to identify and may not be as well represented on the Land Use Information Register. Therefore, individuals interested in pastoral land may be interested in completing further investigations in accordance with Ministry for the Environment Guidelines prior to land purchase and/or development.

Additional Information: Please note that:

- Significant use of lead-based paint on buildings can, in some cases, pose a contamination risk; the use of lead-based paint is not recorded on the Land Use Information Register.
- Buildings in deteriorated or derelict condition which contain asbestos can result in asbestos fibres in soil; the use of asbestos in building materials is not recorded on the Land Use Information Register.
- The long term, frequent use of superphosphate fertilisers can potentially result in elevated levels of cadmium in soil; the use of superphosphate fertiliser is not recorded on the Land Use Information Register.
- We are not currently resourced to fully incorporate historic aerial photographs in our region-wide assessment of HAIL activities. A significant proportion of the Crown historical aerial image archive for the Waikato region is available to view free of charge at http://retrolens.nz/. We recommend this resource is consulted for any HAIL assessment.
- Due to the large volume of enquiries being received, we may not be able to respond to your enquiry as quickly as previously. We are resourced to meet 20 day response times as per LGOIMA, but endeavour to respond more quickly when workload permits. If your enquiry is urgent, please note this first in your enquiry and we will do our best to assist.

Please feel free to contact me if you have any further queries on this matter. For any new enquiries or requests for information please continue to use the Request for Service form for 'Contaminated Land/HAIL.'

Regards,
Guy

Guy Sowry | CONTRACTOR | Land and Soil, Science and Strategy
WAIKATO REGIONAL COUNCIL | Te Kaunihera ā Rohe o Waikato
P: +6478592839
F: facebook.com/waikatoregion
Private Bag 3038, Waikato Mail Centre, Hamilton, 3240

Appendix C:

HCC HAIL

Hamilton City Council
Te kaunihera o Kirikiriroa

Private Bag 3010
Hamilton 3240
New Zealand

TEL 07 838 6699
FAX 07 838 6599
EMAIL info@hcc.govt.nz
hamilton.govt.nz

18 March 2022

Jarrod Hall
PO Box 13077
Tauranga Central
Tauranga 3141

Dear Jarrod:

Request under Section 10 of the Local Government Official Information and Meetings Act 1987

This letter provides the response to your request for information under Section 10 of the Local Government Official Information and Meetings Act 1987. The property that is the subject of this request (details as provided by you and as held on file) is contained in this response as follows.

Address: 0 Powells, Hamilton
Legal Description: Lot 1 DP 548526

As at 18 March 2022 a search of Council records shows that the property has been used and investigated for the following activities listed on the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL):

HAIL Landuse:

- **G3 -** Landfill sites
- **G5 -** Waste disposal to land (excluding where biosolids have been used as soil conditioners)
- **A10 -** Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
- **A1 -** Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application

Status: Partially Investigated
Determination: NES – Residential 10% produce

Council holds further information on the property file in relation to hazardous contaminants in the soil. This information includes the following reports:

1. Ground Contamination Investigation, Powells Road Residential Development. T+T 2016

Important notes: -
No inspection of the subject property has been carried out because of this application. This response relates only to the likely presence of hazardous contaminants. It does not include any information Council may hold in relation to any other matters listed in Section 44A (2) of the Local Government Official Information and Meetings Act 1987.

The Resource Management National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) Regulations 2011 would apply to any tank removal, subdivision, change of use, soil disturbance or soil sampling activity proposed in relation to the piece of land. This may require application for resource consent in accordance with the Resource Management Act 1991. Any site investigation required must be done and reported on by a suitably qualified and experienced practitioner in accordance with the NESCS.

Council is concerned with human receptors only. You are advised to contact the Waikato Regional Council, who may or may not have further information in relation to HAIL activity and the likely presence of hazardous contaminants for this land, particularly in relation to ecological receptors.

Disclaimer: -
Hamilton City Council accepts no liability for any inaccuracy in, or omission from, the information provided above, or for any consequence of that inaccuracy or omission.

Any person who wishes to make any commercial decisions that involve an assessment of whether the site is impacted by hazardous contaminants should make their own enquiries and decisions.

Further information:
More information on hazardous activities and industries that are considered likely to cause land contamination can be found at:- http://www.mfe.govt.nz/issues/hazardous/contaminated/hazardous-activities-industries-list.html.

Please contact me if you require any further assistance.

Regards
Laura Mills
Contaminated Land Officer

Council Building
Garden Place, Hamilton
Phone 07 838 6582
Website www.hamilton.co.nz

Hamilton City Council
Te kaunihera o Kirikiriroa

Private Bag 3010
Hamilton 3240
New Zealand

TEL 07 838 6699
FAX 07 838 6599
EMAIL info@hcc.govt.nz
hamilton.govt.nz

18 March 2022

Jarrod Hall
PO Box 13077
Tauranga Central
Tauranga 3141

Dear Jarrod:

Request under Section 10 of the Local Government Official Information and Meetings Act 1987

This letter provides the response to your request for information under Section 10 of the Local Government Official Information and Meetings Act 1987. The property that is the subject of this request (details as provided by you and as held on file) is contained in this response as follows.

Address: 0 Wairere Drive, Hamilton
Legal Description: Lot 2 DP 548526

As at 18 March 2022 a search of Council records shows that the property has been used and investigated for the following activities listed on the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL):

HAIL Landuse:

- HAIL category A10 (use of horticultural chemicals during general pastoral use, cropping, or orchards).
- HAIL category I (multiple, including: fertiliser use, isolated infilling and presence of fill, use of lead-based paints and use of asbestos containing materials)
- HAIL category A8 (former spray race use, a potential sheep dip)
- HAIL category G5 (waste pits, potential for unknown offal pit locations)
- HAIL categories A17 and D5 (yard area associated with engineering workshop use)
- HAIL category A6 (historic fertiliser or agrichemical storage)
- HAIL category B2 (presence of electrical transformers)
- HAIL category A18 (aboveground storage of treated timber)
- HAIL category H (offal pits, engineering workshop, asbestos in buildings, use of lead- based paints and galvanisation, abattoir activities and spray drift from horticultural, pastoral and orchard activities)

Status: Contaminated Land
Determination: NES – Commercial/Industrial

Council holds further information on the property file in relation to hazardous contaminants in the soil. This information includes the following reports:

1. Preliminary Site Investigation for Ground Contamination, Eastern Transport Corridor – Ruakura Inland Port Development. Tonkin + Taylor 2021
2. Detailed Site Investigation for Ground Contamination, Spine Road – Ruakura Inland Port Development. Tonkin + Taylor 2021

Important notes: -

No inspection of the subject property has been carried out because of this application. This response relates only to the likely presence of hazardous contaminants. It does not include any information Council may hold in relation to any other matters listed in Section 44A (2) of the Local Government Official Information and Meetings Act 1987.

The Resource Management National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) Regulations 2011 would apply to any tank removal, subdivision, change of use, soil disturbance or soil sampling activity proposed in relation to the piece of land. This may require application for resource consent in accordance with the Resource Management Act 1991. Any site investigation required must be done and reported on by a suitably qualified and experienced practitioner in accordance with the NESCS.

Council is concerned with human receptors only. You are advised to contact the Waikato Regional Council, who may or may not have further information in relation to HAIL activity and the likely presence of hazardous contaminants for this land, particularly in relation to ecological receptors.

Disclaimer: -
Hamilton City Council accepts no liability for any inaccuracy in, or omission from, the information provided above, or for any consequence of that inaccuracy or omission.

Any person who wishes to make any commercial decisions that involve an assessment of whether the site is impacted by hazardous contaminants should make their own enquiries and decisions.

Further information:
More information on hazardous activities and industries that are considered likely to cause land contamination can be found at:- http://www.mfe.govt.nz/issues/hazardous/contaminated/hazardous-activities-industries-list.html.

Please contact me if you require any further assistance.

Regards
Laura Mills
Contaminated Land Officer

Council Building
Garden Place, Hamilton
Phone 07 838 6582
Website www.hamilton.co.nz

Appendix D:

Historic Aerial Photographs

Legend

Approximate Site Boundary

0 50 m 100 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 1938		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1938 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5392	Version: Final

Legend

Approximate Site Boundary

0 100 m 200 m

4SIGHT CONSULTING

Produced by Datanest.earth

Title: Aerial Photograph of the Site taken in 1948		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1948 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:6557	Version: Final

Legend

- Approximate Site Boundary

0 100 m 200 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 1953		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1953 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5713	Version: Final

Legend

- Approximate Site Boundary

0 50 m 100 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 1967		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1967 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5069	Version: Final

Legend

Approximate Site Boundary

0 100 m 200 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 1971		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1971 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:6046	Version: Final

Legend

Approximate Site Boundary

0 50 m 100 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 1974		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1974 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5200	Version: Final

Legend

- Approximate Site Boundary

0 100 m 200 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 1979		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1979 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5672	Version: Final

Legend

- Approximate Site Boundary

0 100 m 200 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 1981		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1981 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5662	Version: Final

Legend

Approximate Site Boundary

0 50 m 100 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 1991		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1991 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5392	Version: Final

Legend

Approximate Site Boundary

0 50 m 100 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 1995		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 1995 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5000	Version: Final

Legend

Approximate Site Boundary

0 50 m 100 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 2008		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 2008 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5000	Version: Final

Legend

Approximate Site Boundary

0 50 m 100 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 2015		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 2015 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:5000	Version: Final

Legend

- Approximate Site Boundary

0 100 m 200 m

4SIGHT CONSULTING

Produced by **Datanest.earth**

Title: Aerial Photograph of the Site taken in 2020		
Client: CMW Geosciences Ltd		
Project: Tramway Contamination Assessment	Drawn: JH	Figure No: 2020 Size: A4
Date: 15-03-2022	Checked: AG	
Proj No: 11129	Scale: 1:6135	Version: Final

Appendix E:

Oblique Aerial Photographs

Appendix F:

Site Photographs

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
1	8/03/22

Description:
Focus Area 1:
Sheep handling area

Photo No.	Date:
2	8/03/22

Description:
Focus Area 1:
Sheep handling building

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
3	8/03/22

Description:
Focus Area 1: Former workshop attached to the sheep handling building

Photo No.	Date:
4	8/03/22

Description:
Focus Area 1: Former sheep investigation lab

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
5	8/03/22

Description:
Focus Area 1:
Small transformer building

Photo No.	Date:
6	8/03/22

Description:
Focus Area 1:
Concrete pad

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
7	8/03/22

Description:
North of Focus Area 1: Barn

Photo No.	Date:
8	8/03/22

Description:
Focus Area 2: Concrete walls east of the former weed laboratory

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
9	8/03/22

Description:
Focus Area 2:
Former weed laboratory

Photo No.	Date:
10	8/03/22

Description:
Focus Area 2:
Former weed laboratory

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
11	8/03/22

Description:
Focus Area 2:
PACM fragments on the eastern side of the smaller former weed laboratory buildings

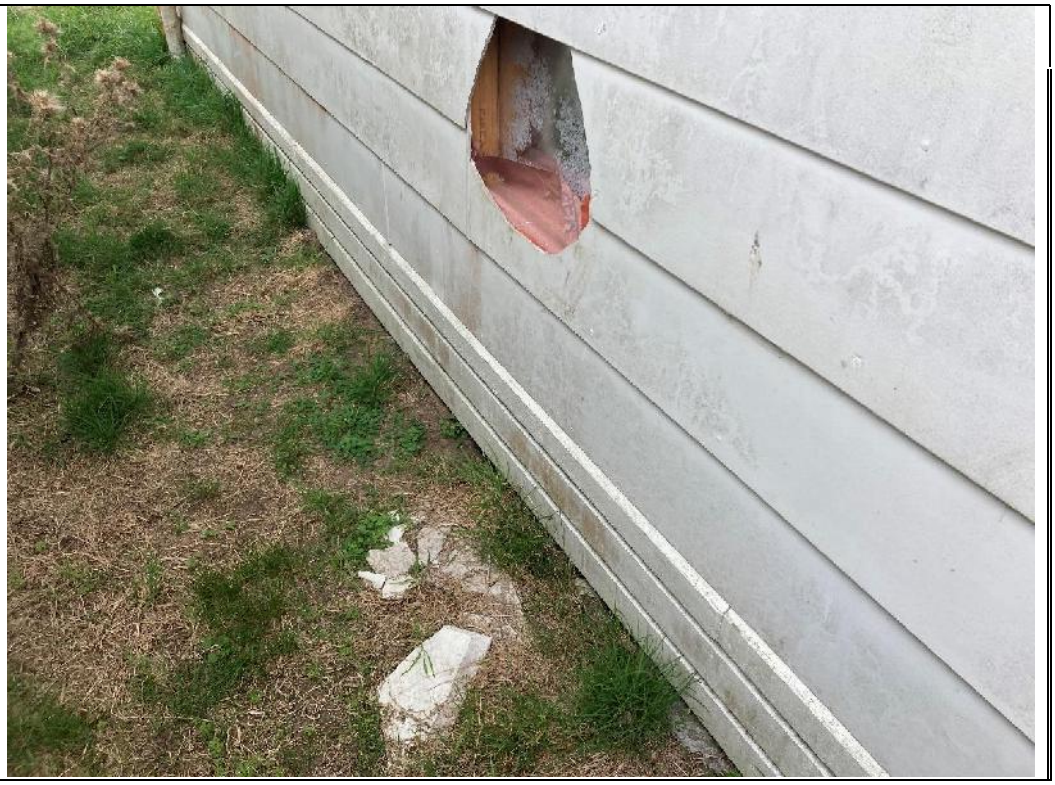


Photo No.	Date:
12	8/03/22

Description:
Focus Area 2:
Interior of glasshouse 1 south of the former weed laboratory

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
13	8/03/22

Description:
Focus Area 2:
Drainage sump at the rear of glasshouse 1

Photo No.	Date:
14	8/03/22

Description:
Focus Area 2:
Glasshouse 2

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
15	8/03/22

Description:
Focus Area 2:
Interior of glasshouse 2 south of the former weed laboratory

Photo No.	Date:
16	8/03/22

Description:
Focus Area 3:
Shearers quarters

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
17	8/03/22

Description:
Focus Area 3:
Shed

Photo No.	Date:
18	8/03/22

Description:
Focus Area 3:
Visual staining on the southern side of the shed

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
19	8/03/22

Description:
Focus Area 3:
Implement shed

Photo No.	Date:
20	8/03/22

Description:
Focus Area 3:
Soil disturbance and PACM in the northern yard area

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
21	8/03/22

Description:
Focus Area 3: Broken barrel containing miscellaneous liquid (hydrocarbon odour) and a small area of staining in the northern yard area

Photo No.	Date:
22	8/03/22

Description:
Focus Area 3: Concrete bunker in the northern yard area containing PACM

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
23	8/03/22

Description:
Focus Area 3:
Concrete bunker in the northern yard area containing PACM and timber

Photo No.	Date:
24	8/03/22

Description:
Focus Area 3:
Minor soil disturbance south of the concrete bunkers with some PACM identified on the ground

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
25	8/03/22

Description:
Focus Area 3:
Small transformer building

Photo No.	Date:
26	8/03/22

Description:
East of Focus Area 3:
Sheep shed

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
27	8/03/22

Description:
East of Focus Area 3: Former drenching area associated with the sheep shed

Photo No.	Date:
28	8/03/22

Description:
Focus Area 4: Southern Landfill area.

PHOTOGRAPHS

Client Name:	Site Location:	Project No.
CMW Geosciences	Tuumata	11129

Photo No.	Date:
29	8/03/22

Description:
Focus Area 4:
Dust suppression pond

Photo No.	Date:
30	8/03/22

Description:
Focus Area 4:
Soil disturbance associated with the development of the wider Powells property