Preliminary Site Investigation – 139 Grange Road, Burnham

Prepared and updated for

Burnham 2020 Ltd

July 2023

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Limitations:

See Section 9.0 for Report Limitations.

Executive Summary

Pattle Delamore Partners Limited (PDP) has been asked by the current landowner Burnham 2020 Ltd to review and update information within a preliminary site investigation (PSI) report[1] prepared by PDP in 2020 for the property located at 139 Grange Road, Burnham. The original report was prepared for a due diligence process for the purchase of the site. The site has since been purchased and it is understood Burnham 2020 Ltd intend to continue with the farming operations whilst also progressively quarry the property to provide aggregate for construction projects. This PSI has been prepared to support the consenting process for the quarrying activity.

No additional site visit has been undertaken to assess current conditions since 2020, as it has been reported that there has been no change in land use activities onsite (i.e. the site is continuing to operate as a farm). Data sources used within the original PSI have been reviewed and updated, as required. This included reviewing the Environment Canterbury Listed Land Use Register (LLUR), current active wells / boreholes and current active consents.

The site history review shows the site was used as a forestry plantation from at least the 1940's until circa 2005. In 2005 the farm was converted to an irrigated cropping/cattle fattening farm and since 2010, the property has operated as an irrigated heifer grazing farm. Key land use activities that may have resulted in contaminating soils/groundwater (based on site walkover observations) include:

- An above ground diesel tank in the yard of the former forestry block (anecdotal information);
- Two above ground fuel storage tanks for refuelling farm vehicles;
- Storage of bulk fertilisers and other materials such as fence posts and used tyres which are used in the general operational aspects of the farm; and
- Waste pits/infill pits relating to past land use (anecdotal information) and current farming practices.

Based on the above, the following HAIL[2] activities have been identified for the site:

- '*Landfill sites*' (HAIL Reference G3)
- '*Waste disposal to land*' (HAIL Category G5)
- 'Bulk storage of fertilizer' (HAIL Category A6)
- '*Storage tanks or drums for fuel*' (HAIL Category A17)

No sampling of soils around the current operational yard area or known pit locations was considered necessary at this stage as these areas will continue to be used for the ongoing operation of the farm. However, broad-acre sampling of surface soils outside of identified the HAIL areas were undertaken to provide an initial indication to the presence of contaminants (if any) in the near surface soils. The sampling results showed the likely key indicator contaminants (i.e. heavy metals and organochlorine pesticides (OCPs)) at background levels for the area. The site history review and sample results suggest that although a number of potentially contaminating activities have been identified at the site, they are in discrete areas only and should not be interpreted across the wider site. These contamination sources were considered to be typical for a large forestry/farming operation.

As the site is currently being used as 'production land', the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soils to Protect Human Health) Regulations 2011* (referred to as the NESCS) is not applicable for the current soil disturbance activities and general operation for the current use of the site. However, the proposed change in land use as a quarry is not defined as 'production land' and therefore the NESCS regulations (soil disturbance and change in land use) will need to be taken into consideration for the proposed quarry development. Given these HAIL areas will continue to be used for the short to medium term, a detailed site investigation (DSI) has not been undertaken so the consent application will need to proceed down the **discretionary activity** process.

The recommended approach to managing the identified contamination source areas during the proposed future quarrying operations is through the development and implementation of a Site Management Plan (SMP). This would include the requirement to further investigate the HAIL areas identified in this PSI prior to any quarrying activities taking place in the sections of the quarry identified. It is recommended that this is included as a condition of the land use consent issued for the operation of the quarrying activities.

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1.0 Introduction

Pattle Delamore Partners Limited (PDP) has been engaged to undertake a review and updating of a preliminary site investigation (PSI; site history review) completed in February 2020 for the property located at 139 Grange Road, Burnham. It is understood the new landowner Burnham 2020 Ltd intends to continue with the farming operations whilst also progressively quarry the property to provide aggregate for construction projects in the region. This PSI has been prepared to support the consenting process for the quarrying activity.

The desktop assessment has been conducted through the inspection of relevant historical records including historical aerial photographs, council documentation as well as undergoing a site inspection in 2020. In addition, a limited soil sampling exercise was completed as part of the original assessment to provide contamination status (if any) of the near surface soils across the wider site.

The objectives of this PSI are to:

- Review the available information to determine the history of the site and whether any activities on the HAIL[1] have been undertaken at the site from past or present land use practises;
- Determine the key contaminants of concern associated with any identified potential sources of contamination and HAIL activities;
- Determine an indication of the contamination status of the near surface soils through a limited soil sampling investigation (broad-acre sampling only);
- Assess the applicability of the NESCS for the soil disturbance activities associated with the proposed quarry; and
- Assess if any new potentially contaminating activities have been undertaken at the site since February 2020.

This assessment has been carried out in general accordance with *Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand* (MfE, 2011) and *Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (Revised 2011).* This PSI has been certified by suitably qualified and experienced practitioner as required by the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soils to Protect Human Health) Regulations 2011* (referred to as the NESCS).

[1] *Hazardous Activities and Industries List* (Ministry for the Environment; MfE, 2011).

2.0 Site Details

The site proposed to be progressively quarried is the triangle shaped area of land bound by Grange Road to the south, Aylesbury Road to the east and Kivers Road to the west (here in referred to as 'the site'). The wider property forming the farm also includes two blocks of land on the southern side of Grange Road. These are referred to as the 'South Blocks' and are shown on Figure 1. The South Block areas are outside of the scope of this PSI as they are not intended to be quarried in the future. However, in some instances the data sources reviewed have included these blocks as they fall under the wider property.

A site location map and existing site layout is presented as Figure 1 in Appendix A.

2.1 Site Identification

The details of the site are provided in Table 1 below.

Table 1: Site Details	
Address	139 Grange Road, Burnham
Legal Description	CB82/294, CB137/244, CB31/285
Site Owner	Burnham Farm Limited
Grid Reference	NZTM BX23: 4262 7278
Area	Approximately 380 hectares
Zoning	Rural Zone – Outer Plains
Current Land Use	Operational Irrigated Heifer Grazing Farm
Surrounding Land Use	North: Open paddocks South: Grange Road followed by open paddocks, lifestyle block homes and Burnham Military Camp East: Aylesbury Road followed by open paddocks West: Open paddocks

2.2 Site Description

At the time of the PDP site inspection on 30 January 2020, the site consisted of an operational irrigated heifer grazing farm. The South Blocks were not included as part of this site inspection.

The majority of the site comprised of grassed paddocks, with the site divided into three main sections of north, south-west and south-east, based on three circular irrigation pivot systems. The sections of the site not included in the three main pivot irrigation systems have smaller separate irrigation systems. A yard area is located in the centre of the site comprising of a barn, mechanical workshop, refuelling tanks, portacabin, several silos, a stock yard and a waste pit. Other farming materials such as fence posts, a covered silage stockpile, rows of bailage and fertiliser are also stored in this area.

Photographs of the site are presented in Appendix B.

2.3 Environmental Setting

The geological map for the area (Forsyth et al., 2008 1:250,000) reports that the surrounding area is underlain by 'grey river alluvium beneath plains or low-level terraces (Q1a)".

The nearest surface water to the site consists of multiple field drains located in the paddocks surrounding the site. The Selwyn River is located 5.5km to the south of the site.

The Environment Canterbury (ECan) Land and Water Regional Plan (LWRP) shows that the site is located outside of the Christchurch Groundwater Protection Zone.

The ECan online GIS database was searched for groundwater bores / wells located within a 2 km radius of the site boundary. There are eleven groundwater bores recorded within the site's boundaries, all of which are used for irrigation or stock water supply. One-hundred and forty-three groundwater bores were recorded within a 2 km radius of the site, all of which are recorded as being 'active (exist, present)', including nineteen for water level observation, thirty-six for irrigation, fifty-eight for domestic supply and / or stockwater supply, three for commercial/industrial and two for geotechnical investigations.

Groundwater bores in the area indicate that groundwater would be expected to be encountered at a depth of approximately 10–20 m below ground level (bgl). Groundwater is expected to flow in a predominately south-easterly direction beneath the site.

A plot and table summarising the active bores within a 200 m radius of the site are presented in Appendix C.

3.0 Desktop Review of Site History

A desktop assessment was undertaken to provide an overview of any potential contaminants of concern that may be present at the site as a result of any documented past and present activities. The following information was sourced in order to establish the history of the site:

- Historical aerial photographs;
- Environment Canterbury (ECan) and Selwyn District Council (SDC) information; and
- Site inspection.

3.1 Historical Aerial Photographs

Historical aerial photographs for the site have been reviewed. The reviewed aerial photographs are presented in Appendix D.

Table 2: Historical Aerial Photographs	
1942	The site consists of paddocks, with a farmhouse in the south-east corner of the site. Forestry trees can be seen in sections of the paddocks and forestry access roads can be seen crosscutting the site. The farmhouse consists of two buildings surrounded by trees, with surrounding lawns and several outbuildings.
1962	The site is covered in mature forestry trees, with forestry access roads clearly visible and the farmhouse still visible in the south-east corner of the site with lawn surrounding the farmhouse.
1974	The property remains unchanged apart from the harvesting of some trees in the south-eastern corner of the site
1982	The farmhouse and associated outbuildings have been demolished. The hedges and lawns surrounding the demolished farmhouse are still present. The balance of the site appears to have been harvested with diagonal lines suggesting rows of slash (forestry debris during harvesting).
1994	The site has been replanted with forestry. A circular area of trees is visible in the location of the former farmhouse.
2004	The trees have been harvested across the site, with loading out areas and tracks visible. Ponded water is present in numerous areas across the site, particularly within loading out areas and the access tracks. Large ponded areas are noted centrally on the site and on the western boundary. It is unknown if these may have been pits.

Table 2: Historical Aerial Photographs	
2015-16	The property has developed into its current layout, with the positions of the three main pivots across the site clearly visible. The current yard is also visible in the southern central section of the site. The current waste pit can be seen next to the two silos located in the centre of the site. 100's of used tyres can be seen in the yard area (used for covering the silage stockpiles) with volume estimated to be less than 20 m^3.
2022	The property remains in its current layout. No significant changes are identified.

Notes:

1. *Historical aerial photographs sourced from Canterbury Map Partners, administered by ECan.*
2. *It should be noted that some aerial images are at a large scale and therefore of relatively low quality.*

3.2 Environment Canterbury Information

3.2.1 Listed Land Use Register (LLUR)

The ECan LLUR is used to hold information about sites that have used, stored or disposed of hazardous substances, based on activities detailed on the HAIL (MfE, 2011). It should be noted that the LLUR is not complete and new sites are regularly being added as ECan receives information and conduct their own investigations.

As of July 2023, the site remains unlisted on the LLUR. However, the neighbouring properties 168 Aylesbury Road, 177 Grange Road and Burnham Military Camp (Res 1176) located immediately east, south and southeast of the site respectively, are listed under two distinct HAIL Codes:

- A10 – Persistent pesticide bulk storage or use - Applies to the two residential / lifestyle block properties at 168 Aylesbury Road and 177 Grange Road. This primarily relates to greenhouse / tunnel houses associated with gardening and horticultural activities.
- G3 – Landfill Sites – RES 1176, Burnham (Burnham Military Camp) applies to a larger parcel associated with Military operations and development. Evidence of landfilling at this site was noted from 1994 to present.

These sites identified outside of the property are not expected to have resulted in any contamination of soils on the subject site and are located down hydraulic gradient of the site so are not expected to cause contamination via groundwater migration.

A copy of the LLUR documentation is presented in Appendix E.

3.2.2 Resource Consents

The ECan online GIS database was searched for resource consents located within a 2 km radius of the site. There are eighty-one resource consents recorded as 'issued-active', with ten recorded as being issued within the site. Consents CRC220897, CRC220897, CRC222635, CRC220897, CRC22089, and CRC222635 are six consent applications currently on-hold for water permitting. Consents CRC222536, CRC222536, CRC222536, CRC221642 are four ground water permits that are active under an S124 continuance and relates to groundwater take for irrigation purposes onsite.

There is considered to be no consented activity that would result in ground contamination that could impact site soils within 2 km of the site.

A table and plot of resource consents within a 2 km radius of the site are presented in Appendix F.

3.3 Selwyn District Council Information

The property files for the site were requested from Selwyn District Council and reviewed for this PSI. The files contained various building consents and applications, none of which related to environmental or potentially contaminating activities and therefore were of no relevance to this investigation and have not been listed here. There have been no changes on site since 2020 so no additional information from SDC was sought.

3.4 Anecdotal Information

The following information was provided during a telephone discussion on 27 January 2020 with the original site owner Mr Leo Donkers (Camden Group).

- The property was formerly used for logging until 2005 when the farm was converted from forestry to an irrigated cropping/cattle fattening farm;
- The site was purchased by the Camden Group in 2010 and converted to an irrigated heifer grazing farm;
- Several waste pits are located on site, including a former infilled pit on the western boundary and a current pit adjacent to the current yard in the centre of the site. There was no information regarding the composition of the former infilled pit, but the current waste pit was reportedly used for the disposal of general farming waste materials; and
- The former logging yard in the northern centre of the site formerly had an above ground diesel storage tank of unknown volume for the fuelling of the vehicles used for the forestry operations.

A plan showing the location of the former forestry yard and a plan showing the two pits (infilled and current), as provided by Mr Donkers, has been presented in Appendix G.

As part of updating this PSI in July 2023, the client (Dan McGregor) confirmed that there have been no new potentially contaminating activities at the site since the site inspection in 2020. The site has continued to operate as a working farm.

3.5 Site Inspection

A site inspection was undertaken by PDP on 30 January 2020. The main findings from the site inspection are summarised below. Key features are shown in Figure 1 presented in Appendix A and photographs of the site are presented in Appendix B.

- One main barn of corrugated iron construction is located in the central portion of the site associated with the current farming operations. The southern end of the barn is currently used for the storage of general farming materials/consumables and vehicles including tractors. This portion of the barn is unsealed and some minor hydrocarbon staining was observed on the ground surface. This was considered typical for normal farming operations where equipment is stored. The northern end of the barn is used as a vehicle workshop and has a concrete surface. A hazardous storage cupboard with signage (2WE – Agrichemicals) was evident in the workshop;
- Two shipping containers are located approximately 50 m north of the barn, with one container marked as containing anhydrous ammonia (fertilizer);
- In the centre of the site, approximately 200 m north of the barn are two above ground fuel storage tanks. One is an old disused diesel fuel tank and the other the current tank used to fuel the farm vehicles on site. There was no obvious significant staining on the surface surrounding these tanks;
- A waste pit was visible approximately 35 m east of the fuel storage tanks. The pit was approximately 4-5 m deep and was being used for the disposal of waste farming materials. Visible waste included organic material (vegetation and deceased farm animals), metal (wire etc), concrete, plastics including tarpaulins, and wood (including some treated wood such as fence posts);
- There were a number of used tyres (100's) placed on the top of the silage stockpile. Other used tyres were stored in the area; and
- The area of the former infilled pit on the western boundary (as reported by Mr Donkers) showed as a slight depression on the ground surface with relatively sparse grass growth during the site walkover.

4.0 Summary of Site History and Potential Sources of Contamination

The available historical information shows the site has been used predominantly for forestry purposes, converting to an irrigated cropping/cattle fattening farm in 2005 and becoming an irrigated heifer grazing farm in 2010 until present. There was no evidence to suggest that any herbicides/pesticides have been used historically at the site.

Key land use activities that may have resulted in contaminating soils/groundwater include:

- An above ground diesel tank was reportedly present in the yard of the former forestry yard (location estimated based on anecdotal evidence provided). This was likely a small above ground tank. The likelihood of there being any significant contamination in the ground associated with this fuel storage is low.
- Two above ground fuel storage tanks for refuelling farm vehicles are currently present on site;
- Storage of bulk fertilisers and other materials such as fence posts and used tyres which are used in the general operational aspects of the farm; and
- Waste pits/infill pits have been identified at the site. The current farming waste pit was observed during the site inspection and contained organics, metal, concrete, plastics and wood waste. The full composition and extent of the material in the pit is unknown. It is understood that future pits will be used in the general area. The composition of the material within the former infilled pit is unknown. Other pits may also exist across the site associated with general farming practices.

Based on this information, the potential contamination sources from past and present land use activities do exist but are confined to certain areas of the property only (refer Figure 3). The contamination sources were considered to be typical for a large forestry/farming operation.

The identified potential contamination sources/HAIL activities include:-

- '*Landfill sites*' (HAIL Reference G3) relating to potential for uncontrolled fill within identified past infilled pits and the current waste pit.
- '*Waste disposal to land*' (HAIL Category G5) associated with storage of general farming materials (treated timber posts) including 100's of used tyres.
- 'Bulk storage of fertilizer' (HAIL Category A6) associated with storage of fertilisers onsite.

- '*Storage tanks or drums for fuel*' (HAIL Category A17) associated with former fuel tank in forestry operations yard and two above ground fuel storage tanks located near to the current yard.

HAIL locations on the site are presented in Appendix A, Figure 2.

5.0 Preliminary Soil Sampling Exercise

No sampling of soils around the current operational yard area or known pit locations was considered necessary as these HAIL areas will continue to be used so will need to be individually investigated/remediated as the quarry progressively develops and expands into these areas. However, in order to provide a general indication of the contamination status of the broad-acre surface soils across the site (i.e. general soils outside of the identified HAIL areas), a preliminary soil sampling investigation was undertaken. This was to inform developers on whether controls in a Site Management Plan would need to be considered during the handling and management of potentially contaminated surface soils during the quarry development.

It should be noted the soil sampling does not constitute a full detailed site investigation (DSI) for the entire site. Additional targeted sampling would be required as the quarry is developed in identified/discovered HAIL areas.

5.1 Soil Sampling Strategy and Analysis

An appropriate soil sampling strategy was derived to meet the objectives described above. A total of 15 soil samples (SS1 to SS15) were collected in a general grid pattern across the site in order to provide broad acre coverage.

A plan showing the soil sampling locations is presented on Figure 1, Appendix A.

The soil profiles across the site displayed silty topsoil to a depth of 0.2 m – 0.3 m bgl, underlain by sandy gravel.

No obvious stains, odours or possible contamination sources were observed during the collection of the soil samples from across the site.

Representative soil samples were collected from the surface soils. On each occasion, a clean pair of nitrile gloves was used for sample collection to prevent cross contamination between samples and to protect the PDP site worker during sample collection. All samples were placed directly into glass jars with food grade plastic sealed lids supplied by Analytica Laboratories Limited (Analytica). Following collection, these samples were placed immediately into a chilly-bin containing frozen ice packs. The chilly-bin was sent with chain of custody documentation to Analytica in Hamilton for analysis. The samples were received the following day after shipment.

Samples were analysed for heavy metals and organochlorine pesticides (OCPs). These compounds are considered to provide a general indication as to the presence of any likely contamination associated with the general horticultural/agricultural land use activities across the site.

5.2 Selected Guideline Criteria

In the absence of any applicable land use standards/guidelines for the future use of the site, comparison of the laboratory results to the ECan background soil concentrations for selected trace elements in the major Canterbury soil groups has been undertaken (ECan, 2007). In particular, the total recoverable metals analytical results have been compared with ECan Level Two background soil concentrations for the 'Yellow Brown Stony' soil group in which the land is located.

Whilst OCP compounds are anthropogenic it is important to note that due to their historical ubiquitous application in agriculture, parklands and turf management they can be considered to also be present at low but detectable 'background' concentrations (MfE, 1998). While there are no official ECan background soil concentrations, ECan has recently recognised that some OCPs are ubiquitous in the environment and has adopted an interim 'background' level (0.431 mg/kg) for ∑DDT[2] (OCP compounds). This value was taken from the report prepared by MfE entitled '*Ambient Concentrations of Selected Organochlorines in Soils*' and dated December 1998.

5.3 Soil Sampling Results and Comparison to Guideline Criteria

The selected guideline criteria for heavy metals and OCPs are presented in Table A, Appendix H. A copy of the laboratory report and chain of custody documentation are presented in Appendix I.

Heavy Metals

All fifteen samples collected and analysed from locations SS1 to SS15 recorded heavy metal concentrations below the ECan (2007) background levels for the local soil type.

OCPs

No detectable OCP compound concentrations were reported in any of the fifteen samples, therefore all samples were below the MfE (1998) background level.

[2] For this assessment, the results for DDT, DDD and DDE are summed together (∑DDT) and compared to background soil concentrations and the soil contaminant standard for DDT.

6.0 Consideration of the NESCS

6.1 Provisions of the NESCS

The NESCS seeks to control activities on contaminated land so as to protect human health. The regulations apply to land which is described as having, has had or is more likely than not to have had an activity or industry described in the HAIL undertaken on it (i.e. the 'piece of land').

As discussed in Section 4.0, there have been land use activities carried out within discrete areas of the site that have the potential to have caused land contamination (i.e. HAIL areas) and these will need to be considered during future site development works. Soil sampling across the reminder of the site (i.e. outside of the identified HAIL areas) showed concentrations of key indicator contaminants at background levels for the area.

As the site is currently being used as 'production land', under regulation 5(8) the NESCS has only limited applicability, and applies for the following activities only:

- 5(8)(a) Removal or replacement of a fuel storage system;
- 5(8)(b) Soil disturbance of the piece of land which is being used for residential purposes (note that there is currently no residential use at the site currently);
- 5(8)(c) Subdivide the land in a way that causes the piece of land to stop being productive land; and
- 5(8)(d) Change of the use of the land in a way that causes the piece of land to stop being production land.

Therefore, on the basis of the above, the NESCS is not applicable for the current soil disturbance activities and general operation for 'production land'. However, the proposed change in land use as a quarry is not defined as 'production land' under the Section 2 of Resource Management Act (RMA; 1991) and therefore the NESCS regulations will need to be taken into consideration for the proposed quarry development.

For the proposed quarry development, the NESCS will potentially apply to the following activities:

- Disturbance of soils in the identified HAIL areas under regulation 5(4); and
- Changing the use of a land under regulation 5(6).

Soil disturbance is a permitted activity under regulation 8(3) provided that controls are put in place to minimise contact with soil during the disturbance, that the soil be reinstated to an erosion-resistant state within one month of completion of the works and that disposal of removed soil is to a facility authorised to receive such waste. The NESCS also sets limits on the volume of

soil disturbance (no more than 25 m^3 per 500 m^2 is disturbed), soil removal (no more than 5 m^3 per 500 m^2 is removed from the site per year) and duration of works (no longer than two months). Based on the nature of quarrying activities, these conditions will unlikely be able to be met so under regulation 8(5) the activity of soil disturbance in those areas where HAIL activities have been identified will require resource consent. No soil sampling has been undertaken in the identified HAIL areas as they will continue to be used for this activity in the short to medium term. As such, the consent application will need to proceed down the **discretionary activity** process.

Change in land use is a permitted activity under regulation 8(4) if it can be demonstrated through the review of the site history that it is highly unlikely that there will be a risk to human health if the activity is done to the 'piece of land'. Given the proposed activity will involve the disturbance of confirmed HAIL areas including farming landfill pits, there is the potential for exposure to uncharacterised waste material/contaminants and therefore a potential risk to human health exists. A resource consent would therefore be required to be obtained for the change in land use. Given the absence of a detailed site investigation of the identified HAIL areas, the consent application will need to proceed down the **discretionary activity** process.

The recommended approach to manage the identified contamination sources is to undertake targeted detailed site investigations of each HAIL area as the quarry development progresses (i.e. immediately prior to disturbance of these identified areas). This will ensure that any contamination sources associated with the ongoing use of the site as production land is captured in the assessments. The results of the testing will determine the appropriate course of action that is required and what remedial works, if any, are required. This would be outlined in a Site Management Plan prepared for the quarry development works.

There has been no assessment of any other consenting requirements associated with the operation of a quarry at the site.

7.0 Summary and Conclusions

PDP has reviewed and updated the available site history information for the portion of land within the property defined as 139 Grange Road, Burnham to reflect current site conditions as of July 2023. The objective of the investigation was to identify any potential sources of contamination from past and/or present land use activities at the site, determine an indication of the contamination status of the near surface soil through a limited soil sampling investigation and to assess the applicability of the NESCS for the future progressive development of the site as a quarry. This has been carried out to support the consenting process.

The site appears to have been used as a forestry plantation from at least the 1940's until circa 2005. In 2005 the farm was converted to an irrigated cropping/cattle fattening farm and more recently since 2010 the property has

been operated as an irrigated heifer grazing farm. The following HAIL activities have been identified across the site:

- '*Landfill sites'* (HAIL Reference G3) relating to potential for uncontrolled fill within identified past infilled pits (based on anecdotal information provided) and the current operational farming waste pit(s).
- '*Waste disposal to land*' (HAIL Category G5) associated with storage of general farming materials (treated timber posts) including 100's of used tyres.
- 'Bulk storage of fertilizer' (HAIL Category A6) associated with bulk storage of fertilisers onsite.
- '*Storage tanks or drums for fuel*' (HAIL Category A17) associated with former fuel tank in forestry operations yard and two above ground fuel storage tanks located near to the current yard.

No sampling of soils around the current operational yard area or known pit locations was completed as these areas will continue to be used for the ongoing operation of the farm and the progressive development of the quarry. However, broad-acre sampling of surface soils outside of the HAIL areas was undertaken to provide an initial indication to the presence of any contaminants in the near surface soils. The sampling results showed the likely key indicator contaminants (i.e. heavy metals and OCPs) at background levels for the area.

On the basis of the site history information and preliminary soil sampling results, a number of potentially contaminating activities have been identified at the site, however these are in discrete areas only and should not be interpreted across the wider site. These contamination sources were considered to be typical for a large forestry/farming operation.

As the site is currently being used as 'production land', the NESCS is not applicable for the current soil disturbance activities and general operation for the current use of the site. However, the proposed change in land use as a quarry is not defined as 'production land' and therefore the NESCS regulations (soil disturbance and change in land use) will need to be taken into consideration for the proposed quarry development. Given these HAIL areas will continue to be used for the short to medium term, a detailed site investigation has not been undertaken so the consent application will need to proceed down the **discretionary activity** process.

The recommended approach to manage the identified contamination source areas during the proposed future quarrying operations is through the development and implementation of a Site Management Plan. This would include the requirement to further investigate the HAIL areas identified in this PSI prior to any quarrying activities taking place in the sections of the quarry identified. It is recommended that this is included as a condition of the land use consent issued for the operation of the quarrying activities.

8.0 References

Forsyth, Barrell and Jongens., 2008; 1:250,000. Geology of the Christchurch Area. Institute of Geological and Nuclear Sciences 1:25,000 Geological Map 16. Lower Hutt, New Zealand.

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Ministry for the Environment, 2011b. *Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (Revised 2011).* Ministry for the Environment, Wellington.

Resource Management (National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

9.0 Report Limitations

This report has been prepared on the basis of information provided by Burnham 2020 Ltd and others (not directly contracted by PDP for the work). PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This report has been prepared based on: visual observations of the site vicinity and analysis of fifteen soil samples. Soil samples were analysed by an analytical laboratory for a suite of heavy metals and OCPs. The site conditions as described in this report have been interpreted from, and are subject to, this information and its limitations and accordingly PDP does not represent that its interpretation accurately represents the full site conditions.

This report is based on the observation and sampling at fifteen locations at the site. The environmental conditions have been interpolated between the sampling locations, and accordingly the interpolated conditions cannot be guaranteed to be accurate.

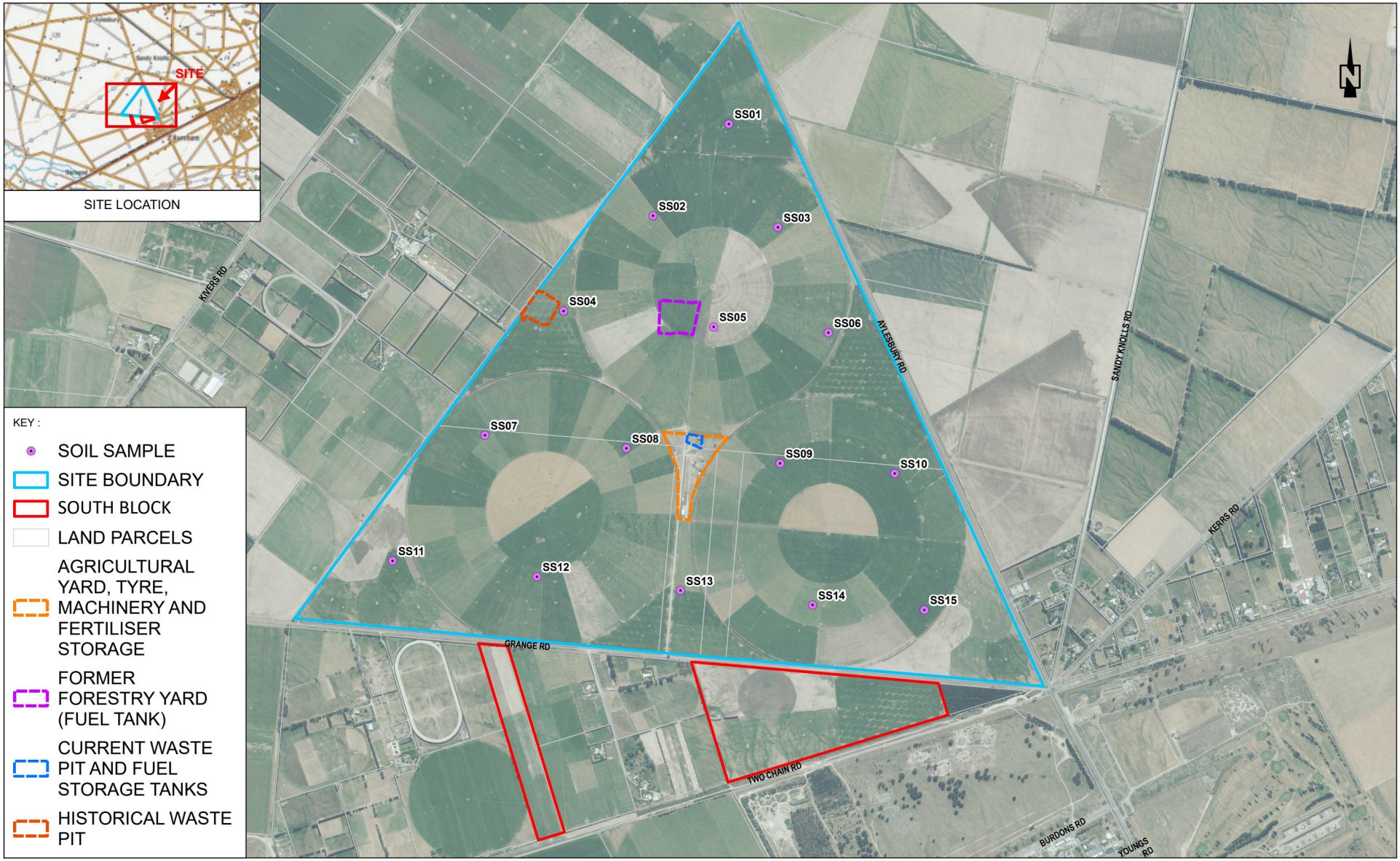
The laboratory test results provide an approximation of the concentration of the tested parameters and are subject to the inherent limitations of the laboratory techniques used for the tests.

PDP has sampled and tested only for those chemicals that are described in this report. The presence or absence of other chemicals at the site is not considered in this report.

The information contained within this report applies to sampling soil undertaken on the date stated in this report, or if none is stated, the date of this report. With time, the site conditions and environmental standards could change so that the reported assessment and conclusions are no longer valid. Accordingly, the report should not be used to refer to site conditions and environmental standards applying at a later date without first confirming the validity of the report's information at that time.

This report has been prepared by PDP on the specific instructions of Burnham 2020 Ltd for the limited purposes described in the report. PDP accepts no liability if the document is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

Appendix A: Figures



SOURCE:
1. AERIAL IMAGERY (FLOWN [2015-2016]) SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

FIGURE 1: SITE LOCATION, SITE BOUNDARY AND SOIL SAMPLE LOCATIONS

SCALE : 1:20,000 (A4)

0 125 250 500 750

METRES

C04096100.mxd 23/07/2023 ISSUE 1

SOURCE:
1. AERIAL IMAGERY (FLOWN [2015-2016]) SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

FIGURE 2: HAIL LOCATIONS

SCALE : 1:6,000 (A4)

0 25 50 100 150

METRES

C04096100.mxd 23/07/2023 ISSUE 1

Appendix B: Site Photographs

Photograph 1: (View north from the yard looking towards the silos)

Photograph 2: (View south towards the entrance of the site and the yard (historical fuel tank in left field of view))

Photograph 3: (Fuel storage tanks, historical (red tank) and current (white))

Photograph 4: (View of the northern side of the barn and mechanics workshop)

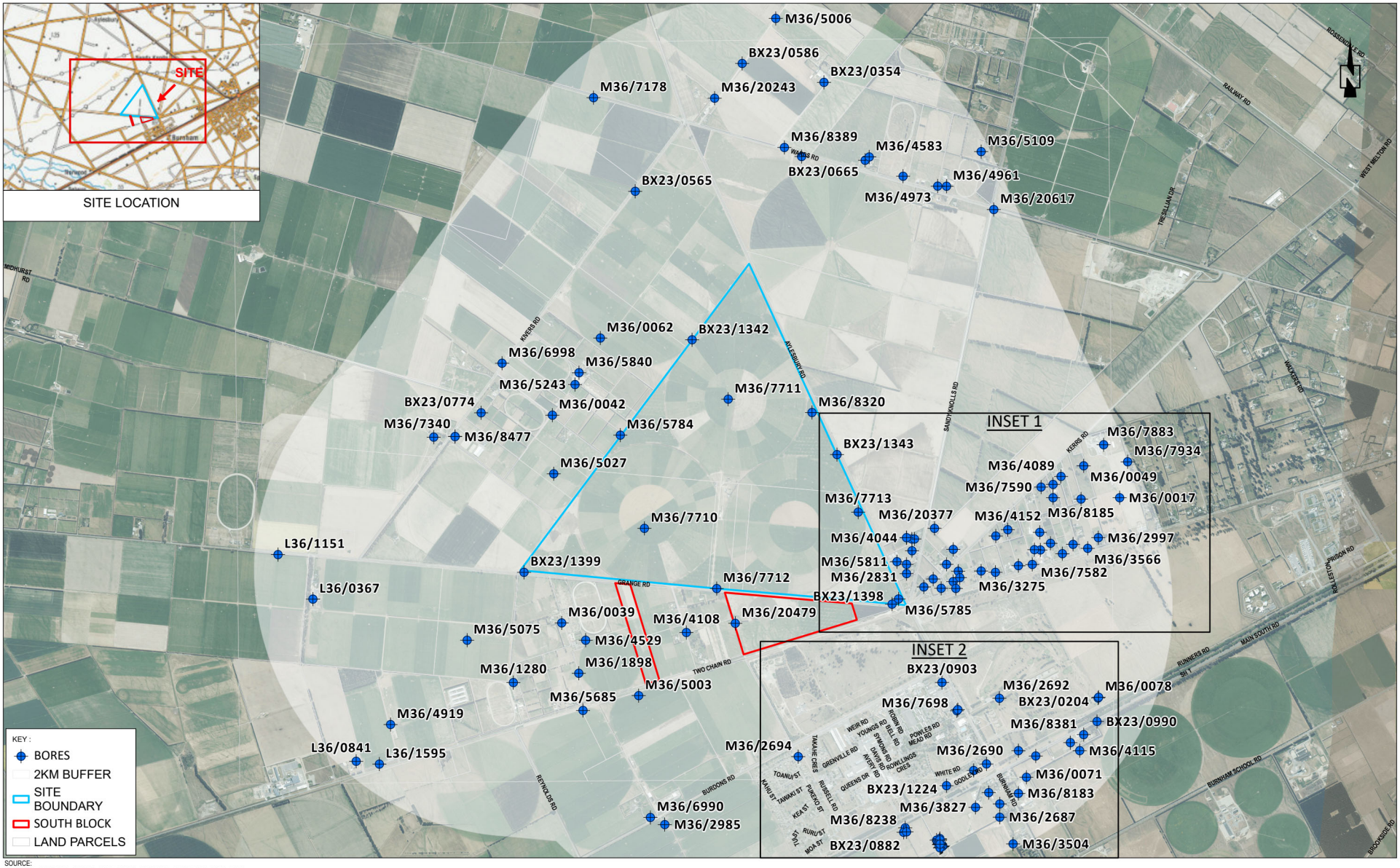
Photograph 5: (Inside of barn showing storage of various materials and some hydrocarbon staining on sandy gravel surface)

Photograph 6: (Current waste pit looking north-east, showing soil profile on northern edge of pit and waste material including wood, organics and tyres)

Photograph 7: (Close up of waste material, including dead stock)

Photograph 8: (Disturbed ground/depression shown on western boundary of site where former waste pit is located)

Appendix C: Environment Canterbury Bore Information



SOURCE:
1. AERIAL IMAGERY (FLOWN [2015-2016]) SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
3. BORE INFORMTION PROVIDED BY ENVIRONMENT CANTERBURY AND USED WITH PERMISSION.

BORES WITHIN 2 KM OF SITE BOUNDARY

SCALE : 1:27,500 (A4)

0 250 500 1,000 1,500
METRES

SOURCE:
1. AERIAL IMAGERY (FLOWN [2015-2016]) SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
3. BORE INFORMTION PROVIDED BY ENVIRONMENT CANTERBURY AND USED WITH PERMISSION.

INSET 1: BORES WITHIN 2 KM OF SITE BOUNDARY

SCALE : 1:7,000 (A4)

0 50 100 200 300

METRES

C04096100.mxd 23/07/2023 ISSUE 1

SOURCE:
1. AERIAL IMAGERY (FLOWN (2015-2016)) SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
3. BORE INFORMTION PROVIDED BY ENVIRONMENT CANTERBURY AND USED WITH PERMISSION.

INSET 2: BORES WITHIN 2 KM OF SITE BOUNDARY

SCALE : 1:7,000 (A4)

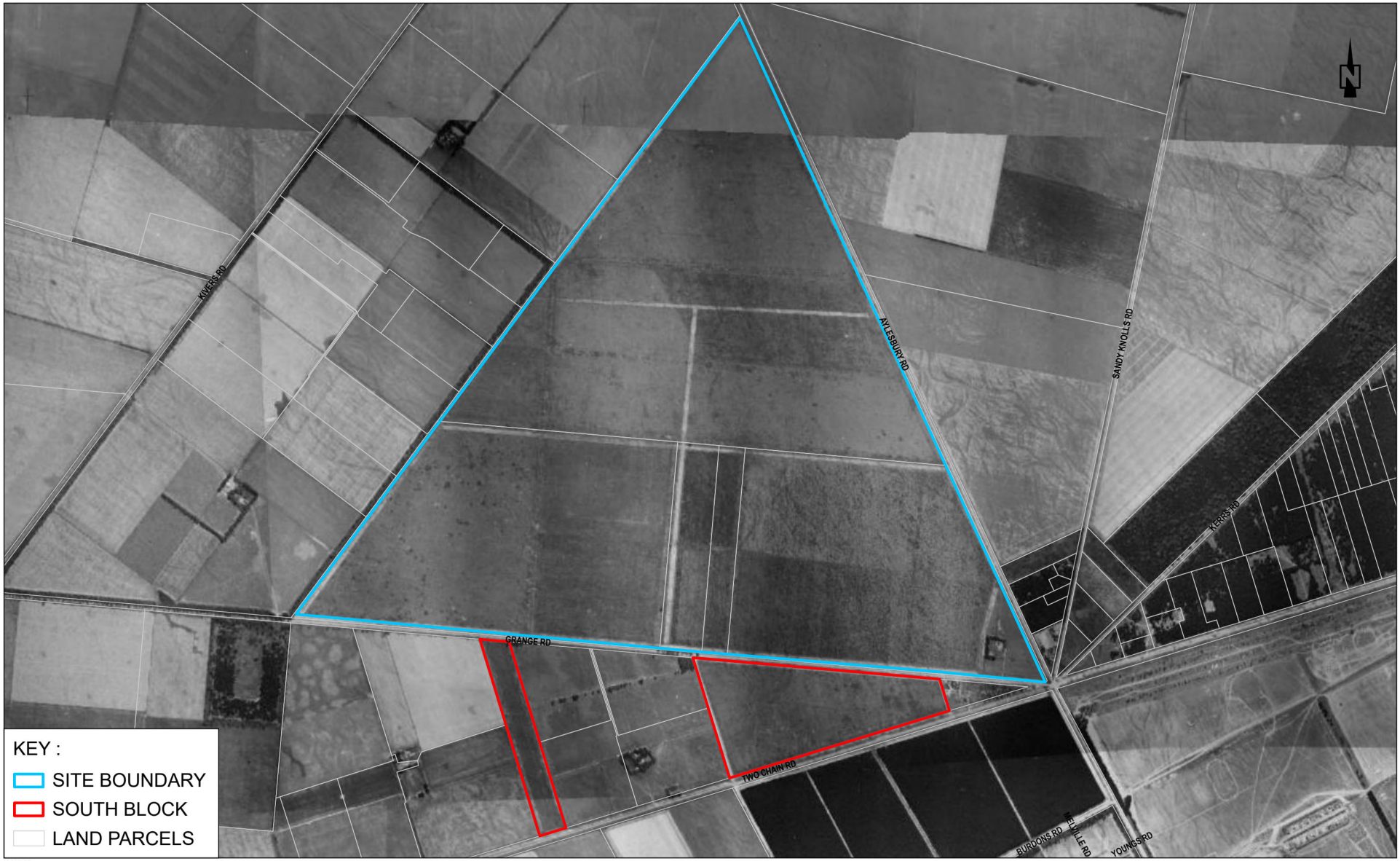
0 50 100 200 300

METRES

Bores located within a 2 km radius of the site (sourced from Ecan GIS Database July 2023)

	Well No.	Well Status	Depth (M)	Diameter (mm)	Well Use	Well Location	Well Owner	Well Type	Top Screen	Bottom Screen	Distance (m)
1	M36/7711	Active (exist, present)	148.38	300	Irrigation	Corner Alyesbury & Grange Road	Burnham Farm Limited	Bore or Well	118.38	142.38	570
2	M36/7710	Active (exist, present)	167.91	300	Irrigation	Corner Alyesbury & Grange Road	Burnham Farm Limited	Bore or Well	142.91	156.91	741
3	M36/8320	Active (exist, present)	101.78	150	Stock Supply	AYLESBURY ROAD	SELWYN PLANTATION BOARD	Bore or Well	94.28	100.28	790
4	BX23/1343	Active (exist, present)	34.19	50	Groundwater Quality	Aylesbury Road	Winstone Aggregates	Bore or Well	4.11	34.19	837
5	M36/7712	Active (exist, present)	162	300	Irrigation	160 Grange Road	Burnham Farm Limited	Bore or Well	133	153	856
6	M36/5784	Active (exist, present)	37.4	51	Water Level Observation	KIVERS ROAD	CHRISTCHURCH CITY COUNCIL	Bore or Well	13.8	37.4	859
7	M36/7713	Active (exist, present)	150.14	300	Irrigation	Corner Alyesbury & Grange Road	Burnham Farm Limited	Bore or Well	126.18	144.14	1020
8	BX23/1342	Active (exist, present)	37.13	50	Groundwater Quality	Aylesbury Road	Winstone Aggregates	Bore or Well	7.06	37.13	1050
9	M36/20479	Active (exist, present)	47.1	150	Domestic and Stockwater	139 Grange Road	Burnham Farm Limited	Bore or Well	41.6	47.36	1155
10	M36/4208	Active (exist, present)	54.5	400	Irrtaation	TWO CHAIN RD	BARTLETT W.E.	Bore or Well	51.4	54.4	1222
11	M36/5027	Active (exist, present)	52	200	Irrigation	KIVERS ROAD	Mr S J & Mrs A K Blakely	Bore or Well	50.5	52	1305
12	M36/5243	Active (exist, present)	52	150	Domestic and Stockwater	KIVERS ROAD	EASTGUN FARMS LTD	Bore or Well	50.5	52	1333
13	M36/5840	Active (exist, present)	52	150	Domestic and Stockwater	KIVERS ROAD	PATERSON, DJ	Bore or Well	50.5	52	1354
14	M36/5042	Active (exist, present)	53.3	300	Irrigation	KIVERS RD	Mr S J & Mrs A K Blakely	Bore or Well			1389
15	M36/5062	Active (exist, present)	127	127	Domestic Supply	KIVERS RD	SEATON, M D	Bore or Well			1404
16	M36/4344	Active (exist, present)	28.9	150	Domestic Supply	SANDY KNOLLS RD	GRIFFITHS AG & M	Bore or Well			1424
17	M36/3667	Active (exist, present)	45		Domestic Supply	SANDY KNOLLS RD	PEARSON D.L.	Bore or Well			1424
18	M36/5811	Active (exist, present)	48.5	150	Domestic and Stockwater	AYLESBURY ROAD	SALKELD, MD	Bore or Well	45.6	48.5	1429
19	M36/7928	Active (exist, present)	47.4	150	Domestic and Stockwater	SANDY KNOLLS ROAD	MR & MRS A & M GRIFFITHS	Bore or Well	45.9	47.4	1465
20	M36/4739	Active (exist, present)	30	125	Domestic Supply	SANDY KNOLLS RD	NEALE, T.D.& K.M.	Bore or Well			1484
21	M36/20534	Active (exist, present)	48	150	Domestic and Stockwater	41 Sandy Knolls Road	Mr G.W Hedges	Bore or Well	46.5	48	1497
22	M36/2885	Active (exist, present)	38.4	150	Domestic Supply	SANDY KNOLLS RD	CONSTABLE	Bore or Well			1502
23	M36/2831	Active (exist, present)	35	150	Domestic Supply	SANDY KNOLLS RD	TANGERDALE B.J.	Bore or Well			1535
24	BX23/1398	Active (exist, present)	23.2	50	Groundwater Quality	Aylesbury Road	Winstone Aggregates	Bore or Well	3.2	23.2	1570
25	M36/5785	Active (exist, present)	27.7	51	Water Level Observation	GRANGE ROAD	CHRISTCHURCH CITY COUNCIL	Bore or Well			1586
26	M36/20377	Active (exist, present)	54	150	Domestic and Stockwater	SANDY KNOLLS ROAD	ROAD METALS HOLDINGS LTD	Bore or Well	52.5	54	1605
27	M36/4528	Active (exist, present)	53.7	200	Irrigation	GRANGE "SILVERLEA FARM LTD"	Sarithero Trustees (2010) Limited	Bore or Well			1634
28	M36/0028	Active (exist, present)	39.4	180	Domestic Supply	Grange rd	Barton, D.S.	Bore or Well			1668
29	BX23/1399	Active (exist, present)	31.68	50	Groundwater Quality	Grange Road	Winstone Aggregates	Bore or Well	3.5	31.68	1693
30	M36/7728	Active (exist, present)	48	150	Domestic Supply	Kerrs Road	Ms IVE Milne	Bore or Well	46.5	48	1697
31	M36/8350	Active (exist, present)	54	150	Domestic and Stockwater	KERRS ROAD	MR D M SOMOR	Bore or Well	52.5	54	1730
32	M36/1519	Active (exist, present)	45.1	150	Domestic Supply	KERRS ROAD	MOYLAN M.T.	Bore or Well	43	45.1	1776
33	BX23/0257	Active (exist, present)	54	150	Domestic and Stockwater	KERRS ROAD	ROAD METALS COMPANY LIMITED	Bore or Well	52.5	54	1785
34	M36/5003	Active (exist, present)	53	300	Irrigation	TWO CHAIN ROAD, CNR THOMAS ROAD	Mr M J & Mrs S E Thomas	Bore or Well	47	53	1785
35	M36/4153	Active (exist, present)	45.7	150	Domestic Supply	TWO CHAIN RD	JAMERSON A.	Bore or Well			1816
36	M36/1898	Active (exist, present)	54.1	200	Irrigation	TWO CHAIN RD	Mr M J & Mrs S E Thomas	Bore or Well	50.9	54.1	1860
37	M36/8271	Active (exist, present)	58	150	Domestic and Stockwater	KERRS ROAD	G D MCNEILL	Bore or Well			1874
38	BX23/0023	Active (exist, present)	54	150	Domestic and Stockwater	KERRS ROAD	MR & MRS R & S SAUNDERS	Bore or Well	52.5	54	1877
39	M36/6998	Active (exist, present)	78	300	Irrigation	Kivers Road	Mr & Mrs B R H & A M Fechney	Bore or Well	52.8	77.8	1889
40	M36/2811	Active (exist, present)	34.1	150	Domestic Supply	KERRS ROAD	RYAN, C & N.	Bore or Well	30.4	34.1	1907
41	BX23/0774	Active (exist, present)	55.2	150	Domestic and Stockwater	Kivers Road	Richard Stuart Trewavas	Bore or Well	52.2	55.2	1908
42	BX23/0193	Active (exist, present)	45	150	Domestic and Stockwater	TWO CHAIN ROAD	MR CAMERON GLEN WOODS.	Bore or Well	43.5	45	1914
43	M36/1286	Active (exist, present)	42.2	150	Irrigation	TWO CHAIN ROAD	MOFFETT M.G.	Bore or Well			2036
44	M36/8477	Active (exist, present)	52.5	150	Domestic and Stockwater	KIVERS ROAD	MR D P & MRS D M STALKER	Bore or Well	50.5	52.5	2065
45	M36/8187	Active (exist, present)	48	150	Domestic Supply	82 KERRS ROAD	MR TIMOTHY PETER CHAPMAN	Bore or Well			2066
46	M36/4397	Active (exist, present)	52.5	150	Domestic and Stockwater	KIVERS RD	Mr R S J Trewavas	Bore or Well	50	52	2066
47	M36/5685	Active (exist, present)	83.1	300	Irrigation	TWO CHAIN ROAD	Mr M J & Mrs S E Thomas	Bore or Well	57	75.5	2073
48	M36/3275	Active (exist, present)	45	125	Domestic Supply	TWO CHAIN RD	CAMPELL D.R.	Bore or Well	44	45	2140
49	M36/4152	Active (exist, present)	45.4	150	Domestic Supply	KERRS RD	PATTERSON .T.	Bore or Well			2144
50	M36/2934	Active (exist, present)	24.3	150	Public Water Supply	BURNHAM CAMP	New Zealand Defence Force, Upper Hutt	Bore or Well			2180
51	M36/7340	Active (exist, present)	58	300	Irrigation	KIVERS ROAD	Mr R J Bell	Bore or Well	52	58	2224
52	M36/1280	Active (exist, present)	53	203	Domestic Supply	TWO CHAIN RD	Mr J D Owens	Bore or Well	49.3	53	2239
53	BX23/0903	Active (exist, present)	198	300	Public Water Supply	Youngs Road	NZ Defence Force	Bore or Well	189	195	2240
54	BX23/0565	Active (exist, present)	62.6	150	Domestic and Stockwater	Kivers Road	Melrose Ltd	Bore or Well	59.6	62.6	2241
55	M36/6059	Active (exist, present)	42	150	Domestic Supply	TWO CHAIN RD	FORSEYS	Bore or Well			2288
56	M36/5075	Active (exist, present)	4.5	51	Water Level Observation	GEORGE SEYMOUR QUAY	CALTEX OIL (NZ) LTD	Well Cluster			2315
57	M36/7390	Active (exist, present)	48	150	Domestic and Stockwater	118 Kerrs Road	Mr & Mrs H & MC Campbell	Bore or Well	46	48	2356
58	M36/5023	Active (exist, present)	36.5	152	Commercial / Industrial	TWO CHAIN RD	Santa Rosa Marketing	Bore or Well	35.1	36.5	2372
59	M36/3942	Active (exist, present)	53.5	200	Commercial / Industrial	TWO CHAIN RD	Santa Rosa Marketing Limited	Bore or Well	51.5	53.5	2384
60	M36/7582	Active (exist, present)	48	150	Domestic and Stockwater	Two Chain Road	Mr D MacDonald & Ms P Frew	Bore or Well	45.5	48	2385
61	BX23/0756	Active (exist, present)	90	150	Domestic Supply	Two Chain Road	AH & Company	Bore or Well	87.3	90.3	2416
62	M36/2955	Active (exist, present)	30	150	Irrigation	KERRS RD	MCMILLAN J.A.	Bore or Well	28.5	30	2445
63	M36/1518	Active (exist, present)	46	150	Domestic Supply	KERRS ROAD	NICOL K.	Bore or Well	45	46	2450
64	M36/7691	Active (exist, present)	118.5	300	Irrigation	Wards Road	Mr & Mrs S E & D J Lill	Bore or Well	110.165	116.165	2456
65	M36/2693	Active (exist, present)	54.9	200	Domestic Supply	BURNHAM CAMP / Powles rd	New Zealand Defence Force, Upper Hutt	Bore or Well	44.8	48.2	2468
66	M36/7498	Active (exist, present)	51.8	168	Water Level Observation	Burnham Camp/ Fowles Rd	Ministry of Defence	Bore or Well			2469
67	M36/1601	Active (exist, present)	42	150	Irrigation	TWO CHAIN ROAD	AGNEW B & G	Bore or Well	39	42	2479
68	M36/8389	Active (exist, present)	53.77	150	Stock Supply	WARDS ROAD	MR & MRS S N & D J PANKHURST	Bore or Well	52.27	53.77	2497
69	M36/4089	Active (exist, present)	44.5	150	Domestic and Stockwater	KERRS RD	MCKENZIE PA & S	Bore or Well	42	44.5	2505
70	BX23/0865	Active (exist, present)	66	150	Domestic and Stockwater	578 Wards Road	Graeme & Estelle Blanchard Family Trusts	Bore or Well	60.78	62.28	2580
71	M36/3941	Active (exist, present)			Domestic Supply	TWO CHAIN RD	FLETCHER	Bore or Well			2583
72	BX23/0169	Active (exist, present)	56	150	Domestic and Stockwater	WARDS ROAD	MR RICHARD BROMLEY	Bore or Well	54.5	56	2603
73	M36/4583	Active (exist, present)	61.5	150	Irrigation	WARDS RD	DORE M.P	Bore or Well	58.5	61.5	2615
74	M36/6990	Active (exist, present)	54	300	Irrigation	Burdons Road	Mr M J & Mrs S E Thomas	Bore or Well	48	54	2635
75	M36/2692	Active (exist, present)	47.8	250	Irrigation	BURNHAM CAMP	New Zealand Defence Force, Upper Hutt	Bore or Well	43.3	47.8	2641
76	M36/5242	Active (exist, present)	46	150	Domestic and Stockwater	TWO CHAIN ROAD	BRYAN, J.G & E.M	Bore or Well	44.5	46	2646
77	M36/8185	Active (exist, present)	48	150	Domestic and Stockwater	KERRS ROAD	MR & MRS JP & TE GALLAWN	Bore or Well	46.5	48	2661
78	M36/2985	Active (exist, present)	54.5	250	Irrigation	BURDONS RD	Mr M J & Mrs S E Thomas	Bore or Well	49.8	54.5	2666
79	M36/0049	Active (exist, present)	27.1	150	Domestic Supply	KERRS ROAD	DE VRIES	Bore or Well			2675
80	M36/4973	Active (exist, present)	55	150	Irrigation	WARDS ROAD	Mr R Bromley	Bore or Well	53.5	55	2683
81	M36/4961	Active (exist, present)	52	150	Domestic and Stockwater	WARDS RD, CNR SANDY KNOLLS RD	Mr & Mrs T P & S L Neale	Bore or Well	50.5	52	2722
82	M36/3566	Active (exist, present)	53.5	150	Irrigation	TWO CHAIN RD	Mr & Mrs B C & A Drake	Bore or Well	50	53	2760
83	M36/20627	Active (exist, present)	48	65	Geotechnical / Geological Investig	Wards Road	Road Metals Limited	Bore or Well	30	48	2824
84	M36/2997	Active (exist, present)	40	150	Irrigation	TWO CHAIN RD	GIBBS J & MA	Bore or Well	38.8	40	2824
85	M36/20243	Active (exist, present)	150	300	Irrigation	WARDS ROAD	Mr G J Pankhurst	Bore or Well	129.5	130.5	2832
86	M36/7881	Active (exist, present)	57.5	150	Domestic and Stockwater	KERRS ROAD	FRESHSPORE FARMS LIMITED	Bore or Well	54.5	57.5	2834
87	BX23/1224	Active (exist, present)	25.72	50	Groundwater Quality	Godley Road	New Zealand Defence Force	Bore or Well	6	25	2854
88	BX23/1233	Active (exist, present)	25.72	50	Groundwater Quality	Godley Road	New Zealand Defence Force	Bore or Well	6	25	2887
89	M36/2690	Active (exist, present)			Domestic Supply	AYLESBURY ROAD	MINISTER OF RAILWAYS	Bore or Well			2913
90	M36/0017	Active (exist, present)	47.3	203	Commercial / Industrial	TWO CHAIN RD	Messrs W D, S D & L G Glass	Bore or Well	41.4	47.3	2949
91	M36/8238	Active (exist, present)	14.5	150	Water Level Observation	STATE HIGHWAY 1	NEW ZEALAND ARMY	Bore or Well	11.2	14	2966
92	BX23/0882	Active (exist, present)	30.4	50	Geotechnical / Geological Investig	Main South Road	Defence Force New Zealand	Bore or Well	14	30	2990
93	M36/8237	Active (exist, present)	21.1	150	Water Level Observation	STATE HIGHWAY 1	NEW ZEALAND ARMY	Bore or Well	18.1	21	2997
94	M36/7934	Active (exist, present)	45	150	Domestic and Stockwater	TWO CHAIN ROAD	MR & MRS MA & DE SWAIN	Bore or Well	42.5	45	3006
95	M36/7178	Active (exist, present)	135.1	300	Irrigation	Wards Road	Mr G J Pankhurst	Bore or Well	93	99	3007
96	M36/4616	Active (exist, present)	20	51	Groundwater Quality	MAIN SOUTH ROAD	MINISTRY OF DEFENCE	Bore or Well			3009
97	BX23/0354	Active (exist, present)	120.21	250	Irrigation	Wards Road	SR Pankhurst	Bore or Well	111.21	117.21	3037
98	M36/5109	Active (exist, present)	56	150	Domestic Supply	SANDY KNOLLS ROAD	NEALE, T.P. & S.L.	Bore or Well	54.5	56	3087
99	BX23/0509	Active (exist, present)	30	150	Domestic Supply	Main South Rd	Jason Falcon	Bore or Well			3087
100	BX23/0586	Active (exist, present)	139.7	250	Irrigation	718 Wards Road	G J & J K Pankhurst	Bore or Well	107	113.7	3093
101	M36/3827	Active (exist, present)	48	150	Irrigation	MAIN SOUTH RD	Mr & Mrs J A & M P Shand & Jamieson	Bore or Well	46	48	3114
102	M36/5317	Active (exist, present)	17.7	150	Groundwater Quality	MAIN SOUTH ROAD	NEW ZEALAND DEFENCE FORCE	Well Cluster	9.4	12.4	3131
103	M36/4919	Active (exist, present)	45	150	Irrigation	TWO CHAIN ROAD	FINCH, P.A. & TAYLOR, J.R.	Bore or Well			3147
104	M36/4767	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well			3159
105	M36/7918	Active (exist, present)	24	150	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well	16	23.5	3161
106	M36/4775	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well			3169
107	M36/4772	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well			3169
108	M36/4771	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well			3169
109	M36/4773	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well			3169
110	M36/4776	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well			3169
111	M36/4769	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well			3169
112	M36/4768	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well			3169
113	M36/4770	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH RD	Institute of Environmental Science & Research	Bore or Well			3169
114	M36/4774	Active (exist, present)	18	100	Water Level Observation	MAIN SOUTH ROAD	Institute of Environmental Science & Research	Bore or Well			3169
115	BX23/0800	Active (exist, present)	16.9		Water Level Observation		ESR	Bore or Well			3179
116	M36/9071	Active (exist, present)	42.7		Domestic Supply	BURNHAM ROAD	IRVING	Bore or Well			3192
117	BX23/0802	Active (exist, present)	17		Other - see comments		ESR	Bore or Well			3195
118	BX23/0801	Active (exist, present)	17.1		Water Level Observation		ESR	Bore or Well			3195
119	BX23/0805	Active (exist, present)	18.1		Other - see comments		ESR	Bore or Well			3196
120	BX23/0804	Active (exist, present)	18.1		Other - see comments		ESR	Bore or Well			3197
121	BX23/0805	Active (exist, present)	15.3		Other - see comments		ESR	Bore or Well			3198
122	BX23/0812	Active (exist, present)			Other - see comments		ESR	Bore or Well			3198
123	M36/6057	Active (exist, present)	19.2		Domestic Supply	BURNHAM ROAD	WRIGHT N.	Bore or Well			3206
124	BX23/0806	Active (exist, present)	16.3		Other - see comments		ESR	Bore or Well			3220
125	BX23/0807	Active (exist, present)	16.5		Other - see comments		ESR	Bore or Well			3221
126	BX23/0809	Active (exist, present)	16.4		Other - see comments		ESR	Bore or Well			3221
127	BX23/0810	Active (exist, present)	17.2		Other - see comments		ESR	Bore or Well			3221
128	BX23/0808	Active (exist, present)	17.3		Other - see comments		ESR	Bore or Well			3221
129	BX23/0811	Active (exist, present)	16.2		Other - see comments		ESR	Bore or Well			3222
130	M36/8183	Active (exist, present)	48	150	Domestic and Stockwater	CNR BURNHAM AND MAIN STH ROADS	PIC New Zealand Limited	Bore or Well	46	48	3238
131	BX23/0204	Active (exist, present)	22.5	50	Water Level Observation	Runners Road	SELWYN DISTRICT COUNCIL	Bore or Well	18	21	3247
132	M36/0078	Active (exist, present)	47.9	250	Irrigation	MAIN SOUTH & BURNHAM ROADS	New Zealand Defence Force, Upper Hutt	Bore or Well	43.3	47.9	3248
133	L36/0367	Active (exist, present)	51.5	300	Irrigation	BURNHAM RD	Mr B J & Mrs G Woods	Bore or Well	48	51.5	3249
134	M36/8478	Active (exist, present)	43	150	Domestic and Stockwater	MAIN SOUTH ROAD	MR & MRS P B & C PLEWS	Bore or Well	40	42	3266
135	M36/2687	Active (exist, present)	30	150	Domestic Supply	BURNHAM RD	DEARDON .S.	Bore or Well	28	30	3283
136	M36/8381	Active (exist, present)	51	150	Domestic Supply	2239 MAIN SOUTH ROAD	MR P & MRS L C FORD	Bore or Well	49.5	51	3309
137	BX23/0090	Active (exist, present)	16.72	50	Groundwater Quality	Main South Road	Selwyn District Council	Bore or Well	0.5	15.2	3335
138	M36/4115	Active (exist, present)	42.1	125	Domestic Supply	MAIN SOUTH RD	LOWE .S.	Bore or Well			3358
139	L36/1595	Active (exist, present)	48	200	Irrigation	Two Chain Road	Anderson, G R & R M	Bore or Well	45	48	3397
140	L36/1151	Active (exist, present)	52.4	300	Irrigation	GRANGE ROAD	Mr B J & Mrs G Woods	Bore or Well	49.4	52.4	3427
141	M36/5006	Active (exist, present)	60	300	Irrigation	CNR WARDS ROAD & AYLESBURY ROAD	Mr S N Pankhurst	Bore or Well	57	60	3448
142	M36/3504	Active (exist, present)			Domestic Supply	BURNHAM RD	BREMNER	Unknown			3502
143	L36/0841	Active (exist, present)	43.4	150	Irrigation	TWO CHAIN RD	Mr & Ms B M & C R Holden & Ward	Bore or Well	41.3	43.4	3520

Appendix D: Historical Aerial Photographs



SOURCE:
1. AERIAL IMAGERY SOURCED FROM CANTERBURY MAPS AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

AERIAL PHOTOGRAPH: 1942

SCALE : 1:20,000 (A4)

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METRES

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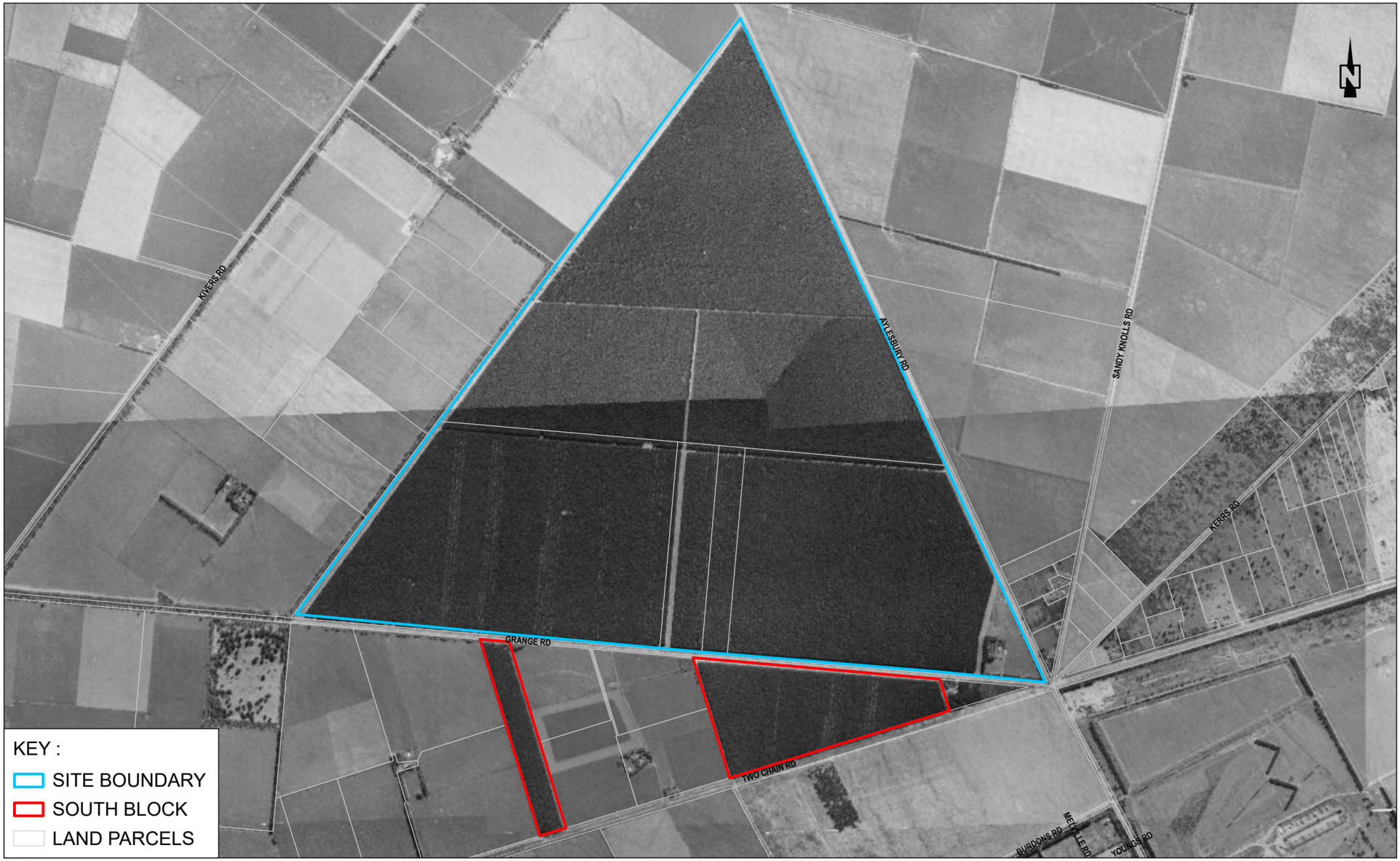

SOURCE:
1. AERIAL IMAGERY SOURCED FROM CANTERBURY MAPS AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

AERIAL PHOTOGRAPH: 1962

SCALE : 1:20,000 (A4)

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METRES

C04096100.mxd 24/07/2023 ISSUE 1

SOURCE:
1. AERIAL IMAGERY SOURCED FROM CANTERBURY MAPS AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

AERIAL PHOTOGRAPH: 1974

SCALE : 1:20,000 (A4)

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METRES

C04096100.mxd 24/07/2023 ISSUE 1

SOURCE:
1. AERIAL IMAGERY SOURCED FROM CANTERBURY MAPS AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

AERIAL PHOTOGRAPH: 1982

SCALE : 1:20,000 (A4)

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METRES

SOURCE:
1. AERIAL IMAGERY SOURCED FROM CANTERBURY MAPS AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

AERIAL PHOTOGRAPH: 1994

SCALE : 1:20,000 (A4)

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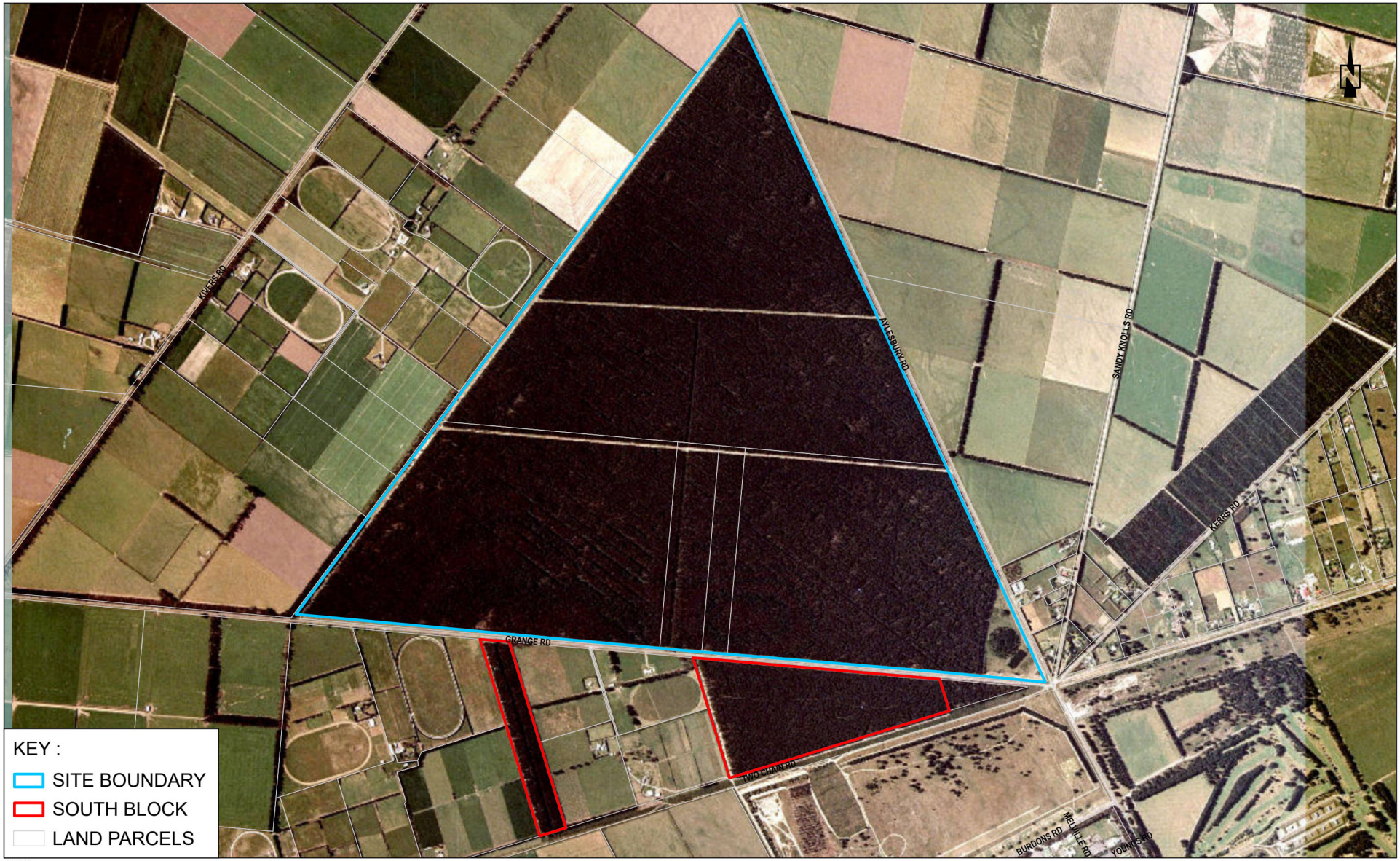
METRES



SOURCE:
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2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

AERIAL PHOTOGRAPH: 2000

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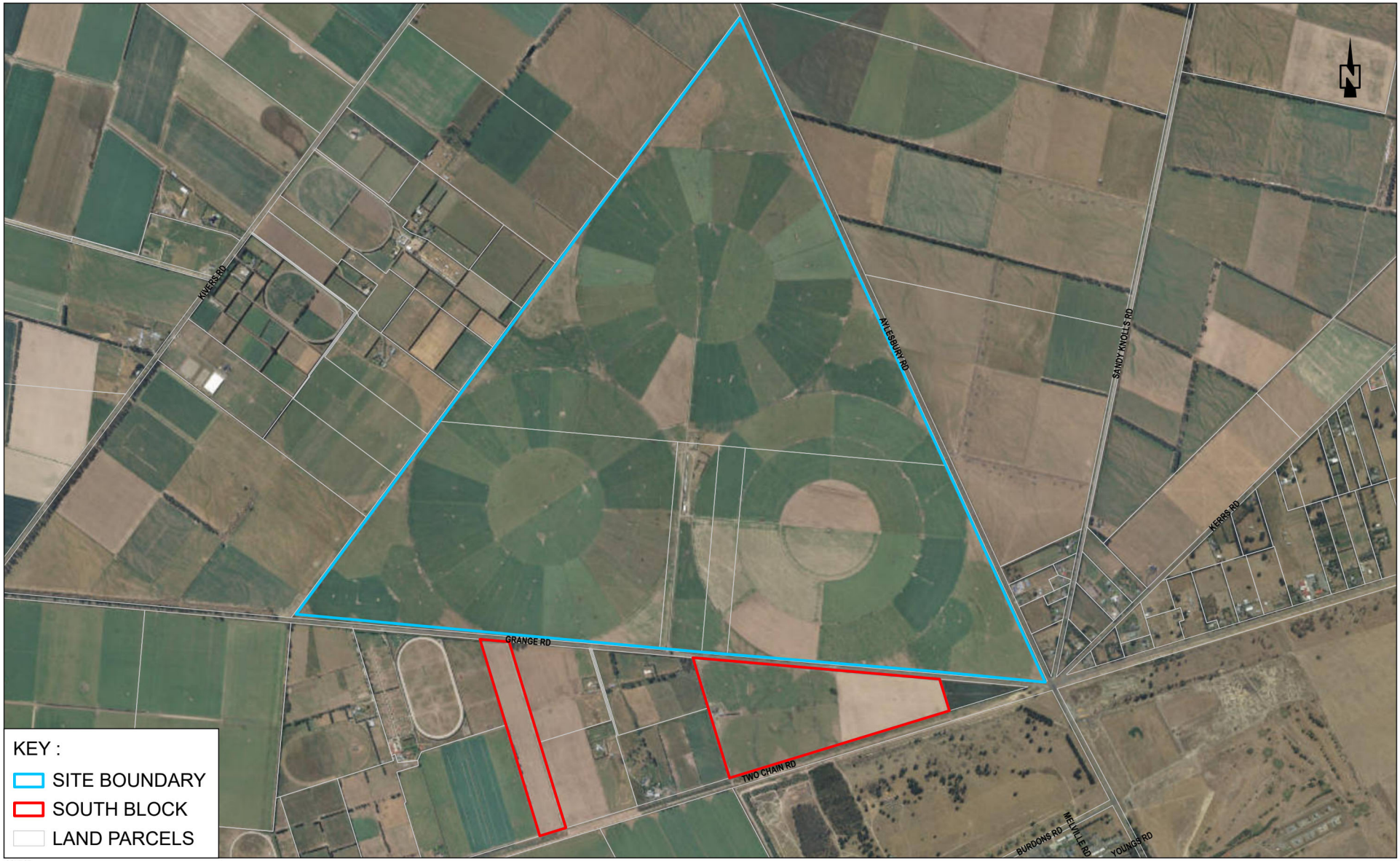

SOURCE:
1. AERIAL IMAGERY SOURCED FROM CANTERBURY MAPS AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

AERIAL PHOTOGRAPH: 2015-16

SCALE : 1:20,000 (A4)

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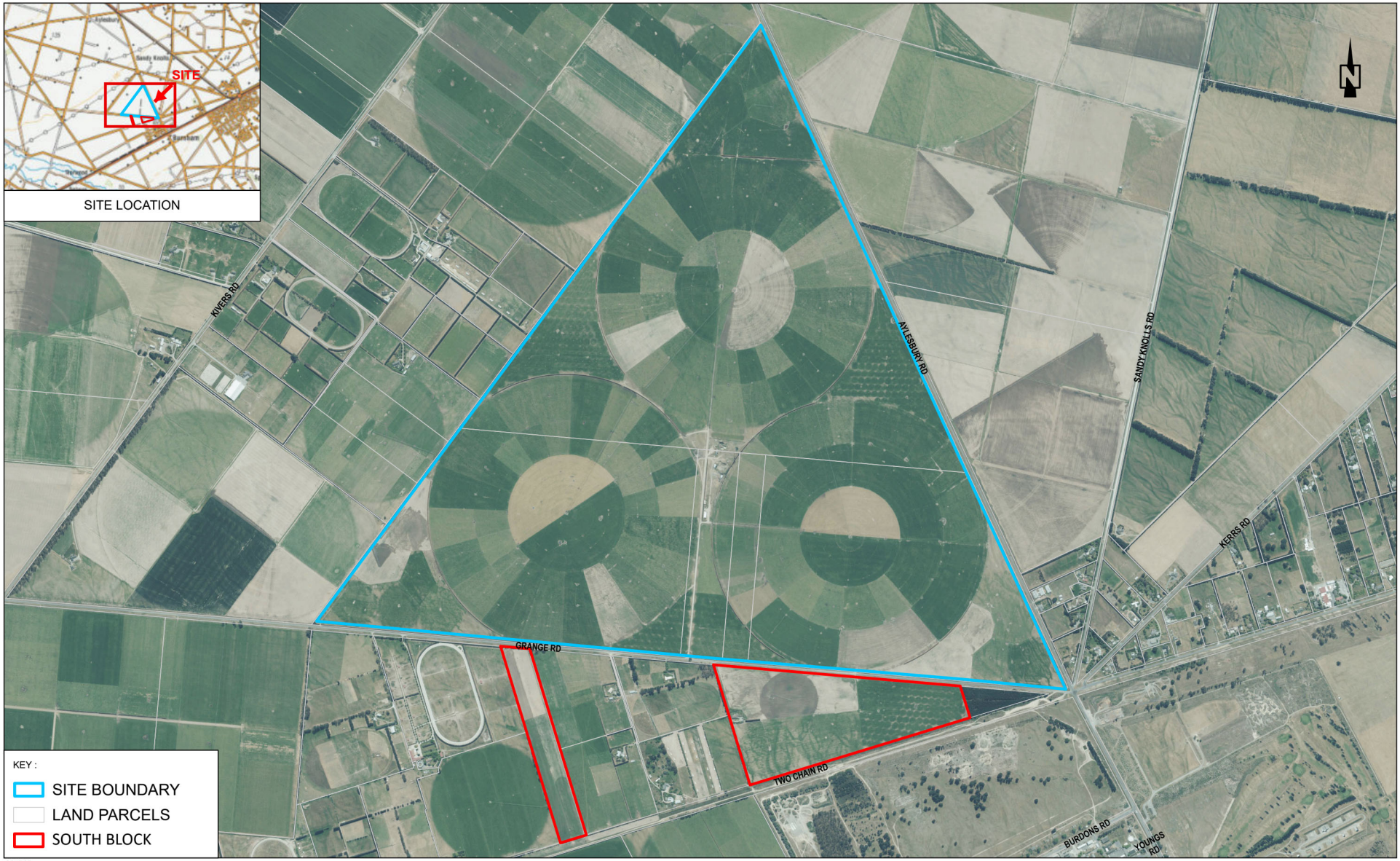

SOURCE:
1. AERIAL IMAGERY SOURCED FROM CANTERBURY MAPS.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
3. BORE INFORMTION PROVIDED BY ENVIRONMENT CANTERBURY AND USED WITH PERMISSION.

AERIAL PHOTOGRAPH: 2020

SCALE : 1:20,000 (A4)

0 250 500

METRES

BURNHAM 2020 LTD - BURNHAM QUARRY

SOURCE:
1. AERIAL IMAGERY SOURCED FROM LINZ.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
3. BORE INFORMTION PROVIDED BY ENVIRONMENT CANTERBURY AND USED WITH PERMISSION.

AERIAL PHOTOGRAPH: 2022

SCALE : 1:20,000 (A4)

0 250 500

METRES

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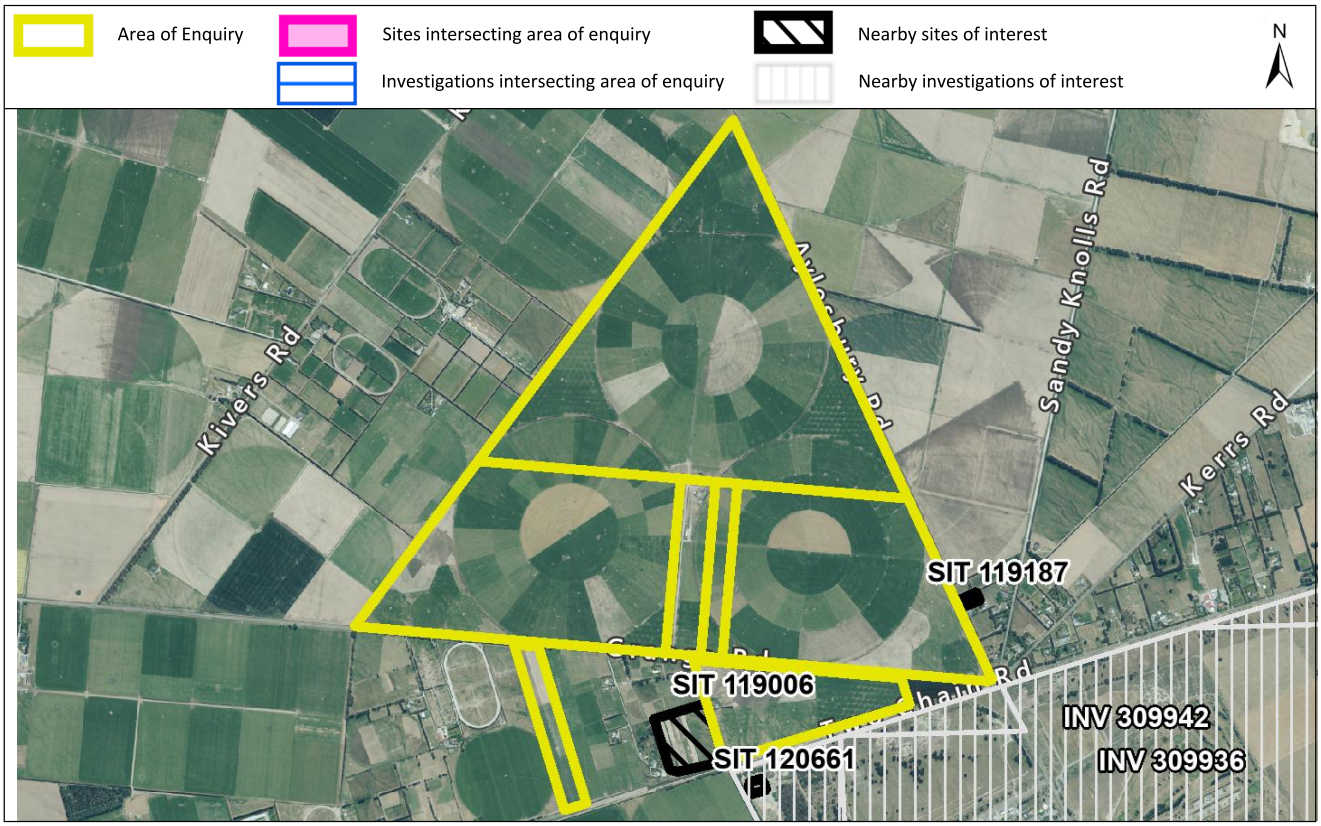
Appendix E: Environment Canterbury Listed Land Use Register

Property Statement
from the Listed Land Use Register

Visit ecan.govt.nz/HAIL for more information or
contact Customer Services at ecan.govt.nz/contact/ and quote ENQ349144

Date generated: 13 July 2023
Land parcels: RS 27777
RS 27724
RS 19387
RS 25412
RS 27725
RS 27776
RS 27862



The information presented in this map is specific to the area within a 200m radius of property you have selected. Information on properties outside the serach radius may not be shown on this map, even if the property is visible.

Sites at a glance

Sites within enquiry area

Site number	Name	Location	HAIL activity(s)	Category

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry only.

Nearby sites

Site number	Name	Location	HAIL activity(s)	Category
119006	177 Grange Rd	177 Grange Rd	A10 - Persistent pesticide bulk storage or use;	Not Investigated
119187	168 Aylesbury Rd	168 Aylesbury Rd	A10 - Persistent pesticide bulk storage or use;	Not Investigated
120661	RES 1176, Burnham	RES 1176, Burnham	G3 - Landfill sites;	Not Investigated

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry within a 200m buffer.

More detail about the sites

Site 119006: 177 Grange Rd (Within 200m of enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: 177 Grange Rd
Legal description(s): Lot 3 DP 55816

HAIL activity(s):

Period from	Period to	HAIL activity
1994	2005	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

5 Nov 2014 This record was created as part of the Selwyn District Council 2015 HAIL identification project.

5 Nov 2014 Vineyard

5 Nov 2014 Area defined from 1994 to 2005 aerial photographs. Horticultural activities (persistent pesticides) were noted in aerial photographs reviewed.

5 Nov 2014 Area defined from 1994 to 2005 aerial photographs. Horticultural activities (persistent pesticides) were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Site 119187: 168 Aylesbury Rd (Within 200m of enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: 168 Aylesbury Rd
Legal description(s): Lot 3 DP 21748

HAIL activity(s):

Period from	Period to	HAIL activity
2000	Present	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

5 Nov 2014 This record was created as part of the Selwyn District Council 2015 HAIL identification project.

5 Nov 2014 Greenhouse and tunnel house

5 Nov 2014 Area defined from 2000 to present aerial photographs. Horticultural activities (persistent pesticides) were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Site 120661: RES 1176, Burnham (Within 200m of enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: RES 1176, Burnham
Legal description(s): RES 1176

HAIL activity(s):

Period from	Period to	HAIL activity
1994	Present	Landfill sites

Notes:

7 Jan 2016 This record was created as part of the Selwyn District Council 2015 HAIL identification project.

7 Jan 2016 Area defined from 1994 to present aerial photographs. A landfill site was noted in aerial photographs reviewed.

Investigations:

INV 309942 **PFAS Preliminary Site Investigation: Burnham Military Camp**
Pattle Delamore Partners Ltd - Preliminary Site Investigation
1 May 2019

Summary of investigation(s):

Environment Canterbury has received a Preliminary Site Investigation report that includes all or part of the property you have selected.

A Preliminary Site Investigation seeks to identify potential sources of contamination resulting from current and historical land uses.

The preliminary site investigation may not have found any potential sources of contamination on the property you have enquired about. Where potential sources of contamination have been identified, a site identification number (e.g. SIT 1234) and land uses from the Hazardous Activities and Industries List (HAIL) will be shown on your statement.

This investigation has not been summarised.

Nearby investigations of interest

INV 309936 **NZDF HAIL Investigation Report**
ENGEO - Preliminary Site Investigation
1 Mar 2018

Summary of investigation(s):

Environment Canterbury has received a Preliminary Site Investigation report that includes all or part of the property you have selected.

A Preliminary Site Investigation seeks to identify potential sources of contamination resulting from current and historical land uses.

The preliminary site investigation may not have found any potential sources of contamination on the property you have enquired about. Where potential sources of contamination have been identified, a site identification number (e.g. SIT 1234) and land uses from the Hazardous Activities and Industries List (HAIL) will be shown on your statement.

This investigation has not been summarised.

Disclaimer

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987.

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Appendix F: Environment Canterbury Resource Consent Information

SOURCE:
1. AERIAL IMAGERY (FLOWN [2015-2016]) SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY CIA FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET SOURCED FROM THE LINZ DATA SERVICE https://data.linz.govt.nz/ AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
5. RESOURCE CONSENT DATA PROVIDED BY ENVIRONMENT CANTERBURY AND USED WITH PERMISSION.

RESOURCE CONSENTS WITHIN 2 KM OF SITE BOUNDARY

SCALE : 1:22,500 (A3)

0 250 500 1,000 1,500
METRES

PATTLE DELAMORE PARTNERS LTD

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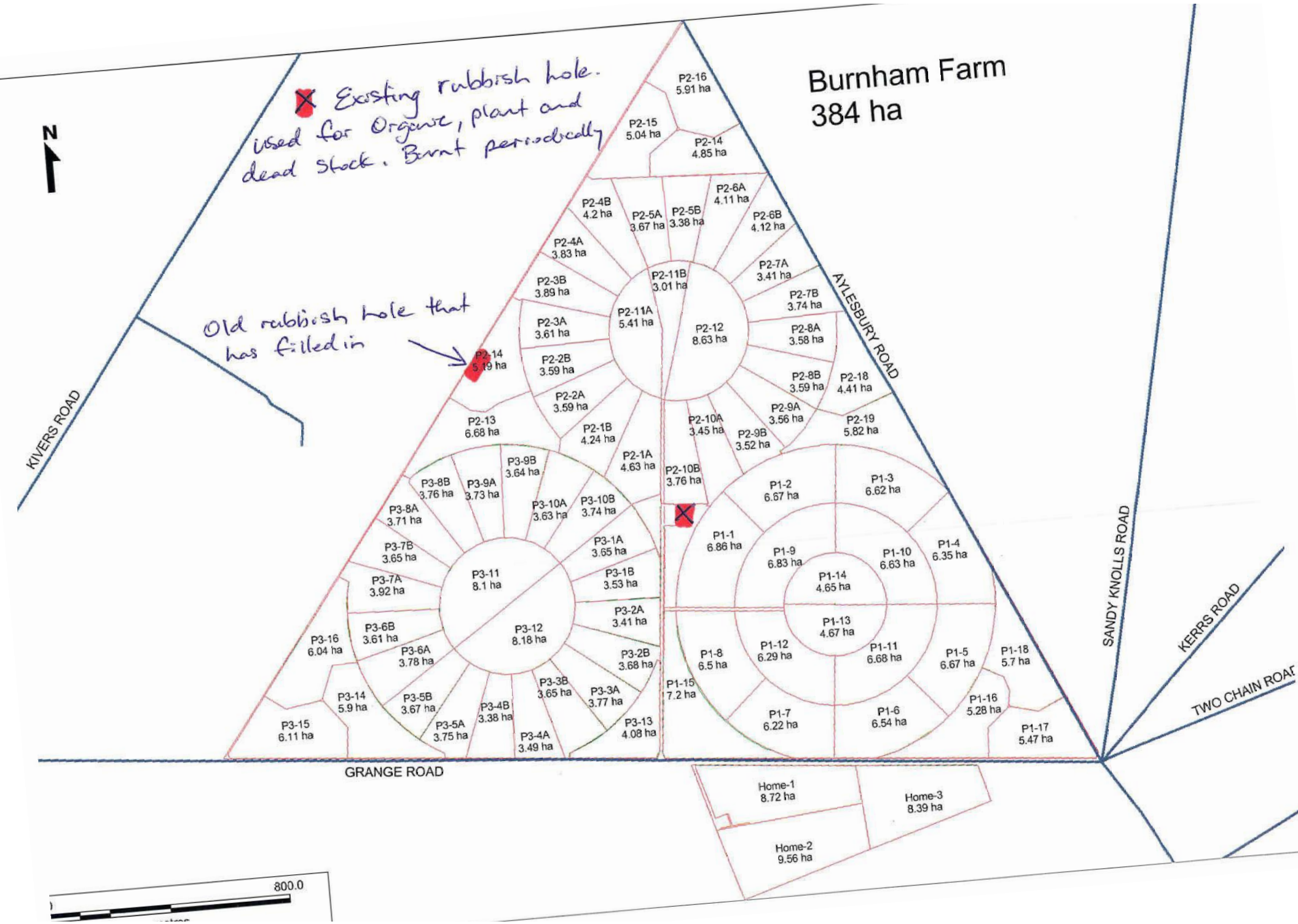
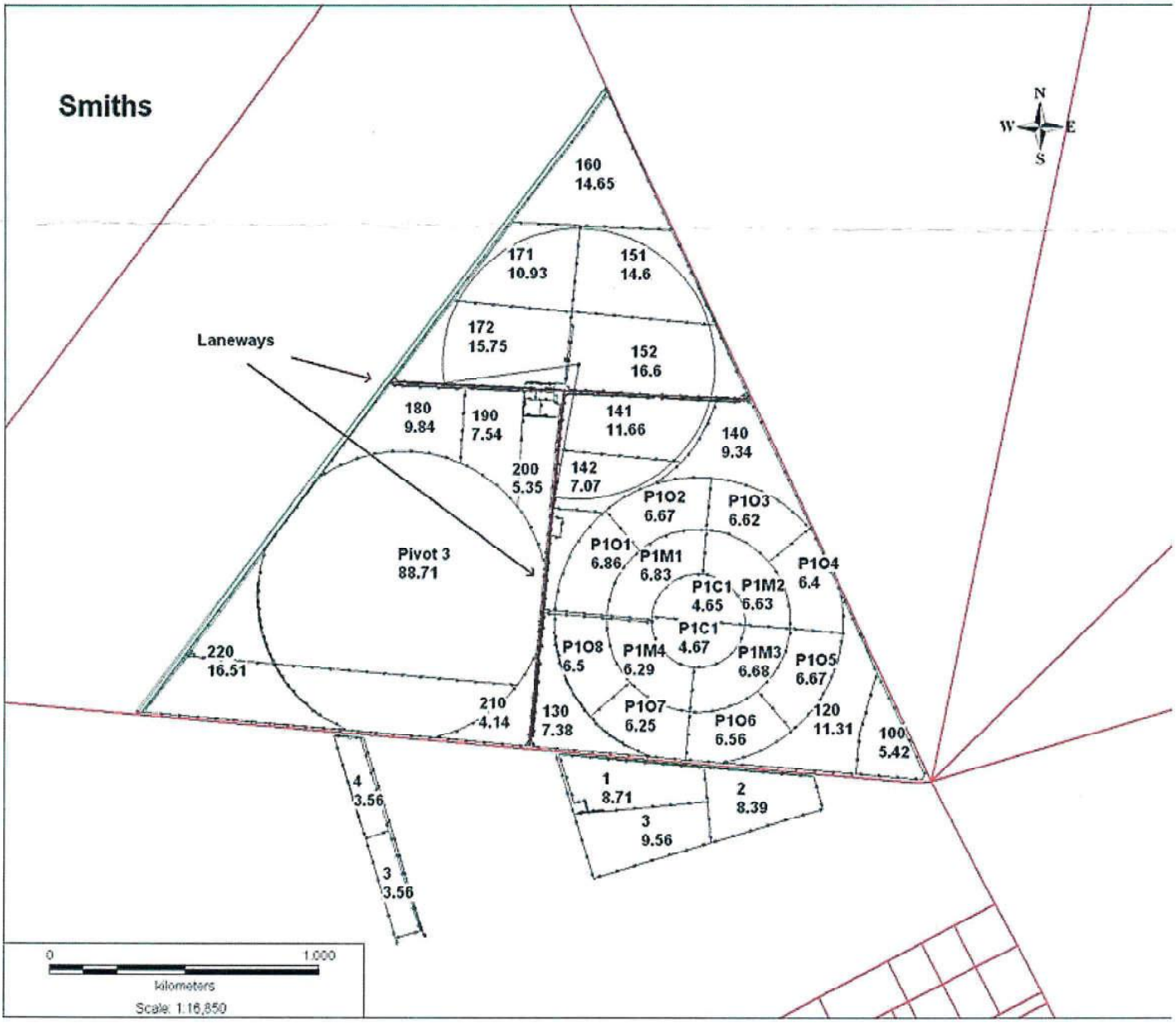
Resouce Consents Located within 2 Km of the site. (Sourced from ECan GIS Database in July 2023).

	Consent No.	Consent Type	Consent Status	Feature Type	Activity Text	Holder Name	Location	From Date	To Date
1	CRC062825.2	Water Permit (s14)	Issued - s124 Continuance	Water Take/Use	Take Groundwater	Road Metals Holdings Limited	Kerrs Road & Wards Road, BURNHAM	March 16, 2012	January 1, 9999
2	CRC110672	Land Use Consent (s9)	Issued - Active	Deposition Area	Deposit Substance	Road Metals Company Limited	Wards Road, BURNHAM	May 27, 2013	May 27, 2048
3	CRC201418	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr M J & Mrs S E Thomas	Grange Road, Burnham	October 16, 2019	August 30, 2028
4	CRC213896	Water Permit (s14)	Issued - Active	Water Take/Use		New Zealand Defence Force	Burnham Military Camp, Burnham	March 3, 2021	January 31, 2035
5	CRC155796	Permitted Activity (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Mr B C & Mrs J H Geddes	171 Kivers Road, Burnham, RS 28109	March 11, 2015	
6	CRC133429	Permitted Activity (s15)	Issued - Inactive	Human Effluent	Discharge Contaminant into Land to Water	Cameron Glen Woods	Two Chain Road, Burnham Lot 2 DP 438559	January 14, 2013	
7	CRC222635	Water Permit (s14)	Application on Hold	General Location		Burnham 2020 Limited	Corner of Aylesbury Road and Grange Road, Burnham		
8	CRC155793	Permitted Activity (s15)	Issued - Inactive	Human Effluent	Discharge Contaminant into Land to Water	Mr B C & Mrs J H Geddes	171 Kivers Road, Burnham, RS 28109	March 11, 2015	
9	CRC173525	Certif of Compliance (s15)	Issued - Inactive	Human Effluent	Discharge Contaminant into Land to Water	Mr M R & Mrs C J Cooper	536 Wards Road, Rolleston	November 23, 2016	
10	CRC195187	Discharge Permit (s15)	Issued - Inactive	Stormwater Residential		New Zealand Defence Force	Aylesbury Road, Burnham	July 9, 2019	July 9, 2024
11	CRC960786	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Richard Stuart James Trewavas	Kivers Road, BURNHAM	December 8, 1995	November 29, 2030
12	CRC182289	Water Permit (s14)	Issued - Active	Groundwater Take		Ziwi Limited	450 Two Chain Rd, BURNHAM	November 28, 2017	February 25, 2038
13	CRC201418	Water Permit (s14)	Issued - Active	Groundwater Take		Mr M J & Mrs S E Thomas	Grange Road, Burnham	October 16, 2019	August 30, 2028
14	CRC160104	Discharge Permit (s15)	Issued - Active	Dairy Effluent	Discharge Contaminant into Land to Water	Mr B C & Mrs J H Geddes & Mr J I G Cooke	171 Kivers Road, BURNHAM	June 30, 2015	October 31, 2027
15	CRC916650	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Messrs W D, S D & L G Glass	Sandy Knolls Road, Wards Road, Selwyn Plantation, BURNHAM	December 8, 1993	December 2, 2028
16	CRC222536	Water Permit (s14)	Issued - s124 Continuance	Water Take/Use	Take Groundwater	Burnham 2020 Limited	Cnr Aylesbury Road and Grange Road, BURNHAM	November 23, 2021	January 1, 9999
17	CRC110815	Permitted Activity (s15)	Issued - Inactive	Human Effluent	Discharge Contaminant into Land to Water	Road Metals Company Limited	Wards Road, BURNHAM	December 2, 2010	
18	CRC070501	Permitted Activity (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Mr G D McNeill & Ms A K R Hunter	40 Kerrs Road, BURNHAM	October 2, 2006	
19	CRC211454	Discharge Permit (s15)	Issued - Active	Stormwater Industrial	Discharge Contaminant into Land to Water	New Zealand Defence Force	Burnham Military Camp, 1 Powles Road, Burnham	June 4, 2021	June 4, 2046
20	CRC061111	Permitted Activity (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Hilary May Coffey	Two Chain Road, BURNHAM	October 5, 2005	
21	CRC157077	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr M P Jones & Sardinero Trustees (2010)	259 Grange Road, BURNHAM	October 29, 2015	June 26, 2038
22	CRC110676	Discharge Permit (s15)	Issued - Active	Contaminated Water	Discharge Contaminant onto Land to Water	Road Metals Company Limited	Wards Road, BURNHAM	May 27, 2013	May 27, 2048
23	CRC141055	Permitted Activity (s15)	Issued - Inactive	Human Effluent	Discharge Contaminant into Land to Water	John William Sandford	500 Two Chain Road, Burnham, Lot 1 DP 440398	August 14, 2013	
24	CRC211454	Discharge Permit (s15)	Issued - Active	Discharge Area		New Zealand Defence Force	Burnham Military Camp, 1 Powles Road, Burnham	June 4, 2021	June 4, 2046
25	CRC220897	Water Permit (s14)	Application on Hold	Water Take/Use	Take Groundwater	Burnham Farm Limited	Cnr Aylesbury Road and Grange Road, BURNHAM		
26	CRC194802	Land Use Consent (s9)	Issued - Active	Farm	Farming	Ribbonwood Farms Limited	449 Grange Road, Burnham	July 19, 2019	July 19, 2034
27	CRC083022	Permitted Activity (s15)	Issued - Inactive	Human Effluent	Discharge Contaminant into Land to Water	Timothy Peter Charman	82 Kerrs Road, BURNHAM	February 19, 2008	
28	CRC171927	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Gavin James Pankhurst	Wards Road, Aylesbury	September 20, 2016	June 13, 2039
29	CRC131273	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Mr B J & Mrs G Woods	Grange Road, BURNHAM	March 14, 2013	September 25, 2031
30	CRC110673	Land Use Consent (s9)	Issued - Active	Hazardous Storage	Use Land	Road Metals Company Limited	Wards Road, BURNHAM	May 27, 2013	May 27, 2048
31	CRC222536	Water Permit (s14)	Issued - s124 Continuance	Water Take/Use	Take Groundwater	Burnham 2020 Limited	Cnr Aylesbury Road and Grange Road, BURNHAM	November 23, 2021	January 1, 9999
32	CRC194957	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr & Mrs S G & D J Lill	Wards Road, Rolleston	May 21, 2020	May 21, 2035
33	CRC161180	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr B R H & Mrs A M Fechney & Mr B C & N	171 Kivers Road, Burnham	September 8, 2015	May 31, 2036
34	CRC194957	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Mr & Mrs S G & D J Lill	Wards Road, Rolleston	May 21, 2020	May 21, 2035
35	CRC110678	Discharge Permit (s15)	Issued - Active	Stormwater Industrial	Discharge Contaminant into Land to Water	Road Metals Company Limited	Wards Road, BURNHAM	May 27, 2013	May 27, 2048
36	CRC190012	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr T P & Mrs S L Neale	Cnr Wards & Sandy Knolls Roads, ROLLESTON	June 14, 2018	August 9, 2030
37	CRC195187	Discharge Permit (s15)	Issued - Inactive	Stormwater Collection Are	Discharge Contaminant onto Land to Water	New Zealand Defence Force	Aylesbury Road, Burnham	July 9, 2019	July 9, 2024
38	CRC110672	Land Use Consent (s9)	Issued - Active	Cleanfill/Quarry		Road Metals Company Limited	Wards Road, BURNHAM	May 27, 2013	May 27, 2048
39	CRC211453	Discharge Permit (s15)	Issued - Active	Stormwater Industrial		New Zealand Defence Force	Burnham Military Camp, 1 Powles Road, Burnham	June 4, 2021	June 4, 2046
40	CRC204338	Discharge Permit (s15)	Issued - Active	Discharge Area		Ziwi Limited	450 Two Chain Rd, Burnham	June 4, 2020	January 30, 2038
41	CRC101077	Permitted Activity (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Lauraine Frampton	Kivers Road, AYLESBURY	September 30, 2009	
42	CRC201418	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Mr M J & Mrs S E Thomas	Grange Road, Burnham	October 16, 2019	August 30, 2028
43	CRC042434.1	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Robert John Bell	Kivers Road, BURNHAM	July 8, 2011	January 30, 2041
44	CRC960786	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Richard Stuart James Trewavas	Kivers Road, BURNHAM	December 8, 1995	November 29, 2030
45	CRC110678	Discharge Permit (s15)	Issued - Active	Stormwater Collection Are	Discharge Contaminant into Land to Water	Road Metals Company Limited	Wards Road, BURNHAM	May 27, 2013	May 27, 2048
46	CRC111574	Permitted Activity (s15)	Issued - Inactive	Human Effluent	Discharge Contaminant into Land to Water	John William Sandford	500 Two Chain Road, BURNHAM	May 4, 2011	
47	CRC157078	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr M J & Mrs S E Thomas	Grange Road, Burnham	October 29, 2015	June 26, 2038
48	CRC211455	Land Use Consent (s9)	Issued - Active	Disturb or Excavate Land		New Zealand Defence Force	Burnham Military Camp, 1 Powles Road, Burnham	June 4, 2021	June 4, 2046
49	CRC157077	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Mr M P Jones & Sardinero Trustees (2010)	259 Grange Road, BURNHAM	October 29, 2015	June 26, 2038
50	CRC213896	Water Permit (s14)	Issued - Active	Water Take/Use		New Zealand Defence Force	Burnham Military Camp, Burnham	March 3, 2021	January 31, 2035
51	CRC130668	Discharge Permit (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Darryle Herridge	170 Kerrs Road, Burnham	October 31, 2012	October 31, 2027
52	CRC152894	Land Use Consent (s9)	Issued - Active	Hazardous Storage	Use Land	Road Metals Company Limited	Wards Road, BURNHAM	November 13, 2014	November 13, 2049
53	CRC204646	Discharge Permit (s15)	Issued - Active	Stormwater Industrial	Discharge Contaminant into Land to Water	A H & Company Limited	450 Two Chain Road, Burnham	June 24, 2020	June 24, 2045
54	CRC131273	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr B J & Mrs G Woods	Grange Road, BURNHAM	March 14, 2013	September 25, 2031
55	CRC150795	Land Use Consent (s9)	Issued - Active	Disturb or Excavate Land	Excavate Material	Road Metals Company Limited	Wards Road, BURNHAM	August 25, 2014	May 27, 2048
56	CRC171927	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Gavin James Pankhurst	Wards Road, Aylesbury	September 20, 2016	June 13, 2039
57	CRC053697	Permitted Activity (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Mr & Ms D L & P J MacDonald & Frew	Two Chain Road, ROLLESTON	February 21, 2004	
58	CRC220897	Water Permit (s14)	Application on Hold	Irrigation Area	Take Groundwater	Burnham Farm Limited	Cnr Aylesbury Road and Grange Road, BURNHAM		
59	CRC110771	Permitted Activity (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Gavin James Pankhurst	718 Wards Road, ROLLESTON	November 26, 2010	
60	CRC211134	Land Use Consent (s9)	Issued - Active	Farm	Farming	Maatua Hou Limited	214 Kivers Road, Burnham	September 3, 2020	August 21, 2035
61	CRC916650	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Messrs W D, S D & L G Glass	Sandy Knolls Road, Wards Road, Selwyn Plantation, BURNHAM	December 8, 1993	December 2, 2028
62	CRC132812	Permitted Activity (s15)	Issued - Inactive	Human Effluent	Discharge Contaminant into Land to Water	Road Metals Holdings Limited	Kerrs Road, Burnham, Lot 6 DP 440446	December 10, 2012	
63	CRC110675	Discharge Permit (s15)	Issued - Active	Cleanfill/Quarry		Road Metals Company Limited	Wards Road, BURNHAM	May 27, 2013	May 27, 2048
64	CRC221642	Water Permit (s14)	Issued - s124 Continuance	Water Take/Use		Burnham 2020 Limited	Cnr Aylesbury Road and Grange Road, BURNHAM	October 21, 2021	January 1, 9999
65	CRC171927	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Gavin James Pankhurst	Wards Road, Aylesbury	September 20, 2016	June 13, 2039
66	CRC190143	Land Use Consent (s9)	Issued - Active	Farm	Farming	Brian Ronald Hugh Fechney	171 Kivers Road, Burnham	August 23, 2018	August 23, 2033
67	CRC152588	Permitted Activity (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Mr D S & Mrs N L Barton	273 Grange Rd, Burnham, Selwyn, Lot 1 DP 30373	October 13, 2014	
68	CRC211138	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Maatua Hou Limited	214 Kivers Road, Christchurch	September 3, 2020	July 1, 2032
69	CRC163879	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr S N & Mrs D J Pankhurst & Mr G C Brow	Wards Road, AYLESBURY	November 10, 2015	June 13, 2039
70	CRC220897	Water Permit (s14)	Application on Hold	Water Take/Use	Take Groundwater	Burnham Farm Limited	Cnr Aylesbury Road and Grange Road, BURNHAM		
71	CRC071145	Land Use Consent (s9)	Issued - Active	Deposition Area	Deposit Substance	Mr B J & Mrs G Woods	Grange Road, BURNHAM	August 24, 2007	August 21, 2042
72	CRC194957	Water Permit (s14)	Issued - Active	Groundwater Take		Mr & Mrs S G & D J Lill	Wards Road, Rolleston	May 21, 2020	May 21, 2035
73	CRC180997	Discharge Permit (s15)	Issued - Active	Dairy Effluent	Discharge Contaminant into Land to Water	Mr B J & Mrs G Woods	Grange Road, BURNHAM	September 19, 2017	April 1, 2045
74	CRC190012	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Mr T P & Mrs S L Neale	Cnr Wards & Sandy Knolls Roads, ROLLESTON	June 14, 2018	August 9, 2030
75	CRC195375	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr S N & Mrs D J Pankhurst & Mr G C Brow	658 Wards Road, Burnham	February 25, 2020	February 25, 2035
76	CRC222536	Water Permit (s14)	Issued - s124 Continuance	Water Take/Use	Take Groundwater	Burnham 2020 Limited	Cnr Aylesbury Road and Grange Road, BURNHAM	November 23, 2021	January 1, 9999
77	CRC062639.1	Discharge Permit (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Ms L T Whiteside & Mr C W Ahradsen	358 Two Chain Road, ROLLESTON	March 5, 2010	February 14, 2041
78	CRC182289	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Ziwi Limited	450 Two Chain Rd, BURNHAM	November 28, 2017	February 25, 2038
79	CRC167226	Land Use Consent (s13)	Issued - Active	General Location		Central Plains Water Trust	Kowai/Hawkins/Hororata/Selwyn/Waikirikiri/Waianiwaniwa Rvr	June 17, 2016	July 25, 2047
80	CRC220897	Water Permit (s14)	Application on Hold	Water Take/Use	Take Groundwater	Burnham Farm Limited	Cnr Aylesbury Road and Grange Road, BURNHAM		
81	CRC101077	Permitted Activity (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Lauraine Frampton	Kivers Road, AYLESBURY	September 30, 2009	
82	CRC190415	Discharge Permit (s15)	Issued - Active	Discharge Point		Freshpork New Zealand Limited	182 Kerrs Road, Burnham	September 6, 2018	September 6, 2033
83	CRC143414	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	New Zealand Defence Force	Burnham Military Camp, BURNHAM	January 22, 2014	January 31, 2035
84	CRC150795	Land Use Consent (s9)	Issued - Active	Mineral Extraction Area	Excavate Material	Road Metals Company Limited	Wards Road, BURNHAM	August 25, 2014	May 27, 2048
85	CRC220897	Water Permit (s14)	Application on Hold	Water Take/Use	Take Groundwater	Burnham Farm Limited	Cnr Aylesbury Road and Grange Road, BURNHAM		
86	CRC153833	Permitted Activity (s15)	Issued - Inactive	Human Effluent	Discharge Contaminant into Land to Water	Dave Patterson	Kivers Road, Burnham, Lot 1 DP 71233	November 27, 2014	
87	CRC180997	Discharge Permit (s15)	Issued - Active	Discharge Point		Mr B J & Mrs G Woods	Grange Road, BURNHAM	September 19, 2017	April 1, 2045
88	CRC211138	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Maatua Hou Limited	214 Kivers Road, Christchurch	September 3, 2020	July 1, 2032
89	CRC157078	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Mr M J & Mrs S E Thomas	Grange Road, Burnham	October 29, 2015	June 26, 2038
90	CRC960198.3	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Stuart Norman Pankhurst	Wards Road, BURNHAM	September 9, 2011	September 13, 2030
91	CRC080708.1	Discharge Permit (s15)	Issued - Active	Human Effluent	Discharge Contaminant into Land to Water	Charwill Limited	Kivers Road, BURNHAM	June 15, 2010	October 25, 2042
92	CRC211453	Discharge Permit (s15)	Issued - Active	Discharge Area		New Zealand Defence Force	Burnham Military Camp, 1 Powles Road, Burnham	June 4, 2021	June 4, 2046
93	CRC222536	Water Permit (s14)	Issued - s124 Continuance	Irrigation Area	Take Groundwater	Burnham 2020 Limited	Cnr Aylesbury Road and Grange Road, BURNHAM	November 23, 2021	January 1, 9999
94	CRC213896	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	New Zealand Defence Force	Burnham Military Camp, Burnham	March 3, 2021	January 31, 2035
95	CRC213807	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr S J & Mrs A K Blakely	176 Kivers Road, BURNHAM	February 11, 2021	January 26, 2029
96	CRC042434.1	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Robert John Bell	Kivers Road, BURNHAM	July 8, 2011	January 30, 2041
97	CRC171927	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Gavin James Pankhurst	Wards Road, Aylesbury	September 20, 2016	June 13, 2039
98	CRC211455	Land Use Consent (s9)	Issued - Active	Disturb or Excavate Land		New Zealand Defence Force	Burnham Military Camp, 1 Powles Road, Burnham	June 4, 2021	June 4, 2046
99	CRC110675	Discharge Permit (s15)	Issued - Active	Cleanfill/Quarry	Discharge Contaminant into Air	Road Metals Company Limited	Wards Road, BURNHAM	May 27, 2013	May 27, 2048
100	CRC222536	Water Permit (s14)	Issued - s124 Continuance	Irrigation Area	Take Groundwater	Burnham 2020 Limited	Cnr Aylesbury Road and Grange Road, BURNHAM	November 23, 2021	January 1, 9999
101	CRC131273	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Mr B J & Mrs G Woods	Grange Road, BURNHAM	March 14, 2013	September 25, 2031
102	CRC222536	Water Permit (s14)	Issued - s124 Continuance	Water Take/Use	Take Groundwater	Burnham 2020 Limited	Cnr Aylesbury Road and Grange Road, BURNHAM	November 23, 2021	January 1, 9999
103	CRC916329	Discharge Permit (s15)	Issued - Active	Piggery Effluent	Discharge Contaminant onto Land to Water	Messrs W D, S D & L G Glass	Sandy Knolls Road, Wards Road, Selwyn Plantation, BURNHAM	September 3, 1999	September 3, 2024
104	CRC235258	Water Permit (s14)	Issued - Active	Irrigation Area	Take Groundwater	Grass Gobblers Limited	Two Chain Road, BURNHAM	June 6, 2023	January 31, 2035
105	CRC235258	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Grass Gobblers Limited	Two Chain Road, BURNHAM	June 6, 2023	January 31, 2035
106	CRC240114	Water Permit (s14)	Issued - Active	Water Take/Use	Take Groundwater	Aylesbury Dairy Limited	Aylesbury Road	June 30, 2023	January 26, 2029

Appendix G: Anecdotal Information


Burnham Farm
384 ha
N
Existing rubbish hole.
used for Organic, plant and
dead stock. Burnt periodically
Old rubbish hole that
has filled in
KIVERS ROAD
AYLESBURY ROAD
SANDY KNOLLS ROAD
KERRS ROAD
TWO CHAIN ROAD
GRANGE ROAD
P2-16 5.91 ha
P2-15 5.04 ha
P2-14 4.85 ha
P2-6A 4.11 ha
P2-4B 4.2 ha
P2-5A 3.67 ha
P2-5B 3.38 ha
P2-6B 4.12 ha
P2-4A 3.83 ha
P2-7A 3.41 ha
P2-3B 3.89 ha
P2-11B 3.01 ha
P2-7B 3.74 ha
P2-11A 5.41 ha
P2-12 8.63 ha
P2-3A 3.61 ha
P2-8A 3.58 ha
P2-14 5.19 ha
P2-2B 3.59 ha
P2-8B 3.59 ha
P2-18 4.41 ha
P2-2A 3.59 ha
P2-9A 3.56 ha
P2-13 6.68 ha
P2-1B 4.24 ha
P2-10A 3.45 ha
P2-19 5.82 ha
P2-9B 3.52 ha
P2-1A 4.63 ha
P2-10B 3.76 ha
P3-9B 3.64 ha
P1-2 6.67 ha
P1-3 6.62 ha
P3-8B 3.76 ha
P3-9A 3.73 ha
P3-10A 3.63 ha
P3-10B 3.74 ha
P3-8A 3.71 ha
P1-1 6.86 ha
P1-9 6.83 ha
P1-10 6.63 ha
P1-4 6.35 ha
P3-7B 3.65 ha
P3-1A 3.65 ha
P3-7A 3.92 ha
P3-11 8.1 ha
P1-14 4.65 ha
P3-1B 3.53 ha
P1-13 4.67 ha
P3-2A 3.41 ha
P3-6B 3.61 ha
P3-16 6.04 ha
P3-12 8.18 ha
P1-8 6.5 ha
P1-12 6.29 ha
P1-11 6.68 ha
P1-5 6.67 ha
P1-18 5.7 ha
P3-6A 3.78 ha
P3-2B 3.68 ha
P1-15 7.2 ha
P3-3B 3.65 ha
P3-3A 3.77 ha
P3-14 5.9 ha
P3-5B 3.67 ha
P1-16 5.28 ha
P3-4B 3.38 ha
P1-7 6.22 ha
P1-6 6.54 ha
P3-15 6.11 ha
P3-5A 3.75 ha
P3-13 4.08 ha
P1-17 5.47 ha
P3-4A 3.49 ha
Home-1 8.72 ha
Home-3 8.39 ha
Home-2 9.56 ha
800.0


Smiths
N
W
E
S
160
14.65
171
10.93
151
14.6
172
15.75
152
16.6
Laneways
180
9.84
190
7.54
141
11.66
140
9.34
200
5.35
142
7.07
P1O2
6.67
P1O3
6.62
P1O1
6.86
P1M1
6.83
P1O4
6.4
Pivot 3
88.71
P1C1
4.65
P1M2
6.63
P1C1
4.67
220
16.51
P1O8
6.5
P1M4
6.29
P1M3
6.68
P1O5
6.67
210
4.14
130
7.38
P1O7
6.25
P1O6
6.56
120
11.31
100
5.42
4
3.56
1
8.71
2
8.39
3
9.56
3
3.56
0
1,000
Kilometers
Scale: 1:16,850

Appendix H: Results Tables

Analytica Laboratories Limited
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Hamilton 3214, New Zealand
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www.analytica.co.nz

Certificate of Analysis

Pattle Delamore Partners Ltd
at Level 2, Grant Thornton House
Christchurch 8011
Attention: Kay Higginbotham
Phone: 0275353133
Email: edward.cromwell@pdp.co.nz

Lab Reference: 20-03730
Submitted by: Kay Higginbotham
Date Received: 31/01/2020
Date Completed: 4/02/2020
Order Number:
Reference: C04096700

Sampling Site:

Report Comments

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

Heavy Metals in Soil

Client Sample ID			SS01	SS02	SS03	SS04	SS05
Date Sampled							
Analyte	Unit	*Reporting Limit*	20-03730-1	20-03730-2	20-03730-3	20-03730-4	20-03730-5
Arsenic	mg/kg dry wt	*0.125*	2.7	2.8	2.7	3.2	3.3
Cadmium	mg/kg dry wt	*0.005*	0.11	0.12	0.067	0.082	0.066
Chromium	mg/kg dry wt	*0.125*	11	13.0	12	12	13.2
Copper	mg/kg dry wt	*0.075*	4.8	4.2	3.4	4.1	4.3
Lead	mg/kg dry wt	*0.25*	11.8	12.5	11.7	11.6	12.7
Nickel	mg/kg dry wt	*0.05*	6.50	6.31	6.13	7.13	7.50
Zinc	mg/kg dry wt	*0.05*	44.3	42.7	38.3	41.7	49.9

Heavy Metals in Soil

Client Sample ID			SS06	SS07	SS08	SS09	SS10
Date Sampled							
Analyte	Unit	*Reporting Limit*	20-03730-6	20-03730-7	20-03730-8	20-03730-9	20-03730-10
Arsenic	mg/kg dry wt	*0.125*	2.8	3.0	3.2	3.4	2.9
Cadmium	mg/kg dry wt	*0.005*	0.065	0.090	0.044	0.095	0.065
Chromium	mg/kg dry wt	*0.125*	12	13.7	13.4	13.1	12
Copper	mg/kg dry wt	*0.075*	4.6	5.1	4.6	4.5	5.2
Lead	mg/kg dry wt	*0.25*	11.8	12.7	12.6	12.4	11.5
Nickel	mg/kg dry wt	*0.05*	6.59	7.33	7.75	7.37	6.93
Zinc	mg/kg dry wt	*0.05*	44.8	40.3	45.3	48.8	49.5

IANZ ACCREDITED LABORATORY

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

Heavy Metals in Soil

Client Sample ID			SS11	SS12	SS13	SS14	SS15
Date Sampled							
Analyte	Unit	*Reporting Limit*	20-03730-11	20-03730-12	20-03730-13	20-03730-14	20-03730-15
Arsenic	mg/kg dry wt	*0.125*	3.1	3.0	3.4	2.8	2.8
Cadmium	mg/kg dry wt	*0.005*	0.064	0.065	0.046	0.076	0.046
Chromium	mg/kg dry wt	*0.125*	13.3	12.6	13.5	12.6	12
Copper	mg/kg dry wt	*0.075*	4.1	3.2	4.8	3.3	3.1
Lead	mg/kg dry wt	*0.25*	12.8	12.8	15.4	12.6	11.6
Nickel	mg/kg dry wt	*0.05*	7.52	7.66	8.45	7.22	6.57
Zinc	mg/kg dry wt	*0.05*	49.7	47.6	50.3	44.1	40.7

Organochlorine Pesticides - Soil

Client Sample ID			SS01	SS02	SS03	SS04	SS05
Date Sampled							
Analyte	Unit	*Reporting Limit*	20-03730-1	20-03730-2	20-03730-3	20-03730-4	20-03730-5
2,4'-DDD	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDD	mg/kg dry wt	*0.003*	<0.003	<0.003	<0.003	<0.003	<0.003
4,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Total DDT	mg/kg dry wt	*0.02*	<0.02	<0.02	<0.02	<0.02	<0.02
alpha-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
beta-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
cis-Chlordane	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
cis-Nonachlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
delta-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Dieldrin	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Endosulfan sulfate	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin ketone	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
gamma-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
trans-nonachlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
trans-Chlordane	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane (sum)	mg/kg dry wt	*0.02*	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	*1*	93.4	87.7	94.1	89.0	90.4

Organochlorine Pesticides - Soil

Client Sample ID			SS06	SS07	SS08	SS09	SS10
Date Sampled							
Analyte	Unit	*Reporting Limit*	20-03730-6	20-03730-7	20-03730-8	20-03730-9	20-03730-10
2,4'-DDD	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDD	mg/kg dry wt	*0.003*	<0.003	<0.003	<0.003	<0.003	<0.003
4,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Total DDT	mg/kg dry wt	*0.02*	<0.02	<0.02	<0.02	<0.02	<0.02
alpha-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
beta-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
cis-Chlordane	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
cis-Nonachlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
delta-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Dieldrin	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Endosulfan sulfate	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin ketone	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
gamma-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
trans-nonachlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
trans-Chlordane	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane (sum)	mg/kg dry wt	*0.02*	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	*1*	93.0	89.4	87.3	89.9	89.2

Organochlorine Pesticides - Soil

Client Sample ID			SS11	SS12	SS13	SS14	SS15
Date Sampled							
Analyte	Unit	*Reporting Limit*	20-03730-11	20-03730-12	20-03730-13	20-03730-14	20-03730-15
2,4'-DDD	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDD	mg/kg dry wt	*0.003*	<0.003	<0.003	<0.003	<0.003	<0.003
4,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Total DDT	mg/kg dry wt	*0.02*	<0.02	<0.02	<0.02	<0.02	<0.02
alpha-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
beta-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
cis-Chlordane	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
cis-Nonachlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
delta-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Dieldrin	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01

Organochlorine Pesticides - Soil

			Client Sample ID	SS11	SS12	SS13	SS14	SS15
			Date Sampled					
Endosulfan sulfate	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Endrin ketone	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
gamma-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
trans-nonachlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
trans-Chlordane	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane (sum)	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	*1*		90.4	87.8	89.1	85.1	92.0

Method Summary

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

OCP in Soil Samples are extracted with hexane, pre-concetrated then analysed by GC-MSMS. (Chlordane (sum) is calculated from the main actives in technical Chlordane: Chlordane, Nonachlor and Heptachlor). (In accordance with in-house procedure).

Total DDT Sum of DDT, DDD and DDE (4,4' and 2,4 isomers)

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Sample Receipt Report

Pattle Delamore Partners Ltd
at Level 2, Grant Thornton House
Christchurch 8011
Attention: Kay Higginbotham
Phone: 0275353133
Email: edward.cromwell@pdp.co.nz

Lab Reference: 20-03730
Submitted by: Kay Higginbotham
Date Registered: 31/01/2020
Date Due: 5/02/2020
Order Number:
Reference: C04096700

Sampling Site:

Note: The published due date is that of tests done internally, subcontracted tests are subject to the sub-contractor's turnaround times and may be reported on or following the due date indicated.

Summary of Samples

Laboratory ID	Client Sample Reference	Date Sampled	Depth	Sample Type	Condition On Arrival
20-03730-1	SS01			Soil	Acceptable
20-03730-2	SS02			Soil	Acceptable
20-03730-3	SS03			Soil	Acceptable
20-03730-4	SS04			Soil	Acceptable
20-03730-5	SS05			Soil	Acceptable
20-03730-6	SS06			Soil	Acceptable
20-03730-7	SS07			Soil	Acceptable
20-03730-8	SS08			Soil	Acceptable
20-03730-9	SS09			Soil	Acceptable
20-03730-10	SS10			Soil	Acceptable
20-03730-11	SS11			Soil	Acceptable
20-03730-12	SS12			Soil	Acceptable
20-03730-13	SS13			Soil	Acceptable
20-03730-14	SS14			Soil	Acceptable
20-03730-15	SS15			Soil	Acceptable

Summary of Testing

		7 Heavy Metals in Soil	OCP in Soil	Dry Sieve
20-03730-1	SS01	✓	✓	✓
20-03730-2	SS02	✓	✓	✓
20-03730-3	SS03	✓	✓	✓
20-03730-4	SS04	✓	✓	✓
20-03730-5	SS05	✓	✓	✓
20-03730-6	SS06	✓	✓	✓

Summary of Testing

		7 Heavy Metals in Soil	OCP in Soil	Dry Sieve
20-03730-7	SS07	✓	✓	✓
20-03730-8	SS08	✓	✓	✓
20-03730-9	SS09	✓	✓	✓
20-03730-10	SS10	✓	✓	✓
20-03730-11	SS11	✓	✓	✓
20-03730-12	SS12	✓	✓	✓
20-03730-13	SS13	✓	✓	✓
20-03730-14	SS14	✓	✓	✓
20-03730-15	SS15	✓	✓	✓

Heavy Metals in Soil

Testing Breakdown

		Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
20-03730-1	SS01	✓	✓	✓	✓	✓	✓	✓
20-03730-2	SS02	✓	✓	✓	✓	✓	✓	✓
20-03730-3	SS03	✓	✓	✓	✓	✓	✓	✓
20-03730-4	SS04	✓	✓	✓	✓	✓	✓	✓
20-03730-5	SS05	✓	✓	✓	✓	✓	✓	✓
20-03730-6	SS06	✓	✓	✓	✓	✓	✓	✓
20-03730-7	SS07	✓	✓	✓	✓	✓	✓	✓
20-03730-8	SS08	✓	✓	✓	✓	✓	✓	✓
20-03730-9	SS09	✓	✓	✓	✓	✓	✓	✓
20-03730-10	SS10	✓	✓	✓	✓	✓	✓	✓
20-03730-11	SS11	✓	✓	✓	✓	✓	✓	✓
20-03730-12	SS12	✓	✓	✓	✓	✓	✓	✓
20-03730-13	SS13	✓	✓	✓	✓	✓	✓	✓
20-03730-14	SS14	✓	✓	✓	✓	✓	✓	✓
20-03730-15	SS15	✓	✓	✓	✓	✓	✓	✓

If you have any queries please email us at enviro.reception@analytica.co.nz or telephone 07 444 5574.

Note: Soil samples will be held onsite for 3 months. Samples will be disposed on the 20th of the 3rd month following the month of receipt (ie: Samples received in January will be disposed on the 20th of April), Please contact our environmental sample reception at enviro.reception@analytica.co.nz or 07 444 5574 if you wish to extend the samples holding period.

Note: Water samples will be held onsite for 1 month. Samples will be disposed of routinely according to receipt dates.

Appendix I: Laboratory Reports and Chain of Custody Information

Table A : Soil Sample Results - Heavy Metals and Pesticides - Burnham Quarry

Sample Name	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS08	Environment Canterbury Background Concentrations[1]
Sample Depth (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Laboratory Reference	20-03730-1	20-03730-2	20-03730-3	20-03730-4	20-03730-5	20-03730-6	20-03730-7	20-03730-8	Regional - Yellow Brown Stony
Date	30 January 2020	30 January 2020	30 January 2020	30 January 2020	30 January 2020	30 January 2020	30 January 2020	30 January 2020	
Heavy Metals									
Arsenic	2.7	2.8	2.7	3.2	3.3	2.8	3.0	3.2	6.35
Cadmium	0.11	0.12	0.067	0.082	0.066	0.065	0.090	0.044	0.14
Chromium	11	13.0	12	12	13.2	12	13.7	13.4	19.89
Copper	4.8	4.2	3.4	4.1	4.3	4.6	5.1	4.6	11.68
Lead	11.8	12.5	11.7	11.6	12.7	11.8	12.7	12.6	19.75
Nickel	6.50	6.31	6.13	7.13	7.50	6.59	7.33	7.75	13.91
Zinc	44.3	42.7	38.3	41.7	49.9	44.8	40.3	45.3	69.58
Organochlorine Pesticides (OCP)									
ΣDDT[2,5]	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	0.431[3]
Dieldrin[4,5]	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	-

Sample Name	SS09	SS10	SS11	SS12	SS13	SS14	SS15		Environment Canterbury Background Concentrations[1]
Sample Depth (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Laboratory Reference	20-03730-9	20-03730-10	20-03730-11	20-03730-12	20-03730-13	20-03730-14	20-03730-15		Regional - Yellow Brown Stony
Date	30 January 2020	30 January 2020	30 January 2020	30 January 2020	30 January 2020	30 January 2020	30 January 2020		
Heavy Metals									
Arsenic	3.4	2.9	3.1	3.0	3.4	2.8	2.8		6.35
Cadmium	0.095	0.065	0.064	0.065	0.046	0.076	0.046		0.14
Chromium	13.1	12	13.3	12.6	13.5	12.6	12		19.89
Copper	4.5	5.2	4.1	3.2	4.8	3.3	3.1		11.68
Lead	12.4	11.5	12.8	12.8	15.4	12.6	11.6		19.75
Nickel	7.37	6.93	7.52	7.66	8.45	7.22	6.57		13.91
Zinc	48.8	49.5	49.7	47.6	50.3	44.1	40.7		69.58
Organochlorine Pesticides (OCP)									
ΣDDT[2,5]	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028		0.431[3]
Dieldrin[4,5]	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55		-

Notes:

1. Background concentrations of selected trace elements in Canterbury soils - Addendum 1. (ECan 2007, Report no. R07/1/2). Based on 'Regional - Yellow Brown Stony' soil type - background concentration value based on maximum plus half inter-quartile range (excluding outliers, which are indicated in brackets).
2. Results for DDT, DDD and DDE summed and compared to soil contaminant standard for DDT
3. Background soils concentration for DDT - Ministry for the Environment, December 1998. Ambient Concentrations of Selected Organochlorines in Soils. Ministry for the Environment, Wellington.
4. Results for Aldrin and Dieldrin summed and compared to soil contaminant standard for Dieldrin.
5. Where one or more of the compounds was below the detection limit, a value of half the detection limit was used in the sum. Where all compounds in the sum are non-detects, the overall detection limit is the sum of the detection limits.

All results in mg/kg.