

Preliminary and Detailed Site Investigation – Remuera Precinct – 79 Ladies Mile, Remuera, Auckland

✦ Prepared for

Fletcher Residential Limited

✦ December 2023



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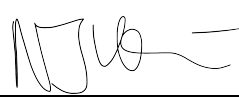
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Limitations:

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Fletcher Residential Limited and others not directly contracted by PDP for the work including Auckland Racing Club, Lander Geotechnical Consultants Limited and Initia Limited. 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 by PDP on the specific instructions of Fletcher Residential Limited for the limited purposes described in the report. PDP accepts no liability if the report 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.

FLETCHER RESIDENTIAL LIMITED - PRELIMINARY AND DETAILED SITE INVESTIGATION -
REMUERA PRECINCT - 79 LADIES MILE, REMUERA, AUCKLAND

This document has been prepared based on the sampling investigations completed by PDP on 29 March and 6 to 7 May 2021 and the results from laboratory analyses or field data gathered by PDP. The site conditions as described in this document 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. The information contained within this document applies to observations and sampling undertaken on the dates stated. With time, the site conditions and environmental standards may change. Accordingly, the reported assessment and conclusions are not guaranteed to apply at a later date.

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

This assessment is limited to collection and analysis of soil samples from discrete sampling locations. Interpretations of subsurface conditions, including contaminant concentrations, are not guaranteed at distance away from the specific points of sampling.

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1.0 Introduction

Pattle Delamore Partners Limited (PDP) has been engaged by Fletcher Residential Limited (FRL) to provide a combined Preliminary Site Investigation (PSI) and Detailed Site Investigation (DSI) report for the 'Remuera Precinct' development area of the Ellerslie Racecourse – located at 79 Ladies Mile, Remuera, Auckland (the site). This area is subject to a Private Plan Change application that will be required to allow residential development at the site. FRL have purchased approximately 6.2 hectares of land located at the eastern end of the Ellerslie Racecourse site from Auckland Thoroughbred Racing and has obtained resource consent (through the fast-track process) to construct approximately 357 residential dwellings. A plan change is now proposed to recognise the consented residential development within the Remuera Precinct.

This report investigates and summarises the actual and/or potential contaminated land issues associated with the current and historical use of the site and includes soil sample collection and analysis to confirm the presence of any residual contaminant concentrations in site soils from the activities associated with the former uses of the site (i.e., nursery/market garden, uncontrolled filling, etc.). This report has been prepared to satisfy the requirements of the following national and regional consenting frameworks for contaminated land management:

- ✧ Resource Management (*National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*) Regulations 2011 (NES-CS); and,
- ✧ E30 Contaminated Land rules in the Auckland Unitary Plan; Operative in Part (AUP-OP) (AC, 2021).

This Combined PSI and DSI has been directed and reviewed by a Suitably Qualified and Experienced Practitioner (SQEP) with respect to contaminated land and has been undertaken in accordance with the Ministry for the Environment (MfE) *Contaminated Land Management Guidelines No.1 – Reporting on Contaminated Sites in New Zealand* (MfE, 2021a), and *Contaminated Land Management Guidelines No.5 – Site Investigation and Analysis of Soils* (MfE, 2021b). A certifying statement to this effect is provided in Appendix A.

It is noted that this report was originally prepared by PDP for Auckland Racing Club (ARC). Previous iterations of the report were addressed to ARC. The report was utilised by FRL to support the fast-track consent applications lodged for the site. In earlier iterations of this report the development area was referred to as 'The Hill', which was the name given to the development area covered by the report at the time, and the site address quoted as 100 Ascot Avenue, Ellerslie. Since then, and specifically as it relates to the current Private Plan Change application, the name of the development area has been changed to 'the Remuera Precinct', and the site address has changed to 79 Ladies Mile, Remuera,

being the address listed on the title for the Remuera Precinct. PDP confirms that this report, as it was prepared for 'The Hill' site, applies to the same area as is relevant for the Remuera Precinct. The two areas are analogous, except the Remuera Precinct is 62,000 m² in area whereas The Hill site was 64,000 m². PDP confirms that this report is suitable and sufficient for use by FRL in support of the Private Plan Change application.

1.1 Project Objectives

The key objective of the PSI is to identify any actual or potential ground contamination, including Hazardous Activity and Industry List (HAIL¹) land use, within the subject site, either from historical or current activities occurring at the site; and to summarise the relevant information in this report.

The key objective of the DSI is to confirm, by means of soil sampling and analysis, any residual contamination impacts to soils from the identified current or historical activities, and provide an assessment of these contaminant concentrations in the context of human health (i.e., NES-CS) and environmental (i.e. AUP-OP) risk. Secondary DSI objectives are to: determine any expected consenting requirements under the NES-CS and the AUP-OP, required to enable potential redevelopment works; to provide some high-level assessment on the potential for waste classification and/or re-use of site soils to be disturbed during the proposed development; and to support the proposed Private Plan Change application required to rezone the site for residential purposes.

1.2 Scope

The scope of work undertaken by PDP includes:

To complete the PSI:

- ✧ A desktop study including a review of a selection of publicly available historic aerial images, the Auckland Council (AC) property file, and AC site contamination enquiry;
- ✧ Interviewing the Track Manager about his knowledge of current and past activities with a particular focus on potentially contaminating activities that may have occurred at the site;
- ✧ Identification of actual or potential impacted ground/HAIL land use as a result of current or former site uses; and
- ✧ Development of a Conceptual Site Model (CSM) to indicate the potentially complete source-pathway-receptor linkages at the site and a

¹ The Hazardous Activities and Industries List (HAIL) is a compilation of activities and industries that are considered likely to cause land contamination resulting from hazardous substance use, storage or disposal. The HAIL is intended to identify most situations in New Zealand where hazardous substances could cause, and in many cases have caused, land contamination. The most recent version of the HAIL was published by the MfE in 2011.

Sampling and Analysis Plan (SAP) to investigate and quantify contaminant concentrations present in Remuera Precinct site soils.

To complete the DSI:

- ✧ Undertake site sampling works to collect samples for analytical testing in accordance with the CSM and the SAP;
- ✧ Compare sample analysis results with the relevant soil guideline criteria and contaminant standards from applicable guideline documents (i.e., the AUP-OP and NES-CS);
- ✧ Provide an assessment of any expected resource consenting requirements for contaminated land management based on the findings of these results; and
- ✧ Provide an assessment of the general classification of soil disposal streams from the materials sampled based on the soil sample results, and/or the ability of the soils to be re-used on site from a contaminated land perspective.

Overall, a comprehensive level of site sampling was undertaken in order to inform the assessment and recommendations. The results of the sampling and the above assessments are to be summarised in this report, completed under the direction of a Suitably Qualified and Experienced Practitioner (SQEP) in Contaminated Land, in general accordance with the MfE CLMG requirements, to support the proposed Private Plan Change application required to rezone the site for residential purposes.

2.0 Investigation

The PSI investigation was completed in early 2021.

2.1 Site Description

The site and general location plan are shown in Figure 1. The site is located in the eastern section of the Ellerslie Racecourse. The site address at the time of the PSI was 100 Ascot Avenue, Greenlane; and has subsequently changed to 79 Ladies Mile, Remuera. The total land area of the Ellerslie Racecourse is approximately 46.15 ha. The ARC website states that horse racing has been occurring at Ellerslie since 1857.

The Remuera Precinct investigation area is crescent shaped and comprises an area of approximately 6.2 ha or 62,000 m² completing the eastern portion of the larger racecourse site (refer to Figure 1). The investigation area is an unfenced, sloped area comprised predominantly of open ground and including a stormwater retention pond and several structures (i.e. a track camera tower, Track Manager's House (in the eastern corner of the site), a pump shed and two water tanks). Remuera Precinct is bounded by Ladies Mile in the east and

Derby Downs Place in the south, the remainder of the site is immediately adjacent to the wider racecourse site.

Immediately adjacent land-use is residential to the north, east and south; with the remainder of the racecourse (commercial/industrial and recreational land-use) to the west. The wider surrounding land-use is typically commercial/industrial and residential land-use.

2.2 Geology, Hydrogeology and Topography

The Geology of the Auckland Urban Area (Kermode, 1992) geological map indicates that the Remuera Precinct is underlain by alternating sandstone and mudstone with variable volcanic content and interbedded volcanoclastic grits of the East Coast Bays Formation in the north, and alluvial and colluvial deposits of sand, silt mud and clay with local gravel and peat beds in the southern section. The wider racecourse site also includes volcanic ash, lapilli and lithic tuff in the west and south.

Targeted geotechnical investigations undertaken within the Remuera Precinct area undertaken by Lander Geotechnical (Lander) in March 2021 found several inclusions of volcanic soils in the form of ash layers through several borehole locations across the site. Subsequent test pit logs reported by Lander for 12 test pits completed in April 2021 also report volcanic inclusions in the form of 'basaltic gravels', 'scoria' and 'ash' layers. The investigation features extended to a maximum depth of 24 m below ground level (bgl), and were drilled and logged as part of the geotechnical investigation component of the works. Refer to geological logs in Appendix B.

Groundwater levels were measured by Lander via four geotechnical bores between 2.8 m bgl and 6.19 m bgl. Groundwater beneath the area is regionally expected to flow to the north north-east towards the Orakei Basin.

The site varies in elevation between 56 m reduced level (RL) in the north/east adjacent to Ladies Mile down to 42 m in the south-west adjacent to Derby Downs. Localised excavations to form a stormwater pond in the southwest site area drop to 39 m (based on topographic contour information provided on AC Geomaps).

2.3 Historical Aerial Photographs

A historical image review was conducted to verify the features that have been identified during the information review, as well as checking for the existence of further potential HAIL features. A selection of aerial images of the Remuera Precinct were analysed dating from 1940 to 2017. The images were obtained from the Land Information New Zealand website Retrolens, AC Geomaps, and Google Earth. The reviewed images are provided in Appendix C. It is noted that the electronic versions of the aerial photographs were used to conduct the review, which allows for site features to be viewed at a larger scale than what may be visible on the sample photographs provided in Appendix C.

Table 1: Historical Imagery Review

Year	Description
1940	<p>The Remuera Precinct area appears to be a grassed area bounded by the main horse racing track to the west and an outer racing track running north to south along the eastern section of the site. Two channels/gullies are visible, both in the north western section of the site, and running from the north east to the south west.</p> <p>Land to the west of the site is occupied by the present-day Ellerslie racecourse and track. Land to the north appears to be primarily utilised for residential purposes, except for a small area of bush immediately to the northwest of the site. Immediately to the east/southeast of the site is a vacant grassed section. Activities associated with market gardening appear to be taking place on adjacent land to the immediate south of the site.</p>
1955	No changes are apparent at the site and its surroundings since the 1940 aerial image. (No aerial image provided; image reviewed for comments only.)
1961	<p>The Remuera Precinct area is as previous except for an area of land along the north western site boundary has been cultivated to what appears to be a nursery/market garden. Associated sheds/structures are present. The Track Manager's House has been established in its present-day location in the eastern section of the site.</p> <p>The majority of market gardens present on the adjacent land to the south have been removed with only one market garden remaining. Associated buildings are still present. The remainder of surrounding site use remains as previously indicated.</p>
1968	No changes are apparent at the site and its surroundings since the 1961 aerial image. (No aerial image provided; image reviewed for comments only.)
1975	<p>No changes are apparent at the site since the 1968 aerial image.</p> <p>The last remaining market garden has been removed from the adjacent property to the south, however, associated buildings are still present. The remainder of surrounding site use remains as previously indicated.</p>
1980	<p>The market gardens and associated structures previously present at the western boundary of the property are now removed. There are several established roadways and evidence of increased civil works/activities onsite. The two gullies running across the north of the site now appear to have been infilled.</p> <p>The remainder of surrounding site use remains as previously indicated.</p>

Table 1: Historical Imagery Review

Year	Description
1988	No changes are apparent at the site and its surrounding since the 1980 aerial image. (No aerial image provided; image reviewed for comments only).
1996	A stormwater pond has been established in the southern section of the site. A pump shed has been established south west of the stormwater pond. The previously vacant section of land in the east has now been developed for residential land use. The remainder of surrounding site use remains as previously indicated.
2001	No changes are apparent at the site since the 1996 aerial image. A building has been established on the adjacent property in the south. The remainder of surrounding site use remains as previously indicated.
2009	The construction of a stormwater jacking shaft on the western site boundary has begun. The remainder of surrounding site use remains as previously indicated.
2012	A mound of fill material is visible in the northern area of the site. Earthworks are visible on the south eastern site boundary. Subsequent imagery from the same year suggests that the earthworks at the western and southern site boundary have been completed by October (image not included). The remainder of surrounding site use remains as previously indicated.
2016	Potential structures might be present in the south western section of the site (2016-2019); however, the resolution of the aerial imagery is not high enough to be certain of the nature of these structures. A stockpile and associated earth works are visible at the northern site boundary. The remainder of surrounding site use remains as previously indicated.
2017	Two water tanks have been established adjacent to the pump shed. The buildings associated with previous market gardens on the adjacent property to the south have been removed. The remainder of surrounding site use remains as previously indicated.

2.4 Auckland Council Information

2.4.1 Property File

The property file consisted of land use consent applications relating to permanent and temporary buildings as well as cut and fill works, and several expert reports that have been commissioned in the past. A brief summary of items considered to be relevant to the contamination history of the Remuera Precinct is as follows:

- ✧ Land use consent documents from 1960 discuss the proposed relocation of the gardener's house (today known as Track Manager's House) to its current position in the north eastern part of the site to give way for the construction of the Southern Motorway.
- ✧ Land use consent documents from 1996 discuss racetrack improvements comprising of cut and 4,000 m³ of filling works. The associated plan suggests that the Remuera Precinct was used to source and/or dispose of soil.
- ✧ Land use consent documents from 2000 discuss the erection of temporary barn structures adjacent to the stormwater pond as movie props. These were proposed to be partly incinerated as part of the movie plot.
- ✧ In May 2005, Earth Consult Ltd ('ECL') undertook a Preliminary Site Investigation to identify potential contaminated soil in the Remuera Precinct area and adjacent land to the south. Two hand augered boreholes were advanced to a depth of 0.1 m below ground level (bgl) and 0.5 m bgl next to the stormwater retention pond to characterise the nature of fill. Analytical results reported fill material containing heavy metal concentrations slightly above regional background concentrations. Contamination found in sampled soil at this location did not exceed applicable criteria, however, contamination was noted to increase with depth. ECL noted that anecdotal evidence suggests that buried solid waste was encountered during the construction of the stormwater detention pond.

Further, 10 soil samples were collected from the western site area, targeting the area of the site historically utilised as a nursery/market garden. These samples were composited and analysed for a suite of heavy metals and organochlorine pesticides (OCPs). Arsenic, copper, mercury, and lead concentrations were found to exceed regional background ranges; and DDT and DDE were detected in trace concentrations. All contaminants analysed were below applicable human health and environmental criteria. ECL noted that 'DDT was commonly used on grassed areas in New Zealand until the mid-1970s to control porina and grass grub populations', and inferred that application of these chemicals is therefore possible to have occurred on grassed areas within the wider racecourse site.

- ✧ In October 2007, Sinclair Knight Merz Ltd ('SKM') undertook an Intrusive Investigation within the northern Hill area related to a proposed stormwater infrastructure upgrade. One machine borehole advanced to 5.0 m bgl revealed heavy metal concentrations above regional background ranges. Four samples were taken at 0.1 m bgl, 0.6 m bgl, 1.2 m bgl and 2.2 m bgl. Trace concentrations of semi-volatile organic compounds (SVOCs) and total petroleum hydrocarbons (TPHs) were encountered in samples from ground surface to 1.2 m depth. However, concentrations of these contaminants were found below applicable background concentrations at depths greater than 1.2 m bgl. Groundwater was not encountered at the target depth of 5 m. The report notes that the site was utilised as a potato farm prior to its redevelopment into a racecourse in 1857.
- ✧ In May 2009, ECL applied for a resource consent to allow for passive discharge of contaminants from a contaminated parcel of land bordering the site in the south. Within the report it was noted that stormwater runoff discharges into a soak hole (in basalt rock) on the subject site for that consent. ECL stated within this letter report that groundwater was suspected to be encountered at a depth of 11 m bgl.

No other items relating to potential or known contamination issues for the Remuera Precinct site were identified in the property file.

Due to the size and number of files noted in the AC property file, individual files are not appended to this report but can be made available electronically on request.

2.4.2 Site Contamination Enquiry

A Site Contamination Enquiry (SCE) was submitted to AC by PDP, the results of which recorded 30 discharge incidents since 2008 within a 500 m radius of the site.

In summary the SCE identified:

- ✧ The parent racecourse site (including Remuera Precinct) as a potential HAIL site due to historical horticultural activities (HAIL A10) and being subject to uncertified filling (HAIL G5).
- ✧ A large number of discharge incidents are reported within 500 m of the site. These incidents are typically small hydrocarbon spills, and/or complaints related to sediment, odour, wastewater, etc.
- ✧ Sixteen observation/geotechnical bores and one bore for domestic use being present.

None of the reported incidents are considered to be of significance with respect to contaminant impact to site soils based on the types of incidents and the separation distance from the site (refer information summary). The bore identified for domestic use is no longer operational and, at 300 m distance from site, not expected to be influenced by activities occurring on site.

Due to the number of items noted in the AC site contamination enquiry, a detailed list of items is not appended to this report but can be made available electronically on request.

2.5 Site Visit

A site visit was completed by a SQEP on 25 March 2021 to physically inspect parts of the site for potential impacted ground areas/HAIL use. Refer to Figure 1 for the location of areas described.

The findings of the site visit are summarised below, and associated photographs with items of note are provided in Appendix C.

2.5.1 Uncertified Fill Areas

Potential imported fill material was observed across the Remuera Precinct site, running north from the stormwater pond, and west above the pond. During the site visit, these areas were observed to be covered with long grass. No visible signs of contamination were observed e.g., no refuse, or impacted vegetation.

Another area of fill adjacent to the Ladies Mile site boundary was identified. During the site visit, this area was observed to have an uneven ground surface comprised of clay and some rocks (volcanic in appearance). On/within the soil timber, concrete, lengths of drainage pipe and greenwaste (i.e. branches, leaves, etc) were observed. No visible signs of contamination, such as soil staining, were observed beyond the inert materials described. An area of dead grass was present at the end of the access track.

2.5.2 Excavated Pond Dredgings

Sediments dredged from the onsite stormwater pond have been placed on the north-eastern boundary of the site (pers. comms. Mr Fulford, ARC Track Manager). The profile of this area is raised approx. 1 m above the surrounding ground level. A small pile of broken concrete was present at the south eastern end of the excavated pond dredgings area.

2.5.3 Track Manager's House

The Track Manager's House is situated in the eastern corner of the site and may be accessed both internally through via the racecourse and via Ladies Mile. It is clad with painted timber weatherboard, and panel baseboard (potentially constructed from asbestos containing material (ACM)). The baseboard was noted to be in good condition. The section was noted to be tidy, and well-kept. No staining or other indication of contamination was observed.

2.5.4 Other Onsite Buildings/Structures

The building located within the north western wedge of the site is a tower, housing track cameras. The tower appeared to be constructed of colour steel and the tower struts of galvanised metal. To the south west of the pond is a shed. The shed appeared to be constructed of metal cladding. No suspected ACM was observed on the exterior. Two HDPE water tanks are present next to the shed.

2.5.5 Other Identified Areas

In the vicinity of the shed other material and equipment was stored e.g. gravel, timber, metal fencing, an electrical switch box, pipes, etc. All appeared to be inert materials.

Along the southern site boundary, beside the internal roadway and along the fence line, is a range of landscaping materials and equipment e.g. timber, grounds maintenance machinery, a pole. All comprised of wood or metal.

No staining of ground, or odours were noted across the remainder of the site.

2.6 Interviews

An interview with Mr Jason Fulford, the ARC Track Manager, was conducted during the site visit. Mr Fulford started working at the recourse in May 1998 and has been the Track Manager at the site since October 2001. He resides in the Track Manager's House located in the north eastern site area. With regards to potential ground contamination, Mr Fulford noted the following general points.

2.6.1 Uncertified Fill Areas

In regard to the potential imported fill material across the site, Mr Fulford noted that the ground across these areas is hummocky and is assumed to have been the site of fill placement, gained from other areas of the racecourse when excavation activities (e.g., to create building platforms and/or relocate surplus soils) have occurred.

Mr Fulford also stated that this area has been an area where the ground staff dispose of green waste from the wider racecourse. He further mentioned that concrete could be present within this placed fill. Mr Fulford stated that no waste incineration has taken place in this area.

2.6.2 Excavated Pond Dredgings

Mr Fulford confirmed that sediments dredged from the on-site stormwater pond have been placed on the north-western boundary of the site approximately two years ago. ARC reports that the pond receives stormwater from the local network.

2.6.3 Track Manager's House

This house is located at 99 Ladies Mile. It was constructed from the lower half of the 19th century Stewards Stand, which was deconstructed and moved in 1908, but has been highly modified. It was originally located in a different area of the wider racecourse site (outside of the Remuera Precinct area) and was relocated to its current position. Mr Fulford stated that the house was repainted within the last year. Prior to painting, the house was water blasted. Mr Fulford confirmed that the contractors used ground covers during the water blasting to catch any paint chips.

2.6.4 Other Buildings / Structures/ Areas

Mr Fulford confirmed that the shed to the south east of the pond is a pump shed to extract water from the pond which is subsequently used to irrigate the racetrack. Mr Fulford could not confirm when the stormwater pond was constructed. The temporary barn structures mentioned within the property file were constructed and demolished as part of the movie plot according to Mr Fulford.

3.0 Information Summary

The information gathered during this PSI and site walkover regarding the current and historical land uses of the site that have the potential to have caused ground contamination can be summarised as follows. It is considered that HAIL activities are more likely than not to have occurred at the site, with areas of potential and/or actual HAIL shown on Figure 1.

3.1 Historical Market Garden / Horticultural Chemical Usage

Historical horticultural use of the western part of the Remuera Precinct area was identified during the aerial image review to have occurred between 1961 and 1980 (approximately). Due to the past use of this area for horticultural purposes and the chemicals used in horticultural practices at this time, chemicals from the OCP suite such as DDT may be present in the soils in this area of the site. This could also apply to any soils which have been impacted by the historical application of these chemicals, and then subsequently relocated within the site confines (i.e. the uncertified fill areas).

- ∴ The AC SCE also lists the wider racecourse site as a HAIL site (A10) due to historical horticultural activities.
- ∴ ECL noted the common use of DDT as a pesticide on grassed areas prior to the mid-1970s. This investigation did not confirm or rule out historical use of pesticides on grassed areas of the Ellerslie racecourse. However, as detailed in the Sampling and Analysis Plan (Section 5), and in Section 6, testing for OCPs including DDT is included in the analysis suite for the historical market garden area, and for soil samples collected from across

the wider Hill site. Therefore, this potential activity has been assessed as part of the DSI.

As such, the investigation of impacts to site soils from past horticultural activities in the Remuera Precinct have been further investigated, refer to Sections 5 and 6 for detail.

3.1.1 Uncertified Fill Areas

Areas of uncertified fill material extend north from the stormwater detention pond and west above the pond as well to the north and eastern parts of the site adjacent to the Ladies Mile site boundary (refer to Figure 1). The two channels visible in aerial photographs prior to 1980 have been infilled with fill material. Mr Fulford has confirmed that these areas have been used to dispose of fill material gained from other areas of the racecourse over time. The north western fill area is, furthermore, utilised by ground staff to dispose of green waste from the wider racecourse according to Mr Fulford. Documents within the property confirm this statement. AC records mark the wider racecourse site (including the Remuera Precinct area) as a HAIL G5 due to the presence of uncertified fill. Uncertified fill may be of concern from a ground contamination perspective due to potential contaminants being present in the soils from soil-source-site contaminating activities, and a lack of historical regulations supporting the assessment and suitability for re-use and relocation of these soils. Based on the information obtained for the Remuera Precinct, uncertified fill is confirmed in this area at depths >4 m, and also warrants further investigation.

3.1.1.1 Stormwater Retention Pond and Pond Dredgings

The historical aerial image review confirmed that the stormwater retention pond was established sometime between 1988 and 1996. The pond has been dredged in the past, and the excavated dredgings have been placed in the northeast site area (refer below and Figure 1). The retention pond is assumed to be the terminal point for any stormwater from the site, and receives run-off from the nearby roading network. As such, the water and associated sediment remaining within the pond are assumed to be a receiving environment for any contaminants which may be found in these areas – i.e. copper, lead, zinc and petroleum hydrocarbons.

It is expected that any small spills and discharge incidents which occur within 500 m of the site may have the potential to enter the stormwater pond and become entrained in the sediments, however, based on the volume and nature of these spills reported in the SCE, it is not expected that they will result in a significant impact to the pond water/sediments. As such, water/sediments within the stormwater pond have been excluded from the scope of this work and may need to be addressed in the future. However, it has been assumed that previously excavated pond dredgings are likely to contain similar contaminant characteristics to the sediment currently present in the stormwater pond and are proposed to be assessed as part of this investigation.

3.1.2 Track Manager's House

The Track Manager's House was constructed from the lower half of the 19th century Stewards Stand, which was deconstructed and moved in 1908, but has been highly modified. The Track Manager's House was subsequently relocated to 99 Ladies Mile prior to the 1960s to make way for the construction of the Southern Motorway. The cladding of the house consists of painted timber weatherboard and baseboard panel. Due to the historical use of lead-based paint, lead contamination may be present in the soil halo (*'area of surface soils'*) immediately surrounding the Track Manager's House; and this contamination source has been addressed as part of the DSI. The baseboard panels appeared to be ACM; but the material was noted to be in good condition and is not considered likely to contribute asbestos fibres to the halo if it remains undisturbed.

3.1.3 Other Identified Areas

- ✧ Anecdotal evidence from the SKM investigation notes that the Remuera Precinct site (or part thereof) has historically been used to farm potatoes, prior to being converted to a Racecourse in 1857. Typical herbicides and pesticides of concern associated with market gardens (e.g. OCPs) are not expected to have been widely used in New Zealand at this point in time, and as such contamination caused by this activity is therefore unlikely to be present today and further investigation is not considered necessary.
- ✧ The gravelled yard/mixed-use area is present in the southern section of the site. Due to short term nature of storage, and the types of equipment/plant, that have been stored in this area being inert in nature it is not expected that contaminants have been leached to the ground as a result of this activity and no further investigation is considered necessary in this area.
- ✧ The adjacent property to the south has been historically used as a market garden but it has been established that stormwater from the adjacent property drains into an onsite soakage hole and is therefore not considered to have contributed contamination to the Remuera Precinct site via any migration pathway (i.e. surface runoff).

3.1.4 Other Onsite Buildings

The AC property file notes two temporary barns that were constructed as movie prop and burned in a controlled and partial manner for the production. Ash might be found in soil in the vicinity of the former buildings as a result of the partial burning of these structures, however the quantity of ash that is likely to have been produced is unlikely have been significant enough to have caused contamination of the site.

The tower in the north western section of the site as well as the pump shed are both constructed of coated and / or galvanised metal and are therefore not likely to have contributed to contamination of the surrounding site soils.

Structures associated with the historical market garden in the western part of the site have been identified in aerial images. These are not considered as having contaminated the site; however, it is not clear what building material has been used to construct these structures and where refuse of these structures was disposed of after demolition.

4.0 Conceptual Site Model

On the basis of the information review, a CSM has been derived to summarise the identified potential contamination sources, pathways and receptors; and to inform the sampling and analysis plan for the Detailed Site Investigation (DSI).

A risk to human health or the environment can only exist if there is a contamination source (i.e. storage or use of materials that could have impacted soil, dust or water), a receptor (i.e. people, surface water) and a migration pathway linking the source and the receptor. An absence of any one of these components means that the exposure pathway is incomplete. Where it has been assessed that there is an incomplete exposure pathway for any of the potential contamination sources discussed in Section 3, these have not been included in the CSM and are not discussed further below). The CSM is provided below in Table 2.

Table 2: Conceptual Site Model			
HAIL land-use/ Impacted Ground (i.e., contaminant source)	G3/G5 – Landfilling from uncertified fill material	A10 – Bulk application of pesticides/herbicides to sport turf and market gardens	Impacted ground resulting from lead-based paint application/maintenance
Onsite location	Uncertified fill areas and excavated pond dredgings area.	Original application in the historical nursery/market garden area.	Surface soil halo immediately surrounding the Track Manager's House.
Identified Contaminants of Concern	Unconfirmed – likely to include heavy metals; OCPs; and polycyclic aromatic hydrocarbons (PAHs); etc. (depending on nature and source of fill)	Heavy metals and OCPs	Lead
Potential Mechanism of Contamination	Disposal of contaminated fill materials to land; leaching of contaminants to ground and potentially groundwater.	Direct application of herbicides/pesticides to racecourse and market garden; leaching of contaminants to ground and potentially groundwater.	Flaking of paint, active disturbance of paint during intentional/accidental interaction and leaching of contaminants to surface soil.
Identified Receptors	<p>Short term:</p> <ul style="list-style-type: none"> ✧ Earthworks contractors during soil disturbance (i.e. maintenance and excavation). ✧ Current site users. ✧ Environmental receptors (via surface water and groundwater) during soil disturbance. <p>Long term:</p> <ul style="list-style-type: none"> ✧ Future residential site users. ✧ Maintenance and excavation workers (if contaminated soil is buried or remains onsite at shallow depths). ✧ Environmental receptors (if contaminated soil is buried or remains onsite). Groundwater users (if contaminants extend into to groundwater systems beneath the site). 		

Table 2: Conceptual Site Model	
Potentially complete exposure pathways identified	<ul style="list-style-type: none"> ✧ Dermal contact, inhalation and soil ingestion for site workers, and residents (on site and neighbouring) during soil disturbance – potentially complete subject to further testing and investigation (only complete for long term workers and residents if contaminated soils are confirmed, remain on site, and are accessible). ✧ Produce consumption and direct uptake during the consumption of plants and food grown in the site soils by future site residents – potentially complete (only complete if contaminated soils remain onsite, and plants are grown and consumed) ✧ Discharges to surface water during soil disturbance – potentially complete subject to further testing and investigation. ✧ Discharges to groundwater – potentially complete (only complete if contaminated soils are present in significant concentrations capable of leaching to groundwater, and remain onsite).
Applicable Land Use Scenarios and Applicable Guideline Criteria	<p>National Environmental Standards for Assessing and Managing Contaminants in Soil (NES-CS) to Protect Human Health – Soil Contaminant Standards (SCS) and Soil Guideline Values (SGV) – Residential 10% produce (including route-specific guideline values for residential¹).</p> <p>Where applicable:</p> <ul style="list-style-type: none"> ✧ New Zealand Guidelines for Assessing and Managing Asbestos in Soil, Soil Guideline Values (BRANZ, 2017). ✧ Guidelines for assessing and managing petroleum hydrocarbon contaminated sites in New Zealand (MfE, 2011d)
Applicable Discharge Criteria	Auckland Unitary Plan Operative in Part (AUP-OP), Permitted Activity criteria for discharges in a volcanic setting – Rule E30
<p>Notes:</p> <p>1. Guidelines from MfE, 2011c Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Module 4 – Soil acceptance criteria during maintenance/excavation work.</p>	

The CSM was used to inform the sampling and analysis plan (SAP) for the DSI, as discussed in Section 5.

5.0 Sampling and Analysis Plan

To assess the residual impact from the above contamination sources, the following SAP has been implemented:

Table 3: Sampling and Analysis Plan			
HAIL land-use/ Impacted Ground (i.e. contaminant source)	G3/G5 – Landfilling from uncertified fill material	A10 – Bulk application of pesticides/herbicides to sport turf and market gardens	Impacted ground resulting from lead-based paint application
Onsite location	Uncertified fill areas and excavated pond dredgings.	Original application in the historical nursery/market garden area.	Surface soil halo immediately surrounding the Track Manager's House.
Sampling Methodology	<p>Test pitting/machine borehole drilling/hand augering to investigate quality and extent of fill materials and in-situ-natural material.</p> <p>Test pit, borehole or hand auger to extend through potential fill material to natural in-situ material.</p> <p>Discrete samples to be collected from any distinct layers of fill (including dredgings); discrete sample to be collected from top of natural material.</p> <p>It is assumed that the excavated pond dredgings and the in-situ pond dredgings exhibit similar contaminant characteristics; therefore, sampling of the excavated dredgings is also to be used to assess the likely quality of the in-situ dredgings.</p>		Discrete samples to be collected directly using hand tools from surface soil at each side of the house. One at 1 m and one at 3 m distance from the house walls.
Sample Number and Frequency	<p>Typically, 2-3 samples and depths per test pit:</p> <ul style="list-style-type: none"> ✧ 1-2 samples of representative fill material ✧ 1 sample at the top of natural ground. 		1 surface sample per location.

Table 3: Sampling and Analysis Plan		
Target Analysis	Selected samples to be analysed for: heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, and zinc); PAHs; OCPs; and semi-quantitative asbestos analysis (if suspected ACM is encountered; may also include bulk material samples for asbestos presence/absence).	Samples to be analysed for: lead
Quality Assurance / Quality Control	<p>Any sample equipment coming into direct contact with the sample (i.e. excavator bucket or spade) to be decontaminated between sample locations with de-ionised water and surfactant.</p> <p>New nitrile gloves to be worn between sample locations.</p> <p>Soil/fill samples to be placed in laboratory supplied sterilised glass jars.</p> <p>Soil/fill samples to be chilled immediately following collection.</p> <p>Soil/fill samples to be transported to IANZ laboratory under standard chain of custody documentation.</p> <p>Sample analysis to be completed by IANZ laboratory by standard analytical methods for the tests described.</p>	

6.0 Detailed Site Investigation

A Detailed Site Investigation (DSI) in general accordance with MfE CLMG No. 5 (MfE 2021b), was undertaken to assess the nature and extent of the actual/potential contamination items identified during the PSI.

6.1 Site Investigation Methodology

Site investigation features included the advancement of boreholes, test pits, hand augers and surface soil observations to provide a broad range of coverage across the site. The site investigations were undertaken in the areas of interest on the following dates:

- ✧ Borehole investigation: 06 and 07 March, 2021 and 06 April, 2021.
- ✧ Hand auger investigation: 29 March, 2021.
- ✧ Test pitting: 06 and 07 May, 2021.
- ✧ Surface Soil Investigation: 07 May, 2021.

Details of the borehole, test pit, hand auger and surface soil investigation locations, and associated samples, at each of the areas in question are shown in Figure 2. The detailed Sampling and Analysis Plan, indicating the sample collection methods and sample number and frequency is shown in Table 3. The Sections below include a summary of the corresponding investigation activities undertaken and related observations from each of the key areas.

6.1.1 Borehole Investigation

Lander completed a geotechnical borehole investigation on 6 and 7 March 2021 (refer to Figure 2 for locations). Lander completed six boreholes of which two were of interest to target uncertified fill materials; MH03 and MH05. During the completion of the geotechnical investigation, site soils were observed and logged by the Lander site operative. The Lander bore logs are provided in Appendix B.

Fill material was encountered in boreholes MH03 and MH05 to a maximum inferred depth of 8.5 m bgl and was typically described as a silty clay or clayey silt mixed with waste/refuse materials (described as wood, concrete, metal, brick, basaltic gravel, etc.). The natural underlying material was described as a silty clay, a silty sand, and vesicular basalt with various volcanic inclusions across the site present most commonly as layers of ash. Groundwater was reported between 2.8 m bgl and 6.19 m bgl.

Soil/fill material samples were collected by PDP from each of the soil cores from known depths: MH03 5.3 m bgl and 9.5 m bgl, and MH05 8.0 m bgl (note: fill was not sampled at MH05 due to a lack of usable soil being present in the core box). For each sample, the field operative collected the samples as indicated by the Sampling and Analysis Plan (refer Section 5.0).

6.1.2 Hand Augers

Two hand augers were advanced into fill areas: HA02 to the north of the stormwater detention pond, and HA08 in the eastern part of the site within the historical market garden area (refer to Figure 2 for hand auger locations).

Hand auger holes extended from 0.3 m (HA08) to 0.5 m (HA02) depth. Geological logs of the hand auger hole (provided in Appendix B) at HA02 reported fill material to a depth of 0.5 m bgl. One sample of fill and one sample of natural material was taken at HA02 (0.1 m bgl and 0.5 m bgl respectively). Two samples of fill material were taken at HA08 (0.1 m bgl and 0.3 m bgl). (Refusal was encountered at 0.4 m bgl at location HA08 (i.e. hand auger borehole did not extend into natural ground). Fill material comprised clayey silt and silty clay. Natural soil encountered comprised of silty clay and ash. No visual or olfactory evidence of contamination, or any building material products, were noted in the fill materials.

For each sample, the field operative collected the samples as indicated by the Sampling and Analysis Plan (refer Section 5.0).

6.1.3 Test Pitting

Twelve test pits were excavated in areas of interest across the Remuera Precinct after the completion of underground service clearance activities (refer to Figure 2 for test pit locations). Each test pit was excavated to natural ground (typically clayey silt/silty clay, or ash).

Fill material was observed in 10 of the 12 test pits. Geological logs (provided in Appendix B) confirm that fill depths ranged from 0.8 m to 4 m throughout the test pit locations. In general fill material appears to deepen to the north west, with shallower fill encountered in the east and south. The fill material was described as clayey silt and silty clay materials mixed with waste/refuse materials (described as wood, metal, plastic, building materials, scoria, glass, etc.). Eight fragments of suspected ACM were identified during the excavation of test pit TP07.

One test pit (TP11) was advanced into the excavated pond dredging area where fill was observed to a depth of 0.8 m bgl consisting of clayey silt with concrete, brick and glass fragments. The underlying natural material encountered was silty clay of the residual east coast bay formation.

In general, one soil/fill material sample was collected from fill material and natural ground from each of the test pits. Additional samples were collected where unique and extensive fill units (e.g. greater than 0.5 m thickness) were identified, or where known features (i.e. excavated pond dredgings) were targeted (i.e. TP11). Samples were also collected where suspected ACM were observed (TP07); along with bulk material samples for presence/absence of asbestos analysis. Samples of soil/fill were collected directly from the excavator

bucket from known depths. For each sample, the field operative collected the samples as indicated by the Sampling and Analysis Plan (refer Section 5.9).

No groundwater was identified to the total excavation depth in any of the investigation test pits.

6.1.4 Surface Soils

Seven surface soil samples were collected around the Track Manager's house, using a spade (refer to Figure 2 for sample locations). Where possible, two surface samples were collected from each side of the house, one at 1 m distance and another one at 3 m distance from the house footprint.

A bulk sample of the suspected ACM baseboard was collected to be analysed for asbestos. For each sample, the field operative collected the samples as indicated by the Sampling and Analysis Plan (refer Section 5.0).

6.2 Data Limitations

This assessment is limited to collection and analysis of soil samples from sampling locations that have been, in part, selected based on underground and above ground infrastructure constraints (i.e. such as stormwater features and proximity to market services such as floodlights and leading cables); and the comparison of laboratory test results with environmental and health guidelines, and based on historical information and other information listed in this report. Subsurface conditions, including contaminant concentrations, can vary in time and distance so that conditions found at any specific point of sampling might not be representative of subsurface conditions that could occur away from the specific point of sampling.

7.0 Soil Evaluation Criteria

Appropriate standards, criteria and guidelines have been selected for comparison to carry out a preliminary health and environmental risk assessment (as outlined in the CSM). These guideline values were selected in accordance with the guidance provided in the MfE (2011a) CLMG No. 2 '*Hierarchy and application in New Zealand of environmental guideline values*'.

7.1 Environmental Assessment Criteria

Applicable environmental assessment criteria for soils within the Auckland area are the permitted activity criteria from the AUP-OP Contaminated Land Rules E30.6.1.4 (note that the permitted activity criteria are the greater of the criteria specified in Table E30.6.1.4.1 – Permitted Activity (PA) Soil Acceptance Criteria, or the natural volcanic background levels for the soil or fill material specified in Table E30.6.1.4.2 – Background Ranges of Trace Elements in Auckland Soils.

7.2 Human Health Assessment Criteria

Applicable human health assessment criteria for soils on this site are:

- ✧ The SCSs (from the NES-CS) for those contaminants included (i.e. arsenic, cadmium, chromium, copper, lead, benzo(a)pyrene equivalent (BaP(eq)), and DDT); and SGVs (from Schedule B(1) *Guideline on Investigation Levels for Soils and Groundwater* National Environmental Protection Measure (NEPM, 2013)) for those inorganic contaminants for which no NES-CS SCS is available (nickel and zinc). Residential SCSs and SGVs with an assumption of 10% produce consumption have been selected as the most appropriate for the potential redevelopment. It is noted that the Private Plan Change application proposes to allow a mixture of residential land uses, which could include high-density residential. However, it is considered appropriate for the more conservative SCSs and SGVs, which allow for produce consumption, to be applied. This is because if the residential 10% produce consumption guideline values are met, then so will the guideline values for high-density residential land use.
- ✧ Guideline values for PAH compounds other than BaP(eq) for residential land use are available in the oil industry guidelines (MfE, 2011b) and these guideline values have been included for assessment. The Tier 1 guideline values for a sandy silt soil type and a contamination depth of < 1 m have been chosen as the most conservative measures for the site based on geological log records from PDP and Lander.
- ✧ The BRANZ Guidelines (2017) are applicable to sites with asbestos in soil impacts. Based on the presence or absence and/or concentrations of asbestos fibres and ACM in the subject soil, BRANZ Guidelines categorises asbestos management of affected soils for various land-use types. These have also been included for assessment on an 'as required' basis.

It should be noted that for HAIL sites for which sampling indicates that concentrations of potential contaminants of concern are within 'background' concentrations, the regulations of the NES-CS do not apply. As such, it is relevant to include the Auckland Regional Council (ARC) Technical Publication 153 ('TP153'), '*Concentrations of inorganic elements in soils from the Auckland Region*' (ARC, 2001); also included in the AUP-OP as Table E30.6.1.4.2 – Background Ranges of Trace Elements in Auckland Soils. In this case, based on the geotechnical logs of Lander confirming natural volcanic in-situ material, the 'volcanic' ranges of the trace elements are applicable.

8.0 Results and Comparison to Applicable Guideline Criteria

The results of the soil sampling, and comparison to applicable assessment criteria, are provided in Table 4 and 5 (attached) and in appended laboratory reports (refer Appendix E). Results are discussed below.

8.1 Environmental Results

8.1.1 Borehole, Test Pit and Hand Auger Samples

While some samples contain concentrations of contaminants which are above natural background levels, all sample results report concentrations of heavy metals, DDT and PAHs below AUP-OP PA criteria, being the greater of the criteria specified in Table E30.6.1.4.1 and the volcanic background criteria from Rule Table E30.6.1.4.2.

8.1.2 Surface Soil Samples

The majority of the surface soil samples report concentrations of lead ranging from 268 mg/kg - 647 mg/kg, which exceed the AUP-OP Permitted Activity criteria for lead (250 mg/kg). The exceptions to this are samples SS5 (102 mg/kg) and SS7 (88 mg/kg).

8.2 Human Health Results

8.2.1 Borehole, Test Pit and Hand Auger Samples

All sample results report concentrations of heavy metals, OCPs, and BaP(eq) which are below the NES-CS SCS and SGVs for residential land-use with 10% produce consumption.

In addition:

- ✧ PAH compound concentrations including naphthalene, and pyrene are also below the Tier 1 criteria from Oil Industry guidelines.
- ✧ Asbestos was confirmed as present in the bulk material sample collected from TP07; soil was visually assessed to comply with BRANZ criteria of 0.01% w/w asbestos as ACM. No asbestos (as ACM or as asbestos fines/fibrous asbestos (AF/FA)) were detected in the soil sample collected from the associated soils (TP7_1.7); and as such this sample was also compliant with the relevant guideline in the BRANZ criteria of <0.001% w/w asbestos as AF/FA.

8.2.2 Surface Soil Samples

The majority of the surface soil samples exceed the NES-CS SCS for lead (210 mg/kg). The exceptions to this are sample SS5 and SS7.

Asbestos was confirmed as present in the bulk material sample collected from the baseboard building material (ASB001) encountered at the site.

9.0 Risk Assessment

9.1 Environmental Risk Assessment Criteria

9.1.1 Borehole, Test Pit and Hand Auger Samples

Due to concentrations of contaminants analysed complying with the relevant AUP-OP permitted activity and background criteria, soils represented by these features are not considered to present a risk to the environment via discharges.

9.1.2 Surface Soil Samples

Surface soils in the immediate vicinity of the Track Manager's House that exceed the AUP-PA criteria for lead (i.e., SS1-SS4, and SS6) are considered to present a potential risk to the environment via discharges if they are not removed from the site or controlled during any soil disturbance activities.

9.2 Human Health Risk Assessment Criteria

9.2.1 Borehole, Test Pit and Hand Auger Samples

Due to concentrations of contaminants analysed complying with the relevant NES-CS SCS and SGVs, soils in these locations are not considered to present a risk to human health.

9.2.2 Surface Soil Samples

Surface soils in the immediate vicinity of the Track Manager's House that exceed the NES-CS criteria for lead (i.e., SS1-SS4, and SS6) are considered to present a potential risk to human health if they are accessible to the current and future site users, and not removed from the site or controlled during any soil disturbance activities.

10.0 Resource Consent Assessment

10.1 Expected Consent Requirements under the AUP-OP

Laboratory results of contaminants analysed from uncertified fill areas (including former market garden and excavated pond dredgings) demonstrate compliance with the AUP-OP criteria, and therefore any soil disturbance works in these areas can be completed as a Permitted Activity under the E30 Contaminated Land rules (i.e. no resource consent for contaminated soil disturbance under the AUP OP is expected to be required).

Surface soils immediately surrounding the Track Manager's House report concentrations of lead above the AUP-OP Permitted Activity criteria for lead, however proposed removal of these soils to remediate this area as a priority Permitted Activity removal under the NES-CS (refer below) will not require works

greater than 200 m³ in volume (the AUP-OP permitted activity threshold), and therefore will not require a consent under the AUP-OP if remediated in this way.

10.2 Expected Consent Requirements under the NES CS

As a result of some DSI sample results exceeding the appropriate background concentrations for the site (and the circumstance that HAIL activities have been identified as 'more likely than not' as having occurred at the site), it has been determined that the site cannot meet the requirement of Regulation 5 (9) of the NES-CS and therefore the regulations of the NES-CS will apply to the site during the soil disturbance and subdivision/change in land-use activities proposed.

Based on the soil sample results (excluding the Track Manager's House results – refer to discussion below) a **controlled activity** consent under Regulation 9 (1) and (3) is expected to be required under the NES-CS for the proposed soil disturbance, and / or soil disposal, and / or subdivision, and / or change in land use works because the contaminant concentrations do not exceed the applicable standards in Regulation 7. This conclusion is contingent upon the impacted soils from the Track Manager's House first being removed as a Permitted Activity under the NES-CS, as detailed below.

Based on the expected area (~600 m²) and volume (~180 m³) of soil to be disturbed during removal and remediation of the soil halo (i.e. surface soils) immediately surrounding the Track Manager's House, it is expected that these works can be completed as a Permitted Activity under Regulation 8 (3) (a) – (g) of the NES-CS. This assessment has been made based on the 'piece of land' comprising the Remuera Precinct development area of 62,000 m².

11.0 Soil Disposal Classification

Based upon the soil sample results and the sampling resolution across the site, the following waste streams are generally expected to apply for any offsite disposal of soils during the potential redevelopment works (pending acceptance by the receiving fill facility, and any requirement to remove this soil from the site).

- ✧ Soil immediately surrounding the Track Manager's House will have to be disposed of as special waste contaminated fill.
- ✧ Fill materials across the site may generally be disposed of as managed fill.
- ✧ In-situ natural ground is considered to be cleanfill.

Further sampling may be able to optimise surplus soil waste disposal streams on an 'as required' basis – i.e. *in-situ* or stockpile sampling of soils proposed to be disposed of offsite may benefit from further sampling and classification at, or immediately prior, to the time of removal in order to demonstrate compliance with cleanfill or managed fill acceptance criteria.

Soil/fill contaminant characteristics reported by the sample results (and site observations) within this report indicate that the material at the Remuera Precinct is suitable for re-use onsite (if considered applicable by other disciplines (i.e., geotechnical, civil works, etc)).

12.0 Conclusions and Recommendations

Anecdotal information notes that subject site has been utilised as part of the wider racecourse since as early as 1857. Previous environmental reports (SKM, 2007) state that the site was in agricultural use prior to this. Based on a number of information sources, the HAIL land-uses and impacts to ground identified as 'more-likely-than-not' to have occurred at the site include: uncertified filling (G5), application of pesticides (A10), and ground impacts as a result from the historical use of lead-based paint on the painted surfaces of the Track Manager's House.

Contamination in relation to potential HAIL activities and/or impacted ground were investigated by means of hand augering, borehole machine investigations, test pitting and surface soil sampling. Testing of contaminants of concern included heavy metals, OCPs, PAHs and asbestos (bulk material and semi-quantitative analysis).

The results of the DSI sampling confirms:

- ✧ The majority of fill samples report various concentrations of PAH compounds, including BaP (eq) above the background criteria for the Auckland Region.
- ✧ The majority of fill and natural soil sample results comply with the AUP-OP Permitted Activity criteria and the NES-CS SCSs and adopted SGVs for residential land-use with 10% produce consumption; except for select surface samples around the Track Manager's House (SS1-SS4 and SS6).
- ✧ Surface soil samples around the Track Manager's House report concentrations of lead above the AUP-OP and NES-CS criteria.

Soil material was observed to comprise of topsoil, reworked natural ground and/or natural ground during the site investigation works, with no identification of stained or odorous soils. ACMs were observed in one of the test pits and in building fabric comprising the baseboard on the Track Manager's house.

Soil remediation is recommended to be undertaken as a permitted activity under the NES-CS for the halo (i.e. soils immediately surrounding) of the Track Manager's house. Specifications regarding the extent of removal of soils from this area, and the handling requirements for these soils will be detailed in a Remedial Action Plan (RAP) directed by a SQEP, to demonstrate compliance with the permitted activity requirements of the NES-CS framework (this RAP and associated CSMP will

also be required under the NES-CS for the controlled activity nature of the remainder of the site, see below). A Site Validation Report (SVR) will be required following the halo soils removal to demonstrate that the lead impacted soils have been removed.

Based on the soil sample results obtained for the remainder of the site complying with the permitted activity criteria of the AUP-OP (and the limited disturbance volume required for the remediation of the impacted soils around the Track Manager's house), no consents are expected to be required under the contaminated land rules of the AUP-OP for the proposed redevelopment works.

Due to confirmation of former HAIL land-use at the site, and soil analysis results reporting contaminant concentrations variably above the AC published background criteria, the regulations of the NES-CS apply to the proposed works at the site. It is expected that after the proposed soil remediation of soils surrounding the Track Manager's house are undertaken (which can be done as a Permitted Activity under both the AUP and the NES-CS), a **Controlled Activity** consent under Regulation 9 (1) and (3) of the NES-CS would be required for the balance of the proposed works in the Remuera Precinct area.

The Controlled Activity consent for the balance of the works will require that a Contaminated Site Management Plan (CSMP; noted above), authored by a SQEP, is prepared to manage any potential exposure to-, and spread of-, contamination from the subject site during the proposed works. This CSMP will include protocols and processes for managing erosion and sediment controls, dust control, appropriate disturbance/management/disposal of impacted soils and reporting requirements (i.e. include provision for an SVR). The SVR is expected to be proposed as a condition of consent for the development. A combined RAP/CSMP has also been prepared, which is considered to be appropriate to support the proposed Private Plan Change application for the site.

Where soil disposal is required from the site, the soil sample results reported from the DSI portion of this investigation provide the supporting information required to a licensed landfill to confirm the appropriate waste stream for disposal of soils, and/or support re-use of the soil/fill onsite.

Dwellings and associated structures (within the proposed rezoning area) at the site that were constructed before the year 2000 will require an asbestos assessment comprising an asbestos management survey or pre-demolition survey to identify the location of any ACM dependent on their requirement to be retained on, or removed from, the site.

Based on the above analysis and due the Contaminated Land provisions of the AUP-OP and the NESCS remaining in place and applying to any development of the site, no additional contamination related specific provisions are considered to be required to support the Private Plan Change application.

13.0 References

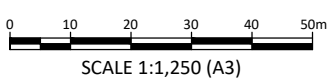
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SOURCE:
1. TOPOGRAPHICAL SURVEY INFORMATION (WIG.dwg) AND DRONE IMAGE SUPPLIED BY HG, RECEIVED 23/03/2021.
2. HISTORICAL MARKET GARDEN LOCATION DERIVED FROM RETROLENS AERIAL PHOTO, FLOWN 02/11/1961.
3. INDICATIVE FILL AREA DERIVED FROM J01706_210409_SiPlan.pdf, SUPPLIED BY LANDER GEOTECHNICAL.

KEY:

[]	POTENTIAL HAIL AND/OR IMPACTED GROUND AREA ²
[]	INDICATIVE FILL AREA ³
[]	SITE INVESTIGATION AREA
[]	PROPERTY BOUNDARY ¹



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FIGURE
FIGURE 1: POTENTIAL HAIL AND/OR IMPACTED GROUND AREAS
PROJECT
PRELIMINARY AND DETAILED SITE INVESTIGATION - REMUERA PRECINCT, ELLERSLIE RACECOURSE - 100 ASCOT AVENUE, ELLERSLIE, AUCKLAND



Table 4.
Soil Sample Results - Residential Land Use - Heavy Metals¹, Organochlorine Pesticides¹, Polycyclic Aromatic Hydrocarbons¹ and Asbestos² .

Soil Sample ID	HA02_0.1	HA08_0.1	MH03_5.3		Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁴	NES SCS & SGV Residential ⁵
Lab Identification Number	21-14665-1	21-14665-3	21-18589-1		Volcanic ³		10% Produce
Sample Type	Fill	Fill	Fill				
Date Sampled	29/03/2021		6/04/2021				
Heavy Metals							
Arsenic	5.5	4.3	11		0.4 - 12	100	20
Cadmium	0.039	0.077	0.28		<0.1 - 0.65	7.5	3
Chromium (total)	28.5	33.9	73.1		3 - 125	400	460 ^{5a}
Copper	18.2	29.4	51.8		20 - 90	325	>10,000
Lead	18.7	76.1	168		<5 - 65	250	210 ^{5b}
Nickel	29	35.9	97.7		4 - 320	4 - 320	400 ⁶
Zinc	46.1	79.7	206		54 - 1160	54 - 1160	7,400 ⁶
Organochlorine Pesticides (OCPs)							
Total DDT	-	<0.02	<0.02		-	12	70
All OCPs below the laboratory detection limit	-	ND	ND		-	-	-
Polycyclic Aromatic Hydrocarbons							
Naphthalene	-	-	0.036		-	-	(500) ^{8, 9, 10m}
Pyrene (non-carcinogenic)	-	-	4.7		-	-	(510) ^{8, 9, 10x}
Benzo[a]pyrene TEQ (LOR) ⁷	-	-	5.70		-	20	20

Soil Sample ID	HA02_0.5	HA08_0.3	MH03_9.5	MH05_8.0	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁴	NES SCS & SGV Residential ⁵
Lab Identification Number	21-14665-2	21-14665-4	21-18589-2	21-18589-3			
Sample Type	In-situ natural soil	Fill	In-situ natural soil	In-situ natural soil			
Date Sampled	29/03/2021		6/04/2021				
Heavy Metals							
Arsenic	4.2	4.8	3.9	4.1	0.4 - 12	100	20
Cadmium	0.0076	0.066	0.016	0.025	<0.1 - 0.65	7.5	3
Chromium (total)	22.7	29.1	15.8	28.6	3 - 125	400	460 ^{5a}
Copper	8.17	23.7	10.9	14.5	20 - 90	325	>10,000
Lead	6.06	45.5	5.54	5.98	<5 - 65	250	210 ^{5b}
Nickel	7.11	35.7	20.8	29.3	4 - 320	4 - 320	400 ⁶
Zinc	15.4	60.3	42.1	41.7	54 - 1160	54 - 1160	7,400 ⁶
Organochlorine Pesticides (OCPs)							
Total DDT	-	<0.02	<0.02	<0.02	-	12	70
All OCPs below the laboratory detection limit	-	ND	ND	ND	-	-	-
Polycyclic Aromatic Hydrocarbons							
Naphthalene	-	-	ND	ND	-	-	(500) ^{8, 9, 10m}
Pyrene (non-carcinogenic)	-	-	ND	ND	-	-	(510) ^{8, 9, 10x}
Benzo[a]pyrene TEQ (LOR) ⁷	-	-	ND	ND	-	20	20

86	Concentration above Auckland Council background criteria for volcanic soils
ND	Concentration below laboratory limit of detection
-	Parameter not tested/No guideline value available

- Notes.
- All results in mg/kg.
 - Results as weight for weight percentage (w/w %) of the total sample.
 - Criteria from Table E30.6.1.4.2 - Background ranges of trace elements in Auckland soils - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021) - volcanic.
 - Criteria from Table E.30.6.4.1 - Permitted activity soil acceptance criteria - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021).
 - NES Soil Contaminant Standards from "Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health" (MfE, 2011) - Residential land use of 10% produce.
 - 5a. SCS value is for chromium VI.
 - 5b. SCS value is for inorganic lead.
 - Guideline values from "Schedule B(1) Guideline on Investigation Levels for Soils and Groundwater National Environment Protection Measure" (NEPM), updated May, 2013.
 - Risk associated with mixture of carcinogenic PAHs assessed by comparison with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. Where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the toxic equivalent (TEQ) for that PAH.
 - Criteria from Table 4.13 of the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Module 4 - Tier 1 Soil Screening Criteria (MfE, 2011): Soil acceptance criteria Residential land use - All Pathways for soil type sandy Silt, < 1m.
 - Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons.
 - The following notes indicate the limiting pathway for each criterion: m - maintainance, x - PAH surrogate.
 - NA indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likley to be encountered on site.
 - Criteria from New Zealand Guidelines for Assessing and Managing Asbestos in Soil - Residential Land Use (BRANZ guidelines, 2017).
 - Weight of asbestos in ACM as a percent of the total sample (weight for weight percent (w/w%)).
 - Combined fibrous asbestos and asbestos fines (FA/AF) as weight for weight percentage (w/w%) of the total sample.

Table 4 continued.

Soil Sample Results - Residential Land Use - Heavy Metals¹, Organochlorine Pesticides¹, Polycyclic Aromatic Hydrocarbons¹ and Asbestos² .

Soil Sample ID	TP1 0.7	TP2 0.9	TP3 0.4	TP4 0.8	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁴	NES SCS & SGV Residential ⁵
Lab Identification Number	21-21190-1	21-21190-3	21-21190-5	21-21190-8			
Sample Type	Fill	Fill	Fill	Fill			
Date Sampled	6/05/2021						
					Volcanic ³		10% Produce
Heavy Metals							
Arsenic	4.7	4.3	2.7	4.7	0.4 - 12	100	20
Cadmium	0.17	0.086	0.065	0.10	<0.1 - 0.65	7.5	3
Chromium (total)	58.1	80.1	25.0	59.6	3 - 125	400	460 ^{5a}
Copper	32.5	33.4	23.8	54.9	20 - 90	325	>10,000
Lead	62.7	33.3	47.6	44.8	<5 - 65	250	210 ^{5b}
Nickel	67.8	80.0	36.2	63.2	4 - 320	4 - 320	400 ⁶
Zinc	104	75.2	82.0	96.1	54 - 1160	54 - 1160	7,400 ⁶
Organochlorine Pesticides (OCPs)							
Total DDT	<0.02	<0.02	<0.02	<0.02	-	12	70
All OCPs below the laboratory detection limit	ND	ND	ND	ND	-	-	-
Polycyclic Aromatic Hydrocarbons							
Naphthalene	<0.010	0.017	<0.010	0.014	-	-	(500) ^{8, 9, 10m}
Pyrene (non-carcinogenic)	0.86	4.9	0.14	2.5	-	-	(510) ^{8, 9, 10x}
Benzo[a]pyrene TEQ (LOR) ⁷	0.79	4.3	0.16	1.8	-	20	20

Soil Sample ID	TP1 1.6	TP2 1.0	TP3 1.0	TP4 1.45	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁴	NES SCS & SGV Residential ⁵
Lab Identification Number	21-21190-2	21-21190-4	21-21190-6	21-21190-9			
Sample Type	In-situ natural soil	In-situ natural soil	In-situ natural soil	In-situ natural soil			
Date Sampled	6/05/2021						
Heavy Metals							
Arsenic	3.3	2.9	6.3	1.5	0.4 - 12	100	20
Cadmium	0.034	0.018	0.19	0.0085	<0.1 - 0.65	7.5	3
Chromium (total)	68.8	23.0	56.3	8.1	3 - 125	400	460 ^{5a}
Copper	31.7	6.4	40.1	3.0	20 - 90	325	>10,000
Lead	12.2	8.14	110	2.3	<5 - 65	250	210 ^{5b}
Nickel	106	11.5	68.8	3.6	4 - 320	4 - 320	400 ⁶
Zinc	77.8	21.0	130	4.7	54 - 1160	54 - 1160	7,400 ⁶
Organochlorine Pesticides (OCPs)							
Total DDT	<0.02	<0.02	<0.02	<0.02	-	12	70
All OCPs below the laboratory detection limit	ND	ND	ND	ND	-	-	-
Polycyclic Aromatic Hydrocarbons							
Naphthalene	<0.010	<0.010	0.022	<0.010	-	-	(500) ^{8, 9, 10m}
Pyrene (non-carcinogenic)	0.19	0.054	3.4	<0.020	-	-	(510) ^{8, 9, 10x}
Benzo[a]pyrene TEQ (LOR) ⁷	0.20	0.05	3.0	< 0.03	-	20	20

86	Concentration above Auckland Council background criteria for volcanic soils
250	Concentration above Auckland Council permitted activity criteria
ND	Concentration below laboratory limit of detection
-	Parameter not tested/No guideline value available

- Notes.
- All results in mg/kg.
 - Results as weight for weight percentage (w/w %) of the total sample.
 - Criteria from Table E30.6.1.4.2 - Background ranges of trace elements in Auckland soils - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021) - volcanic.
 - Criteria from Table E.30.6.4.1 - Permitted activity soil acceptance criteria - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021).
 - NES Soil Contaminant Standards from "Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health" (MfE, 2011) - Residential land use of 10% produce.
 - 5a. SCS value is for chromium VI.
 - 5b. SCS value is for inorganic lead.
 - Guideline values from "Schedule B(1) Guideline on Investigation Levels for Soils and Groundwater National Environment Protection Measure" (NEPM), updated May, 2013.
 - Risk associated with mixture of carcinogenic PAHs assessed by comparison with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. Where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the toxic equivalent (TEQ) for that PAH.
 - Criteria from Table 4.13 of the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Module 4 - Tier 1 Soil Screening Criteria (MfE, 2011): Soil acceptance criteria Residential land use - All Pathways for soil type sandy Silt, < 1m.
 - Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons.
 - The following notes indicate the limiting pathway for each criterion: m - maintainance, x - PAH surrogate.
 - NA indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likley to be encountered on site.
 - Criteria from New Zealand Guidelines for Assessing and Managing Asbestos in Soil - Residential Land Use (BRANZ guidelines, 2017).
 - Weight of asbestos in ACM as a percent of the total sample (weight for weight percent (w/w%)).
 - Combined fibrous asbestos and asbestos fines (FA/AF) as weight for weight percentage (w/w%) of the total sample.

Table 4 continued.

Soil Sample Results - Residential Land Use - Heavy Metals¹, Organochlorine Pesticides¹, Polycyclic Aromatic Hydrocarbons¹ and Asbestos² .

Soil Sample ID	TP5_0.4	TP6_1.0	TP7_1.5	TP8_0.4	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁴	NES SCS & SGV Residential ⁵
Lab Identification Number	21-21190-10	21-21190-12	21-21190-15	21-21190-18			
Sample Type	In-situ natural soil	Fill	Fill	Fill			
Date Sampled	6/05/2021			7/05/2021			
					Volcanic ³		10% Produce
Heavy Metals							
Arsenic	3.4	3.1	4.7	3.3	0.4 - 12	100	20
Cadmium	0.052	0.094	0.27	0.020	<0.1 - 0.65	7.5	3
Chromium (total)	67.7	119	69.6	25.5	3 - 125	400	460 ^{5a}
Copper	31.0	53.2	53.2	9.60	20 - 90	325	>10,000
Lead	9.43	15.1	136	7.80	<5 - 65	250	210 ^{5b}
Nickel	75.0	226	120	19.6	4 - 320	4 - 320	400 ⁶
Zinc	80.6	86.6	152	24.8	54 - 1160	54 - 1160	7,400 ⁶
Organochlorine Pesticides (OCPs)							
Total DDT	<0.02	<0.02	<0.02	<0.02	-	12	70
All OCPs below the laboratory detection limit	ND	ND	ND	ND	-	-	-
Polycyclic Aromatic Hydrocarbons							
Naphthalene	<0.010	<0.010	0.078	<0.010	-	-	(500) ^{8, 9, 10m}
Pyrene (non-carcinogenic)	<0.020	0.42	15	0.035	-	-	(510) ^{8, 9, 10x}
Benzo[a]pyrene TEQ (LOR) ⁷	< 0.03	0.29	15	0.040	-	20	20
Sample Name			TP7_1.7		-	-	BRANZ Residential ¹²
Laboratory Reference			2610504.1		-	-	
Sample Type			Fill		-	-	
Asbestos in Soil							
Asbestos presence (Y/N)			N		-	-	-
Description of Asbestos form			-		-	-	-
Asbestos as ACM ¹³			ND		-	-	0.01
FA / AF ¹⁴			ND		-	-	0.001
Soil Sample ID		TP6_1.7	TP7_3.1	TP8_1.0	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁴	NES SCS & SGV Residential ⁵
Lab Identification Number		21-21190-13	21-21190-16	21-21190-19			
Sample Type		In-situ natural soil	In-situ natural soil	In-situ natural soil			
Date Sampled		6/05/2021		7/05/2021			
					Volcanic ³		10% Produce
Heavy Metals							
Arsenic		5.3	10	3.3	0.4 - 12	100	20
Cadmium		0.11	0.24	0.049	<0.1 - 0.65	7.5	3
Chromium (total)		49.4	67.2	62.9	3 - 125	400	460 ^{5a}
Copper		22.7	43.6	23.0	20 - 90	325	>10,000
Lead		40.4	134	12.7	<5 - 65	250	210 ^{5b}
Nickel		55.9	97.5	54.0	4 - 320	4 - 320	400 ⁶
Zinc		74.4	168	63.9	54 - 1160	54 - 1160	7,400 ⁶
Organochlorine Pesticides (OCPs)							
Total DDT		<0.02	<0.02	<0.02	-	12	70
All OCPs below the laboratory detection limit		ND	ND	ND	-	-	-
Polycyclic Aromatic Hydrocarbons							
Naphthalene		<0.010	0.029	<0.010	-	-	(500) ^{8, 9, 10m}
Pyrene (non-carcinogenic)		0.30	7.3	0.11	-	-	(510) ^{8, 9, 10x}
Benzo[a]pyrene TEQ (LOR) ⁷		0.27	7.5	0.070	-	20	20
86	Concentration above Auckland Council background criteria for volcanic soils						
250	Concentration above Auckland Council permitted activity criteria						
ND	Concentration below laboratory limit of detection						
-	Parameter not tested/No guideline value available						

- Notes.
- All results in mg/kg.
 - Results as weight for weight percentage (w/w %) of the total sample.
 - Criteria from Table E30.6.1.4.2 - Background ranges of trace elements in Auckland soils - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021) - volcanic.
 - Criteria from Table E.30.6.4.1 - Permitted activity soil acceptance criteria - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021).
 - NES Soil Contaminant Standards from "Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health" (MfE, 2011) - Residential land use of 10% produce.
 - 5a. SCS value is for chromium VI.
 - 5b. SCS value is for inorganic lead.
 - Guideline values from "Schedule B(1) Guideline on Investigation Levels for Soils and Groundwater National Environment Protection Measure" (NEPM), updated May, 2013.
 - Risk associated with mixture of carcinogenic PAHs assessed by comparison with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. Where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate
 - Criteria from Table 4.13 of the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Module 4 - Tier 1 Soil Screening Criteria (MfE, 2011): Soil acceptance criteria Residential land use - All Pathways for soil type sandy Silt, < 1m.
 - Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons.
 - The following notes indicate the limiting pathway for each criterion: m - maintenance, x - PAH surrogate.
 - NA indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site.
 - Criteria from New Zealand Guidelines for Assessing and Managing Asbestos in Soil - Residential Land Use (BRANZ guidelines, 2017).
 - Weight of asbestos in ACM as a percent of the total sample (weight for weight percent (w/w%)).
 - Combined fibrous asbestos and asbestos fines (FA/AF) as weight for weight percentage (w/w%) of the total sample.

Table 4 continued.

Soil Sample Results - Residential Land Use - Heavy Metals¹, Organochlorine Pesticides¹, Polycyclic Aromatic Hydrocarbons¹ and Asbestos² .

Soil Sample ID	TP9_1.0	TP10_1.9	TP11_0.7	TP12_0.5	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁴	NES SCS & SGV Residential ⁵
Lab Identification Number	21-21190-20	21-21190-27	21-21190-29	21-21190-31			
Sample Depth (mbgl)	Fill	Fill	Fill	In-situ natural soil			
Date Sampled	7/05/2021						
Heavy Metals					Volcanic ³		10% Produce
Arsenic	4.2	4.1	3.7	3.3	0.4 - 12	100	20
Cadmium	0.055	0.011	0.14	0.053	<0.1 - 0.65	7.5	3
Chromium (total)	48.6	19.3	41.0	63.0	3 - 125	400	460 ^{5a}
Copper	23.1	5.6	34.1	26.4	20 - 90	325	>10,000
Lead	17.6	3.2	95.3	9.11	<5 - 65	250	210 ^{5b}
Nickel	54.0	8.53	107	66.1	4 - 320	4 - 320	400 ⁵
Zinc	56.1	12.0	98.3	80.8	54 - 1160	54 - 1160	7,400 ⁶
Organochlorine Pesticides (OCPs)							
Total DDT	<0.02	<0.02	<0.02	<0.02	-	12	70
All OCPs below the laboratory detection limit	ND	ND	ND	ND	-	-	-
Polycyclic Aromatic Hydrocarbons							
Naphthalene	<0.010	<0.010	0.039	<0.010	-	-	(500) ^{8, 9, 10m}
Pyrene (non-carcinogenic)	0.55	<0.020	7.5	<0.020	-	-	(510) ^{8, 9, 10x}
Benzo[a]pyrene TEQ (LOR) ⁷	0.54	< 0.03	7.0	< 0.03	-	20	20

Soil Sample ID	TP9_2.5	TP10_2.8	TP11_0.9		Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁴	NES SCS & SGV Residential ⁵
Lab Identification Number	21-21190-22	21-21190-28	21-21190-30				
Sample Depth (mbgl)	Fill	In-situ natural soil	In-situ natural soil				
Date Sampled	7/05/2021				Volcanic ³		10% Produce
Heavy Metals							
Arsenic	4.1	4.2	1.8		0.4 - 12	100	20
Cadmium	0.085	0.031	0.0083		<0.1 - 0.65	7.5	3
Chromium (total)	38.9	69.2	17.9		3 - 125	400	460 ^{5a}
Copper	20.1	29.5	6.4		20 - 90	325	>10,000
Lead	29.5	13.2	7.09		<5 - 65	250	210 ^{5b}
Nickel	36.6	92.7	6.69		4 - 320	4 - 320	400 ⁶
Zinc	61.6	56.9	10.1		54 - 1160	54 - 1160	7,400 ⁶
Organochlorine Pesticides (OCPs)							
Total DDT	<0.02	<0.02	<0.02		-	12	70
All OCPs below the laboratory detection limit	ND	ND	ND		-	-	-
Polycyclic Aromatic Hydrocarbons							
Naphthalene	<0.010	<0.010	<0.010		-	-	(500) ^{8, 9, 10m}
Pyrene (non-carcinogenic)	0.61	<0.020	<0.020		-	-	(510) ^{8, 9, 10x}
Benzo[a]pyrene TEQ (LOR) ⁷	0.41	< 0.03	< 0.03		-	20	20

Soil Sample ID	TP9_4.0				Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ⁴	NES SCS & SGV Residential ⁵
Lab Identification Number	21-21190-24						
Sample Depth (mbgl)	In-situ natural soil						
Date Sampled	7/05/2021				Volcanic ³	10% Produce	
Heavy Metals							
Arsenic	6.7				0.4 - 12	100	20
Cadmium	0.022				<0.1 - 0.65	7.5	3
Chromium (total)	37.7				3 - 125	400	460 ^{5a}
Copper	28.2				20 - 90	325	>10,000
Lead	9.94				<5 - 65	250	210 ^{5b}
Nickel	21.4				4 - 320	4 - 320	400 ⁶
Zinc	36.2				54 - 1160	54 - 1160	7,400 ⁶
Organochlorine Pesticides (OCPs)							
Total DDT	<0.02				-	12	70
All OCPs below the laboratory detection limit	ND				-	-	-
Polycyclic Aromatic Hydrocarbons							
Naphthalene	<0.011				-	-	(500) ^{8, 9, 10m}
Pyrene (non-carcinogenic)	<0.020				-	-	(510) ^{8, 9, 10x}
Benzo[a]pyrene TEQ (LOR) ⁷	< 0.03				-	20	20

86	Concentration above Auckland Council background criteria for volcanic soils
250	Concentration above Auckland Council permitted activity criteria
ND	Concentration below laboratory limit of detection
-	Parameter not tested/No guideline value available

- Notes.
- All results in mg/kg.
 - Results as weight for weight percentage (w/w %) of the total sample.
 - Criteria from Table E30.6.1.4.2 - Background ranges of trace elements in Auckland soils - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021) - volcanic.
 - Criteria from Table E.30.6.4.1 - Permitted activity soil acceptance criteria - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021).
 - NES Soil Contaminant Standards from "Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health" (MfE, 2011) - Residential land use of 10% produce.
 - 5a. SCS value is for chromium VI.
 - 5b. SCS value is for inorganic lead.
 - Guideline values from "Schedule B(1) Guideline on Investigation Levels for Soils and Groundwater National Environment Protection Measure" (NEPM), updated May, 2013.
 - Risk associated with mixture of carcinogenic PAHs assessed by comparison with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. Where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the toxic equivalent (TEQ) for that PAH.
 - Criteria from Table 4.13 of the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Module 4 - Tier 1 Soil Screening Criteria (MfE, 2011): Soil acceptance criteria Residential land use - All Pathways for soil type sandy Silt, < 1m.
 - Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons.
 - The following notes indicate the limiting pathway for each criterion: m - maintainance, x - PAH surrogate.
 - NA indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likley to be encountered on site.
 - Criteria from New Zealand Guidelines for Assessing and Managing Asbestos in Soil - Residential Land Use (BRANZ guidelines, 2017).
 - Weight of asbestos in ACM as a percent of the total sample (weight for weight percent (w/w%)).
 - Combined fibrous asbestos and asbestos fines (FA/AF) as weight for weight percentage (w/w%) of the total sample.

Table 5.

Soil Sample Results - Residential Land Use - Heavy Metals¹.

Soil Sample ID	SS1	SS2	SS3	SS4	Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ³	NES SCS & SGV Residential ⁴
Lab Identification Number	21-21190-33	21-21190-34	21-21190-35	21-21190-36			
Sample Depth (mbgl)	Surface soil	Surface soil	Surface soil	Surface soil			
Date Sampled	7/05/2021						
Heavy Metals					Volcanic ²		10% Produce
Lead	647	268	361	291	<5 - 65	250	210 ^{4b}

Soil Sample ID	SS5	SS6	SS7		Background Ranges of Trace Elements in Auckland Soils	AUP OP Permitted Activity Criteria ³	NES SCS & SGV Residential ⁴
Lab Identification Number	21-21190-37	21-21190-38	21-21190-39				
Sample Depth (mbgl)	Surface soil	Surface soil	Surface soil				
Date Sampled	7/05/2021						
Heavy Metals					Volcanic ²	10% Produce	
Lead	102	382	88		<5 - 65	250	210 ^{4b}

86	Concentration above Auckland Council background criteria for volcanic soils
250	Concentration above NESCS SCS or SGVs
250	Concentration above Auckland Council permitted activity criteria
-	Parameter not tested/No guideline value available

Notes.

1. All results in mg/kg.
2. Criteria from Table E30.6.1.4.2 - Background ranges of trace elements in Auckland soils - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021).
3. Criteria from Table E.30.6.4.1 - Permitted activity soil acceptance criteria - Chapter E30 of the Auckland Unitary Plan Operative in part (AC, 2021).
4. NES Soil Contaminant Standards from "Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health" (MfE, 2011) - Residential land use of 10% produce.
- 4a. SCS value is for inorganic lead.

I Natalie Webster of Pattle Delamore Partners certify that:

1. This combined preliminary and detailed site investigation meets the requirements of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (the NES-CS) because it has been:
 - a. Completed by a suitably qualified and experienced practitioner, and
 - b. Completed in accordance with the current edition of *Contaminated land management guidelines No 5 – Site investigation and analysis of soils*, and
 - c. reported on in accordance with the current edition of *Contaminated land management guidelines No 1 – Reporting on contaminated sites in New Zealand*, and
 - d. the report is certified by a suitably qualified and experienced practitioner.
2. This detailed site investigation concludes that the activities that will occur under regulation 5(2) to (6) are controlled activities under regulation 9 of the NES-CS because contaminant concentrations do not exceed the applicable standard in regulation 7 of NES-CS.

Evidence of the qualifications and experience of the suitably qualified and experienced practitioner(s) who have done this investigation and certified this report is provided below.

This certification applies to the date of this report.

Signed



Natalie Webster

Technical Director – Contaminated Land

Natalie Webster – Project Director

Natalie is an environmental scientist with over 18 years of experience in undertaking environmental and contaminated land assessments. She has a BSc in Geology from the University of Canterbury, and a MSc in Environmental Science (1st class hon) from the University of Auckland. Natalie has experience with organising and undertaking site investigations, environmental assessments, and monitoring programmes for a range of environmental issues, across a broad range of media including soil, sediment, surface water, groundwater, and ground gas; and for a wide range of contaminants including heavy metals, petroleum hydrocarbons, and asbestos. Natalie has experience in the assessment of data (including statistical analysis) to undertake risk assessments, including Tier 2 risk assessments. She has familiarity with and understanding of the current contaminated land regulation and practice in New Zealand including assessments against the NES-CS; and in the consenting of contaminated sites across New Zealand.


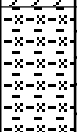
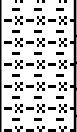
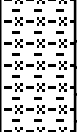
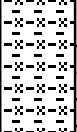
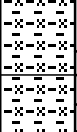
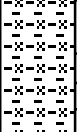
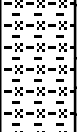
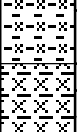
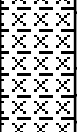
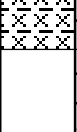














Rod Lidgard – Project Manager and Technical Specialist

Rod is an environmental geologist with over 15 years of experience in undertaking environmental and contaminated land assessments. Rod is a Certified Environmental Practitioner – Site Contamination specialist. Certification numbers 1272 CEnvP, and SC41119.

**Myra Belkot – Investigation Field Operative and Author**

Myra is an environmental scientist with 3 years' experience in undertaking environmental and contaminated land assessments. She has a BSc in Geography and Environmental Science from Canterbury University of Christchurch. Myra has practical experience in a variety of contaminated land assessment techniques and has relevant experience in carrying out and reporting on both Preliminary and Detailed Site Investigations.

Client : AUCKLAND RACING CLUB				Auger Borehole No. HA1											
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE				Sheet 1 of 8											
Job Number: J01706				Vane Head: 307		Logged By: RZ		Processor : RZ		Date: 29.03.21					
Borehole Location:		mN	mE	Ground R.L.		Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details				
		Description: Refer to site plan													
SOIL DESCRIPTION															
TOPSOIL															
playey SILT, brown. Hard, dry, no plasticity [ASH]											5				
EOB at 0.15m. Too hard to auger further. Scala pentrometer test commenced and found effective refusal (ER) at 0.4m.											9				
							0.5				10 (ER, HB)				
							1.0				Scala Pentrometer Test (blows/100mm)				
							1.5				HB = Hammer Bouncing				
							2.0								
							2.5								
							3.0								
							3.5								
							4.0								
							4.5								
							5.0								
							5.5								
							6.0								
				Comments:		Borehole Diameter:		Topsoil		Sand		Sandstone		Plutonic	
				Groundwater not encountered.		50mm		Fill		Gravel		Siltstone		No Core	
				UTP = unable to penetrate.		Checked:		Clay		Organic		Limestone			
				EOB = end of borehole.		RG		Silt		Pumice		Volcanic			





























Client : AUCKLAND RACING CLUB				Auger Borehole No. HA2								
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE				Sheet 2 of 8								
Job Number: J01706				Vane Head: 307		Logged By: RZ		Processor : RZ		Date: 29.03.21		
Borehole Location:		mN	mE	Ground R.L.		Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details	
		Description: Refer to site plan										
SOIL DESCRIPTION												
TOPSOIL											Sample 1 Disturbed 0.5-1.0m	
silty CLAY, grey and brown mottled orange and light grey. Hard, moist, medium plasticity [FILL]							0.5	201+				
silty CLAY with trace fine sand, orange and light grey mottled. Hard, moist, medium plasticity [RESIDUAL EAST COAST BAYS FORMATION]							1.0	201+				
becoming very stiff, insensitive							1.5	150/98	1.5			
							2.0	150/89	1.7			
							2.5	124/100	1.2			
silty CLAY, grey. Stiff, moist, high plasticity, insensitive, with trace black carbonaceous inclusions							3.0	89/66	1.3			
becoming very stiff							3.5	115/83	1.4			
							4.0	121/86	1.4			
clayey SILT, grey. Very stiff, moist, low plasticity, insensitive							4.5	130/104	1.3			
EOB at 5.0m. Target depth							5.0	135/98	1.4			
							5.5					
							6.0					
		Comments:		Borehole Diameter:	Topsoil		Sand		Sandstone		Plutonic	
		Groundwater not encountered.		50mm	Fill		Gravel		Siltstone		No Core	
		UTP = unable to penetrate.		Checked: RG	Clay		Organic		Limestone			
		EOB = end of borehole.			Silt		Pumice		Volcanic			

Client : AUCKLAND RACING CLUB						Auger Borehole No. HA03								
Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE						Sheet 3 of 8								
Job Number: J01706						Vane Head: 1900		Logged By: RZ		Processor : RG		Date: 29.03.21		
Borehole Location:		mN	mE	Ground R.L.		Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details			
		Description: Refer to site plan												
SOIL DESCRIPTION														
TOPSOIL						[Pattern]								
clayey SILT, orange/brown. Hard, moist, medium plasticity [ASH]						[Pattern]	0.5		215+					
becoming light brown/orange mottled orange/brown, low plasticity, with trace limonite						[Pattern]	1.0		215+					
slightly clayey SILT with trace fine sand, light grey mottled light orange/brown. Hard, moist, low plasticity, with trace limonite [RESIDUAL EAST COAST BAYS FORMATION]						[Pattern]	1.5		215+					
silty CLAY, orange streaked light grey. Very stiff, moist, high plasticity, insensitive, with trace limonite						[Pattern]	2.0		200/117	1.7				
becoming very stiff, moderately sensitive						[Pattern]	2.5		160/80	2.0				
becoming light grey, without limonite						[Pattern]	3.0		135/61	2.2				
becoming hard						[Pattern]	3.5		160/77	2.1				
at 5.0m, becoming very stiff, insensitive						[Pattern]	4.0		215+					
EOB at 5.0m. Target Depth.						[Pattern]	4.5		215+					
						[Pattern]	5.0		154/108	1.4				
						[Pattern]	5.5							
						[Pattern]	6.0							
<div></div> Comments: Groundwater not encountered. Measured on 6.04.21, 13.04.21 and 16.04.21 UTP = unable to penetrate. FOB = end of borehole						Borehole Diameter:	Topsoil	[Pattern]	Sand	[Pattern]	Sandstone	[Pattern]	Plutonic	[Pattern]
						50mm	Fill	[Pattern]	Gravel	[Pattern]	Siltstone	[Pattern]	No Core	
						Checked:	Clay	[Pattern]	Organic	[Pattern]	Limestone	[Pattern]		
						RG	Silt	[Pattern]	Pumice	[Pattern]	Volcanic	[Pattern]		


Client : AUCKLAND RACING CLUB						Auger Borehole No. HA4								
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE						Sheet 4 of 8								
Job Number: J01706						Vane Head: 307		Logged By: RZ		Processor : RZ		Date: 29.03.21		
Borehole Location:		mN	mE	Ground R.L.		Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details			
		Description: Refer to site plan												
SOIL DESCRIPTION														
TOPSOIL											Sample 1 Disturbed 0.5-1.0m			
clayey SILT, orange/brown. Hard, moist, low plasticity [ASH]							-0.5		201+					
							-1.0		201+					
silty CLAY, orange and light grey mottled. Hard, moist, medium plasticity [RESIDUAL EAST COAST BAYS FORMATION]							-1.5		201+					
							-2.0		201+					
becoming very stiff, insensitive							-2.5		150/104	1.4				
							-3.0		124/72	1.7				
							-3.5		170/112	1.5				
clayey SILT, orange and light grey mottled. Hard, moist, low plasticity							-4.0		201+					
							-4.5		201+					
EOB at 5.0m. Target depth							-5.0		201+					
							-5.5							
							-6.0							
<div></div> Comments: Groundwater not encountered. UTP = unable to penetrate. EOB = end of borehole.						Borehole Diameter:	Topsoil		Sand		Sandstone		Plutonic	
						50mm	Fill		Gravel		Siltstone		No Core	
						Checked:	Clay		Organic		Limestone			
						RG	Silt		Pumice		Volcanic			

<div>Client :AUCKLAND RACING CLUB</div> <div>Project Location :RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number:J01706</div>				<div>Auger Borehole No. HA5</div> <div>Sheet 5 of 8</div> <div><div>Vane Head:1900</div><div>Logged By:RG</div><div>Processor :RZ</div><div>Date:29.03.21</div></div>							
Borehole Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details		
Description:Refer to site plan											
SOIL DESCRIPTION											
TOPSOIL											
silty CLAY, orange streaked light grey. Very stiff, moist, medium plasticity, with trace limonite [ALLUVIUM]					0.5		193+		Sample 1 Disturbed 0.5-1.0m		
clayey SILT, light grey mottled orange/brown. Very stiff, moist, low to medium plasticity becoming brown, low plasticity					1.0		193+				
becoming very stiff, moderately sensitive					1.5		110/412.7				
					2.0		113/392.9				
silty CLAY, orange/grey mottled grey. Very stiff, moist, medium to high plasticity, moderately sensitive becoming orange/brown					2.5		130/612.1				
becoming insensitive					3.0		130/691.9				
silty CLAY, black speckled dark brown. Very stiff, moist, medium to high plasticity, with trace organic inclusions					3.5		193+				
					4.0		193+				
					4.5		193+				
at 5.0m, becoming insensitive					5.0		180/1021.8				
EOB at 5.0m. Target depth											
					5.5						
					6.0						
<div><div></div><div>LANDER</div><div>geotechnical</div></div>	<div>Comments:</div> <div>Groundwater not encountered.</div> <div>UTP = unable to penetrate.</div> <div>EOB = end of borehole.</div>		Borehole Diameter:	Topsoil		Sand		Sandstone		Plutonic	
			50mm	Fill		Gravel		Siltstone		No Core	
			Checked:	Clay		Organic		Limestone			
			RG	Silt		Pumice		Volcanic			

<div>Client :AUCKLAND RACING CLUB</div> <div>Project Location :RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number:J01706</div>				<div>Auger Borehole No. HA6</div> <div>Sheet 6 of 8</div> <div><div>Vane Head:1900</div><div>Logged By:RG</div><div>Processor :RZ</div><div>Date:01.04.21</div></div>								
Borehole Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details			
Description: Refer to site plan												
SOIL DESCRIPTION												
TOPSOIL												
clayey SILT, dark brown. Stiff, moist, medium plasticity, with trace fine gravel [FILL]												
silty CLAY, orange streaked light grey. Very stiff, moist, high plasticity, moderately sensitive [RESIDUAL EAST COAST BAYS FORMATION]					0.5		203/61	3.3				
clayey SILT, orange streaked light grey. Hard, moist, medium plasticity												
becoming light grey					1.0		215+					
becoming orange streaked light grey, with trace limonite					1.5		215+					
					2.0		190/68	2.8				
					2.5		215+					
becoming light grey with trace fine sand					3.0		215+					
					3.5		215+					
becoming orange, with minor limonite					4.0		129/55	2.4				
silty CLAY, light grey and orange streaked grey. Very stiff, moist, medium to high plasticity, moderaely sensitive, with trace limonite												
becoming insensitive					4.5		160/95	1.7				
clayey SILT, orange. Very stiff, moist, medium plasticity, with some limonite												
clayey SILT with trace fine sand, dark grey. Hard, moist, low to medium plasticity [TRANSITIONAL EAST COAST BAYS FORMATION]					5.0		UTP					
EOB at 5.0m. Target Depth.												
					5.5							
					6.0							
<div></div> <div>Comments: Groundwater not encountered. Measured on 6.04.21, 13.04.21 and 16.04.21 UTP = unable to penetrate. EOB = end of borehole.</div>				Borehole Diameter:	Topsoil		Sand		Sandstone		Plutonic	
				50mm	Fill		Gravel		Siltstone		No Core	
				Checked:	Clay		Organic		Limestone			
				RG	Silt		Pumice		Volcanic			














Client : AUCKLAND RACING CLUB				Auger Borehole No. HA7									
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE				Sheet 7 of 8									
Job Number: J01706				Vane Head: 307		Logged By: RZ		Processor : RZ		Date: 29.03.21			
Borehole Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak / residual	Soil Sensitivity	Sample and Laboratory / Other Test Details				
	Description: Refer to site plan												
SOIL DESCRIPTION													
TOPSOIL													
clayey SILT, brown. Hard, dry to moist, low plasticity [ASH]													
becoming brown/orange					0.5		201+						
becoming moist, medium plasticity					1.0		201+						
silty CLAY, orange and light grey mottled. Hard, moist, medium plasticity [RESIDUAL EAST COAST BAYS FORMATION]					1.5		201+						
becoming high plasticity					2.0		201+						
becoming very stiff, insensitive					2.5		184/138	1.3					
becoming wet					3.0		173/118	1.5					
					3.5		178/130	1.4					
clayey SILT, grey. Hard, moist, low plasticity					4.0		201+						
					4.5		201+						
EOB at 5.0m. Target depth					5.0		201+						
					5.5								
					6.0								
		Comments:		Borehole Diameter:		Topsoil		Sand		Sandstone		Plutonic	
		Groundwater not encountered.		50mm		Fill		Gravel		Siltstone		No Core	
		UTP = unable to penetrate.		Checked:		Clay		Organic		Limestone			
		EOB = end of borehole.		RG		Silt		Pumice		Volcanic			

<div>Client : AUCKLAND RACING CLUB</div>						Auger Borehole No.								HA8							
<div>Project Location : ELLERSLIE RACECOURSE, ELLERSLIE</div>															Sheet 8 of 8						
<div>Job Number: J01706</div>						Vane Head: 307		Logged By: RZ		Processor : RZ		Date: 29.03.21									
Borehole Location:	mN	mE	Ground R.L.			Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) <small>peak / residual</small>	Soil Sensitivity	Sample and Laboratory / Other Test Details										
Description:	Refer to site plan																				
SOIL DESCRIPTION																					
TOPSOIL											Scala Pentrometer Test (blows/100mm)										
clayey SILT, orange and grey mottled brown. Hard, moist, medium plasticity [FILL]																					
EOB at 0.4m. Too hard to auger further. Scala pentrometer test commenced and found effective refusal (ER) at 0.6m. 							- 0.5				= 10 - 20+ (ER, HB) HB = Hammer Bouncing										
							- 1.0														
							- 1.5														
							- 2.0														
							- 2.5														
							- 3.0														
							- 3.5														
							- 4.0														
							- 4.5														
							- 5.0														
							- 5.5														
							- 6.0														
						<div>LANDER geotechnical</div>						Borehole Diameter:		Topsoil		Sand		Sandstone		Plutonic	+ + + +
												50mm		Fill		Gravel		Siltstone		No Core	
												Checked:		Clay		Organic		Limestone			
												RG		Silt		Pumice		Volcanic			

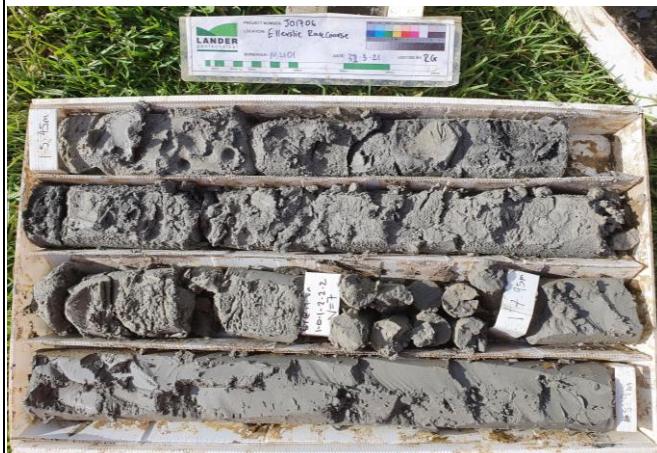
Client : AUCKLAND RACING CLUB					Machine Borehole No. MH01							
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE					Sheet 1 of 4							
Job Number: J01706					Vane Head: 1900	Logged By: RG	Processor : RG	Start Date: 30.03.21	Finish Date: 31.03.21			
Stratigraphy	Borehole Location:	mN	mE		Ground R.L.		Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT
		Description: Refer to site plan		Orientation: vertical								
		CORE DESCRIPTION			Legend	Depth (m)	DEFECTS					
Fill		TOPSOIL					Bentonite	Open Barrel		74		UTP
		clayey SILT, orange, dark grey and light brown/grey streaked. Hard, moist, medium plasticity, with occasional fine gravel inclusions				0.5						
Ash		clayey SILT, light brown mottled dark brown/red. Hard, moist, medium plasticity, with minor fine basaltic gravel				1.0	Gravel backfill		90		UTP	
		fine to medium scoriaceous GRAVEL with some silt, dark brown/red. Loose, moist, no plasticity				1.5	Piezometer screened from 1.0m to base		54			
		silty CLAY, dark brown/red. Very stiff, moist, medium plasticity, with minor basaltic inclusions up to 70mm diameter				2.0			SPT		UTP	
						2.5	Groundwater at 2.8m. Measured on 16.04.21		76			
		clayey SILT, orange/red and orange mottled red/brown. Hard, moist, medium plasticity at 2.6m, becoming red/brown, low plasticity				3.0	Groundwater at 2.86m. Measured on 13.04.21	Triple Tube		SPT	SPT at 1.5-1.95m 6/2/4 N=6	
		slightly clayey SILT, orange/brown streaked dark green. Very stiff, moist, low plasticity				3.5	Groundwater at 3.05m. Measured on 06.04.21			36		
Auckland Volcanic Field Basalt		slightly weathered, black, vesicular BASALT; Strong				4.0	at 3.8-4.0m, Chaotically fractured		36	36	UTP	
						4.5	1JN, ST, R4, 30° 1JN, UN-PL, R4, 30° Chaotically fractured, with clay infill at 4.6m, 1JN, PL, R4, 90°, clay at 4.8m-5.2m Void		100	36		
		VOID				5.0			100	36		
		slightly weathered, black, vesicular BASALT; Strong				5.5	Chaotically fractured		0	0		
Alluvium		fine to medium basaltic GRAVEL with minor clay, light grey mottled black. Loose, moist, no plasticity				6.0	Chaotically fractured		86	36		
		clayey SILT, orange streaked light grey. Stiff, moist, medium plasticity, with trace limonite				6.5			100			
						7.0						
		with trace black organic inclusions				7.5						
						8.0						
		Comments:			Drilling Fluid:		Topsoil	Sand	Sandstone	Plutonic	+++	
					water		Fill	Gravel	Siltstone	No Core		
		Driller: Pro-Drill Rig: Tractor		Checked:		Clay	Organic	Limestone				
				RP		Silt	Pumice	Volcanic				

Client : AUCKLAND RACING CLUB						Machine Borehole No.							MH01
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE						Sheet 2 of 4							
Job Number: J01706						Vane Head:	Logged By:	Processor :	Start Date: 30.03.21 Finish Date: 31.03.21				
						1900	RG	RG					
Stratigraphy	Borehole Location:	mN	mE	Ground R.L.		Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT		
	Description:	Refer to site plan		Orientation: vertical									
	CORE DESCRIPTION			Legend	Depth (m)	DEFECTS							
Alluvium	with trace fine sand			[Symbol]	8.5		Triple Tube	SPT			SPT at 8.0-8.45m 1/2/4 N=6		
	with trace black medium gravel sized basaltic inclusions to 8.6m, without fine sand			[Symbol]	9.0			100					
				[Symbol]	9.5			SPT			SPT at 9.2-9.65m 0/2/3 N=5		
	organic stained silty CLAY, dark grey/brown. Stiff, moist, medium to high plasticity			[Symbol]	10.0								
	with trace black organic inclusions			[Symbol]	10.5			100					
	silty CLAY, orange mottled light grey/brown. Stiff, moist, medium to high plasticity, with trace limonite			[Symbol]	11.0			SPT			SPT at 11.0-11.45m 0/2/2 N=4		
				[Symbol]	11.5			100					
	organic stained silty CLAY, black mottled brown/grey. Stiff, moist, high to medium plasticity, with trace black organic inclusions			[Symbol]	12.0			SPT			SPT at 12.0-12.45m 0/1/1 N=2		
				[Symbol]	12.5								
				[Symbol]	13.0								
				[Symbol]	13.5								
				[Symbol]	14.0			42					
	silty CLAY with trace fine sand, black mottled light grey/brown. Stiff, moist, high plasticity, with trace organic inclusions			[Symbol]	14.5								
	with very thin layer black wood			[Symbol]	15.0			SPT			SPT at 15.0-15.45m 0/1/2 N=3		
	with some black organic inclusions at 15.0m, becoming light grey, with minor fine sand, without organic inclusions			[Symbol]	15.5								
	becoming dark grey			[Symbol]	16.0		Open Barrel	68					
						Drilling Fluid:	Topsoil	Sand	Sandstone	Plutonic			
Comments: Driller: Pro-Drill Rig: Tractor						water	Fill	Gravel	Siltstone	No Core			
						Checked:	Clay	Organic	Limestone				
							Silt	Pumice	Volcanic				

Client : AUCKLAND RACING CLUB					Machine Borehole No. MH01						
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE					Sheet 3 of 4						
Job Number: J01706					Vane Head: 1900	Logged By: RG	Processor : RG	Start Date: 30.03.21	Finish Date: 31.03.21		
Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT	
	Description: Refer to site plan			Orientation: vertical							
	CORE DESCRIPTION			Legend	Depth (m)	DEFECTS					
Alluvium	with very thin bed of organic stained silty CLAY				16.5			Open Barrel	68		
clayey SILT with trace fine sand, dark grey. Stiff, moist, medium plasticity				17.0							
silty CLAY, dark grey. Stiff, moist, high plasticity				17.5							
				18.0							
				18.5							
				19.0							
				19.5							
				20.0							
				20.5							
				21.0							
				21.5							
				22.0							
				22.5							
				23.0							
				23.5							
				24.0							


	Comments:	Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	+++
			Fill		Gravel		Siltstone		No Core	
		Checked:	Clay		Organic		Limestone			
		Driller: Pro-Drill	Rig: Tractor		Silt		Pumice		Volcanic	


Client : AUCKLAND RACING CLUB										Machine Borehole No. MH01									
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE										Sheet 4 of 4									
Job Number: J01706										Vane Head: 1900		Logged By: RG		Processor : RG		Start Date: 30.03.21		Finish Date: 31.03.21	
Stratigraphy	Borehole Location:	mN			mE			Ground R.L.			Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT			
	Description: Refer to site plan						Orientation: vertical												
East Coast Bays Formation Bedrock	CORE DESCRIPTION						Legend	Depth (m)	DEFECTS			90	100	SPT	SPT		SPT at 24.0-24.12m 50 for 120mm N>50		
	EOB at 24.12m. Target Depth.							24.5											
Comments:										Drilling Fluid: water		Topsoil	Sand	Sandstone	Plutonic				
										Checked: RP		Fill	Gravel	Siltstone	No Core				
Driller: Pro-Drill										Rig: Tractor		Clay	Organic	Limestone					
												Silt	Pumice	Volcanic					

















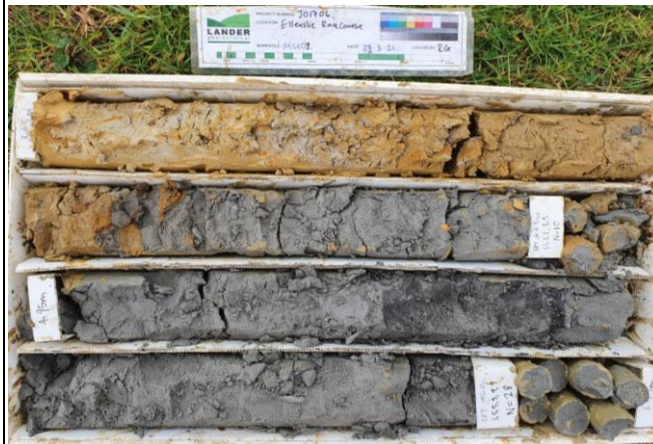
client:	AUCKLAND RACING CLUB	project no: J01706	figure no:
project:	ELLERSLIE RACECOUSE		Figure MH01a
	ELLERSLIE	compiled:	date:
title:	PHOTO SUMMARY	RG	30.03.21-31.03.21



	client:	AUCKLAND RACING CLUB	project no: J01706	figure no: Figure MH01b
	project:	ELLERSLIE RACECOUSE		
		ELLERSLIE	compiled:	date:
	title:	PHOTO SUMMARY	RG	30.03.21-31.03.21

Client : AUCKLAND RACING CLUB				Machine Borehole No. MH02									
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE				Sheet 1 of 2									
Job Number: J01706				Vane Head: 1900		Logged By: RG		Processor : RG		Start Date: 31.03.21		Finish Date: 01.04.21	
Stratigraphy	Borehole Location:	mN	mE	Ground R.L.		Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT		
	Description: Refer to site plan			Orientation: vertical									
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS							
Fill	TOPSOIL				0.5	Bentonite		Open Barrel	72				
	clayey SILT, orange, grey and light brown/yellow mottled. Hard, moist, medium plasticity, with trace fine gravel												
Ash	clayey SILT, black specked dark brown. Very stiff, moist, medium plasticity, with trace organic inclusions				1.0				100				
	becoming dark brown specked orange/brown, with trace fine gravel sized dark red/brown hardened silt clast inclusions												
Alluvium	fine to medium scoriaceous gravel, red/brown. Loose, moist, no plasticity				1.5	Piezometer screened from 1.0m to base		SPT	100				
	silty CLAY, light grey streaked light orange. Stiff, moist, high plasticity												
					2.0								
					2.5				48				
					3.0				SPT				
					3.5				100				
	clayey SILT with minor fine sand, orange streaked light grey. Very stiff, moist, medium to low plasticity				4.0								
	clayey SILT with minor fine sand, dark grey. Stiff, moist, medium to low plasticity				4.5								
					5.0	Groundwater at 4.7m. Measured on 06.04.21			SPT				
						Groundwater at 4.77m. Measured on 13.04.21							
					5.5	Groundwater at 4.83m. Measured on 16.04.21			100				
	with moderately thin bed organic stained clayey SILT				6.0								
	with very closely spaced, laminated grey silty CLAY beds				6.5				SPT				
					7.0				76				
					7.5								
	without silty CLAY bands				8.0								
<div></div> <div>Comments:</div> <div>Driller: Pro-Drill</div> <div>Rig: Tractor</div>					Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	+++
						Fill		Gravel		Siltstone		No Core	
					Checked:	Clay		Organic		Limestone			
						Silt		Pumice		Volcanic			

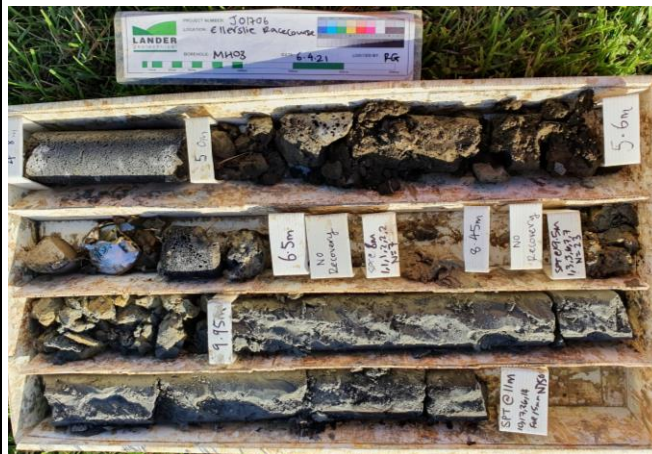
Client : AUCKLAND RACING CLUB										Machine Borehole No. MH02									
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE										Sheet 2 of 2									
Job Number: J01706										Vane Head: 1900		Logged By: RG		Processor : RG		Start Date: 31.03.21		Finish Date: 01.04.21	
Stratigraphy	Borehole Location:	mN			mE			Ground R.L.			Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT			
	Description: Refer to site plan							Orientation: vertical											
	CORE DESCRIPTION				Legend	Depth (m)	DEFECTS												
Alluvium					XXXXXX	8.5				Triple Tube	40								
						9.0													
						9.5													
						10.0													
						10.5													
						11.0													
						11.5													
						12.0													
						12.5													
						Transitional East Coast Bays Formation											silty CLAY, dark grey. Hard, moist, medium to high plasticity		
11.5																			
12.0																			
12.5																			
13.0																			
13.5																			
14.0																			
14.5																			
15.0																			
15.5																			
Transitional East Coast Bays Formation	clayey SILT with trace fine sand, dark grey. Very stiff, moist, medium plasticity				XXXXXX	12.5					SPT	69				SPT at 11.0-11.4m 15/50 for 250mm N>50			
	13.0																		
	13.5																		
Transitional East Coast Bays Formation	silty CLAY, dark grey. Hard, moist, high to medium plasticity				XXXXXX	14.0					SPT	0				SPT at 12.5-12.95m 10/11/16 N=27			
	14.5																		
	15.0																		
Transitional East Coast Bays Formation	EOB at 15.95m. Target Depth.				XXXXXX	15.5					SPT	0				SPT at 14.0-14.45m 11/19/26 N=45			
						16.0													
						16.5													
	Comments:					Drilling Fluid:		Topsoil		Sand		Sandstone		Plutonic					
						water		Fill		Gravel		Siltstone		No Core					
						Checked:		Clay		Organic		Limestone							
						Driller: Pro-Drill		Rig: Tractor	Silt		Pumice		Volcanic						





client:	AUCKLAND RACING CLUB	project no: J01706	figure no:
project:	ELLERSLIE RACECOUSE		Figure MH02
	ELLERSLIE	compiled:	date:
title:	PHOTO SUMMARY	RG	31.03.21-01.04.21

Client : AUCKLAND RACING CLUB						Machine Borehole No.							
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE						Sheet 1 of 2							
Job Number: J01706						Vane Head:	Logged By:	Processor :	Start Date: 06.04.21 Finish Date: 07.04.21				
						1900	RG	RG					
Stratigraphy		Borehole Location:	mN	mE	Ground R.L.	Groundwater/Piezometer		Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT	
		Description:	Refer to site plan		Orientation: vertical								
		CORE DESCRIPTION	Legend	Depth (m)	DEFECTS								
Fill		clayey SILT, light orange and light grey mottled brown. Very stiff, moist, medium plasticity, with minor fine gravel at 0.1m, with 70mm diameter concrete block at 0.15m, with 60mm diameter basaltic gravel with 100mm diameter basaltic gravel		0.5	Bentonite →			Open Barrel	100			UTP	
		with moderately thin bed basalt		1.0					44			UTP	
				1.5	Gravel backfill →				60			UTP	
				2.0	Piezometer screened from 1.0m to base			Triples Tube	SPT			UTP SPT at 1.5-1.58m 1,5 for 0mm (HB) N>50	
		coarse to medium basaltic GRAVEL, black. Loose, moist, no plasticity		2.5					17				
				3.0					10				
		silty fine GRAVEL, dark grey specked dark brown. Loose, wet, no plasticity, with minor medium gravel slightly weathered black vesicular BASALT; Strong		3.5					94			SPT at 3.5-3.73m 3,6 for 75mm (HB) N>50	
		silty CLAY, black and grey mottled light brown. Stiff, moist, high plasticity, with minor fine gravel, with 40mm diameter brick at 3.45m		4.0					SPT				
				4.5					39				
		CONCRETE		5.0					48				
		slightly weathered, black, vesicular BASALT; Strong		5.5					11				
		clayey SILT, dark brown. Very stiff, moist, medium plasticity, with trace fine to medium gravel with 90mm diameter basaltic gravel without fine gravel		6.0	Groundwater at 6.02m. Measured on 13.04.21								
				6.5	Groundwater at 6.19m. Measured on 16.04.21								
		with 45mm diameter wood block at 6.35m, with 70mm diamater can at 6.4m, with woodchips up to 30mm diameter at 6.43m, with 70mm diameter basaltic gravel		7.0					0				
				7.5									
				8.0									
		Comments:		Drilling Fluid:		Topsoil	Sand	Sandstone	Plutonic				
				water		Fill	Gravel	Siltstone	No Core				
				Checked:		Clay	Organic	Limestone					
				RP		Silt	Pumice	Volcanic					
Driller: Pro-Drill		Rig: Tractor											












Client : AUCKLAND RACING CLUB					Machine Borehole No. MH03							
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE					Sheet 2 of 2							
Job Number: J01706					Vane Head: 1900	Logged By: RG	Processor : RG	Start Date: 06.04.21	Finish Date: 07.04.21			
Stratigraphy	Borehole Location:	mN	mE	Ground R.L.		Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT	
	Description: Refer to site plan			Orientation: vertical								
	CORE DESCRIPTION			Legend	Depth (m)							DEFECTS
Alluvium	silty CLAY, orange streaked light grey/brown. Stiff, moist, medium to high plasticity				8.5		Triple Tube	SPT			SPT at 8.0-8.45m 2/3/4 N=7	
								9.0				
Transitional East Coast Bays Formation	fine sandy SILT with minor clay, white specked dark grey. Medium dense, moist, low to no plasticity				9.5			SPT			SPT at 9.5-9.95m 4/9/14 N=23	
	silty CLAY, dark grey, Hard, moist, medium to high plasticity				10.0							
	with trace fine sand				10.5		84					
	without fine sand											
	with minor black carbonaceous inclusions							11.0				
East Coast Bays Formation Bedrock	highly to moderately weathered white specked dark grey, medium SANDSTONE; Very weak				12.0			57	60		SPT at 11.0-11.24m 27, 50 for 90mm N>50	
					12.5			SPT	SPT			
					13.0							
					13.5			58	66			
					14.0			SPT	SPT			
					14.5							
					15.0							
EOB at 14.28m. Target Depth.				15.5						SPT at 14.0-14.28m 37, 50 for 130mm N>50		
				16.0								
 Comments:				Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
				water	Fill		Gravel		Siltstone		No Core	
				Checked:	Clay		Organic		Limestone			
				Driller: Pro-Drill	Rig: Tractor	RP	Silt		Pumice		Volcanic	

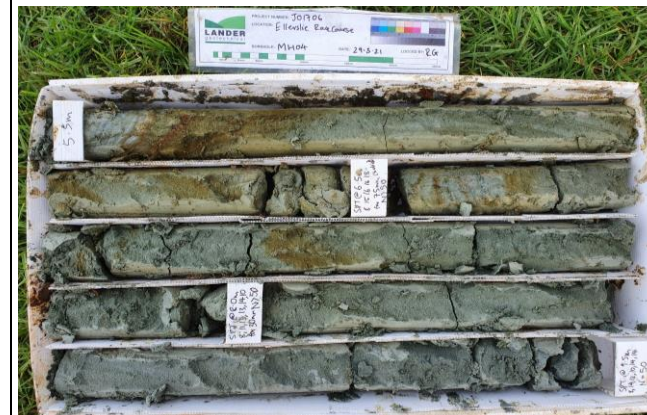


	client:	AUCKLAND RACING CLUB	project no: J01706	figure no:
	project:	ELLERSLIE RACECOUSE		Figure MH03
			ELLERSLIE	compiled:
	title:	PHOTO SUMMARY	RG	06.04.21-07.04.21

Client : AUCKLAND RACING CLUB				Machine Borehole No. MH04									
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE				Sheet 1 of 3									
Job Number: J01706				Vane Head: 1900		Logged By: RG		Processor : RG		Start Date: 29.03.21		Finish Date: 29.03.21	
Stratigraphy	Borehole Location:	mN	mE	Ground R.L.		Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT		
	Description: Refer to site plan			Orientation: vertical									
CORE DESCRIPTION				Legend	Depth (m)	DEFECTS							
Alluvium	TOPSOIL					Bentonite		Open Barrel	100			UTP	
	clayey SILT, light orange mottled light grey/brown. Very stiff, moist, medium plasticity at 0.4m, with minor limonite				0.5				100			UTP	
	at 0.5m, with thin bed dark orange/brown limonite SILT at 40°								100				
	at 0.6m, with extremely closely spaced laminated beds				1.0				100				
	hardened limonite SILT, to 0.65m								100				
	at 0.7m, with trace fine sand, with moderately thin bed dark grey organic stained silty CLAY				1.5	Gravel backfill			100				
	at 0.9m, with laminated bed orange hardened limonite SILT					Piezometer screened from 1.0m to base			SPT			UTP	
	at 1.0m, becoming grey				2.0							SPT at 1.5-1.95m 13/19/17 N=36	
	at 1.2m, with moderately thin bed limonite SILT												
	slightly clayey SILT with minor fine sand, orange streaked dark grey. Hard, moist, low plasticity, with minor limonite				2.5				100				
	becoming dark green and orange stained dark grey				3.0							UTP	
	becoming medium plasticity, with without fine sand				3.5	Groundwater at 3.66m. Measured on 06.04.21			SPT			SPT at 3.0-3.45m 9/12/16 N=28	
becoming dark grey, without limonite staining				4.0	Groundwater at 3.7m. Measured on 13.04.21								
				4.5	Groundwater at 3.74m. Measured on 16.04.21			100					
with moderately thin bed with minor black carbonaceous inclusions				5.0							UTP		
becoming orange and dark green mottled				5.5				SPT			SPT at 4.5-4.95m 15/50 for 180mm N>50		
becoming orange streaked dark green/grey				6.0									
				6.5									
				7.0				SPT			SPT at 6.5-6.95m 23, 50 for 225mm N>50		
				7.5				94					
				8.0									
 Comments:				Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	+++	
					Fill		Gravel		Siltstone		No Core		
				Checked:	Clay		Organic		Limestone				
					Silt		Pumice		Volcanic				
Driller: Pro-Drill				Rig: Tractor									

Client : AUCKLAND RACING CLUB					Machine Borehole No. MH04							
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE					Sheet 2 of 3							
Job Number: J01706					Vane Head: 1900	Logged By: RG	Processor : RG	Start Date: 29.03.21	Finish Date: 29.03.21			
Stratigraphy	Borehole Location:	mN	mE	Ground R.L.	Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT		
	Description: Refer to site plan			Orientation: vertical								
	CORE DESCRIPTION			Legend	Depth (m)	DEFECTS						
Alluvium	<p>becoming orange mottled green/grey</p> <p>with moderately thin bed highly weathered orange mottled dark grey, fine SANDSTONE; Extremely to very weak at 40°</p> <p>at 10.9m, becoming dark grey</p> <p>becoming clayey SILT, medium plasticity,with laminated black organic band, without fine sand</p> <p>at 11.6m, with minor black organic inclusions</p> <p>at 11.7m, becoming low plasticity, with minor fine sand, with very closely spaced laminted bed grey silty CLAY</p> <p>with thin bed dark red/brown fine limonite gravel</p> <p>clayey SILT with trace fine sand, dark brown/orange mottled light brown/orange. Very stiff, moist, low to medium plasticity, with trace limonite</p> <p>at 13.2m, with very thin layer dark orange/brown limonite band at 20°</p> <p>interbedded very thin to thin clayey SILT, orange mottled light brown/grey. Hard, moist, medium plasticity beds with very thin to thin silty CLAY, grey. Hard, moist, medium plasticity</p> <p>slightly clayey SILT with trace fine sand, dark orange mottled light orange. Very stiff, moist, low plasticity</p> <p>at 13.7m, with very thin bed hardened dark red/brown limonite at 20°, with black mottles</p> <p>fine sandy SILT with trace clay, light grey and black mottled light orange/brown. Dense, moist, no to low plasticity, with trace manganese oxidation</p> <p>with orange streaks at 10°</p> <p>becoming orange streaked light orange/brown</p> <p>with moderately thin bed with light grey silty CLAY mottles up to 10mm diameter intermixed</p> <p>becoming black specked and light orange mottled light grey</p>				<p>8.5</p> <p>9.0</p> <p>9.5</p> <p>10.0</p> <p>10.5</p> <p>11.0</p> <p>11.5</p> <p>12.0</p> <p>12.5</p> <p>13.0</p> <p>13.5</p> <p>14.0</p> <p>14.5</p> <p>15.0</p> <p>15.5</p> <p>16.0</p>		<p>Triple Tube</p> <p>94</p> <p>95</p> <p>100</p> <p>90</p> <p>67</p>	<p>SPT</p> <p>SPT</p> <p>SPT</p> <p>SPT</p> <p>SPT</p> <p>SPT</p>		<p>SPT at 8.0-8.41m 19, 50 for 228mm N>50</p> <p>SPT at 9.5-9.45m 22/22/28 N=50</p> <p>SPT at 11.0-11.44m 13, 50 for 290mm N=50</p> <p>SPT at 12.5-12.95m 10/20/28 N=48</p> <p>SPT at 14.0-14.45m 8/15/25 N=40</p> <p>SPT at 15.5-15.95m 13/11/15 N=26</p>		
	Comments:			Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	+++
				water	Fill		Gravel		Siltstone		No Core	
	Driller: Pro-Drill	Rig: Tractor	Checked:	Clay		Organic		Limestone				
				Silt		Pumice		Volcanic				

Client : AUCKLAND RACING CLUB						Machine Borehole No. MH04						
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE						Sheet 3 of 3						
Job Number: J01706						Vane Head: 1900	Logged By: RG	Processor : RG	Start Date: 29.03.21 Finish Date: 29.03.21			
Stratigraphy	Borehole Location:	mN	mE	Ground R.L.		Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT	
	Description:	Refer to site plan		Orientation: vertical								
	CORE DESCRIPTION			Legend	Depth (m)	DEFECTS						
Alluvium					16.5		Triple Tube	86			SPT at 17.0-17.45m 7/11/16 N=27	
	becoming dark orange and light grey specked light orange/brown, with trace limonite				17.0			SPT				
	irregularly interbedded thin beds of fine sandy SILT with minor clay, orange and light grey specked light orange. Medium dense, moist, low plasticity, with laminated bands of silty CLAY, light orange/brown. Very stiff, moist, medium plasticity				17.5			90				
					18.0							
	slightly clayey SILT with minor fine sand, light orange/brown. Very stiff, moist, low plasticity at 18.6m, becoming light grey				18.5			SPT			SPT at 18.5-18.95m 7/11/16 N=26	
					19.0							
	becoming orange streaked light grey, with trace black organic inclusions				19.5			100				
					20.0			SPT			SPT at 20.0-20.45m 11/16/24 N=40	
	becoming orange				20.5							
	becoming orange streaked light grey				21.0			88				
					21.5			SPT			SPT at 21.5-21.95m 11/14/23 N=37	
	becoming light grey, with occasional light orange streaks				22.0							
	EOB at 21.95m. Target Depth.				22.5							
					23.0							
					23.5							
					24.0							
 Comments:				Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
					Fill		Gravel		Siltstone		No Core	
				Checked:	Clay		Organic		Limestone			
				Driller: Pro-Drill	Rig: Tractor	Silt		Pumice		Volcanic		



client:	AUCKLAND RACING CLUB
project:	ELLERSLIE RACECOUSE
	ELLERSLIE
title:	PHOTO SUMMARY

project no:	figure no:
J01706	Figure MH04
compiled:	date:
RG	29.03.21

Client :AUCKLAND RACING CLUB

Project Location : ELLERSLIE RACECOURSE, ELLERSLIE

Job Number: J01706

Machine Borehole No. MH05

Sheet 1 of 2

Vane Head: 1900

Logged By: RG

Processor : RG

Start Date: 07.04.21

Finish Date: 07.04.21

Stratigraphy

Fill

Borehole Location:

mNmE

Description: Refer to site plan

Ground R.L.

Orientation: vertical

CORE DESCRIPTION

Legend

Depth (m)

DEFECTS

TOPSOIL

clayey SILT, light grey, brown and orange streaked light orange/brown. Very stiff, moist, medium plasticity

0.5

clayey SILT, orange and grey mottled dark brown. Very stiff, moist, medium plasticity, with minor fine gravel

1.0

medium scoriaceous and basaltic GRAVEL, with brick

clayey SILT with minor fine gravel, dark brown. Stiff, moist, low to medium plasticity

1.5

orange brick

clayey SILT, red and orange mottled dark grey/blue. Very stiff, moist, medium plasticity

2.0

2.5

3.0

silty CLAY, black and orange mottled light grey/blue, very stiff, moist, high plasticity at 3.2m, becoming light grey/blue and black mottled dark grey/black

3.5

clayey SILT, red and light brown mottled dark brown. Stiff, moist, medium plasticity, with minor fine to medium basaltic gravel inclusions

4.0

4.5

clayey SILT, orange mottled light grey/blue. Very stiff, moist, medium plasticity, with minor fine gravel

5.0

clayey SILT with tarce fine gravel, dark brown. Very stiff, moist, low to medium plasticity with trace rootlets

5.5

slightly weathered, black, vesicular BASALT; Strong, infilled with clayey SILT, brown. Stiff, moist, medium plasticity, with trace fibrous inclusions

6.0

6.5

7.0

7.5

8.0

Groundwater/ Piezometer

Drilling Method & Casing

Recovery (%)

RQD (%)

Sample and Laboratory Test Details

Vane Dial / Sensitivity & SPT

LANDER

geotechnical

Comments:

Driller: Pro-Drill

Rig: Tractor

Drilling Fluid:

water

Checked:

RP

Topsoil

Fill

Clay

Silt

Sand

Gravel

Organic

Pumice

Sandstone

Siltstone

Limestone

Volcanic

Plutonic

No Core

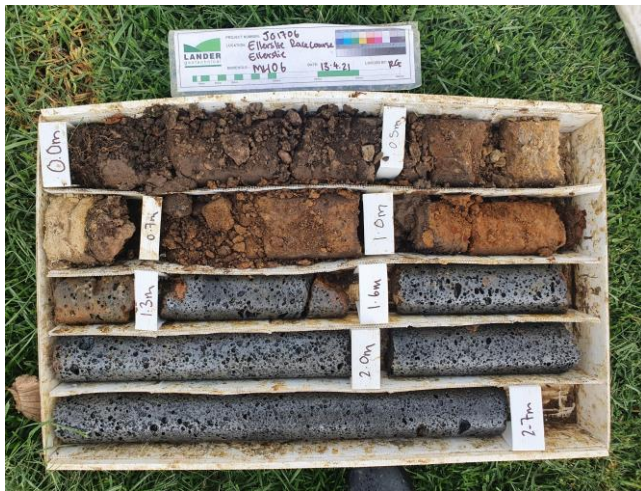
Client : AUCKLAND RACING CLUB					Machine Borehole No. MH05						
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE					Sheet 2 of 2						
Job Number: J01706					Vane Head: 1900	Logged By: RG	Processor : RG	Start Date: 07.04.21	Finish Date: 07.04.21		
Stratigraphy	Borehole Location:	mN	mE	Ground R.L.		Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT
	Description: Refer to site plan			Orientation: vertical							
	CORE DESCRIPTION		Legend	Depth (m)	DEFECTS						
Transitional East Coast Bays Formation	silty CLAY, light grey streaked orange. Stiff, moist, medium plasticity			8.5			Triple Tube	27			
	with 50mm diameter basaltic inclusion										
	silty fine to medium SAND with minor clay, white speckled dark grey. Medium dense, moist, no to low plasticity, with minor white coarse sand sized inclusions			9.0				40			
				9.5							
Bedrock	highly weathered, grey, fine SANDSTONE; Very weak to weak			10.5					0		
	with minor black carbonaceous inclusions			11.0							
East Coast Bays Formation	EOB at 11.0m. Target Depth.			11.0							
				11.5							
				12.0							
				12.5							
				13.0							
				13.5							
				14.0							
				14.5							
				15.0							
				15.5							
		16.0									
		Comments:	Drilling Fluid:	Topsoil		Sand		Sandstone		Plutonic	
			water	Fill		Gravel		Siltstone		No Core	
			Checked:	Clay		Organic		Limestone			
			RP	Silt		Pumice		Volcanic			
Driller: Pro-Drill		Rig: Tractor									




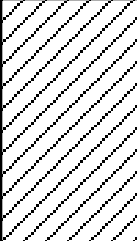


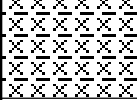














client:	AUCKLAND RACING CLUB	project no: J01706	figure no:
project:	ELLERSLIE RACECOUSE		Figure MH05
	ELLERSLIE		compiled:
title:	PHOTO SUMMARY	RG	07.04.21


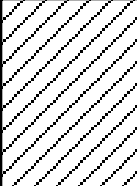














[illegible]

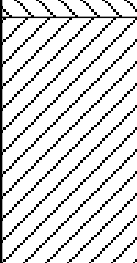
















Client : AUCKLAND RACING CLUB						Machine Borehole No.								MH06				
Project Location : ELLERSLIE RACECOURSE, ELLERSLIE						Sheet 2 of 2												
Job Number: J01706						Vane Head:	Logged By:	Processor :	Start Date: 13.04.21 Finish Date: 13.04.21									
						1900	RG	RG										
Stratigraphy	Borehole Location:	mN	mE		Ground R.L.			Groundwater/ Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT					
	Description:	Refer to site plan			Orientation: vertical													
	CORE DESCRIPTION	Legend	Depth (m)	DEFECTS														
Auckland Volcanic Field	with white quartz inclusion up to 60mm diameter				<>	8.5	1JN, PL, R4, 80-85°	Triples Tube	100	92								
	EOB at 9.5m. Target Depth.				<>	9.0	1JN, PL-UN, R4, 90°											
					<>	9.5												
					<>	10.0												
					<>	10.5												
					<>	11.0												
					<>	11.5												
					<>	12.0												
					<>	12.5												
					<>	13.0												
					<>	13.5												
					<>	14.0												
					<>	14.5												
					<>	15.0												
					<>	15.5												
					<>	16.0												
						Comments: 						Drilling Fluid:		Topsoil	Sand	Sandstone	Plutonic	+ + +
												water		Fill	Gravel	Siltstone	No Core	
												Checked:		Clay	Organic	Limestone		
												RP		Silt	Pumice	Volcanic		
Driller: Pro-Drill						Rig: Tractor												


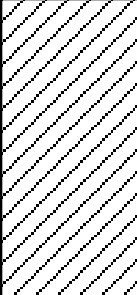


















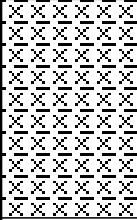














client:	AUCKLAND RACING CLUB	project no: J01706	figure no:
project:	ELLERSLIE RACECOUSE		Figure MH06
	ELLERSLIE		date:
title:	PHOTO SUMMARY	RG	13.04.21


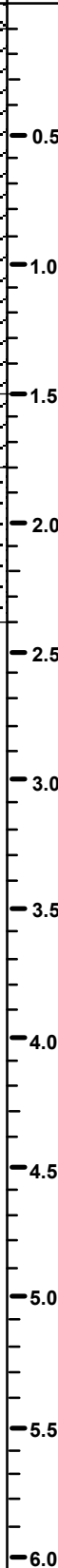
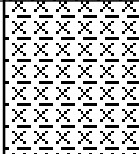








<div>Client : AUCKLAND RACING CLUB</div> <div>Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number: J01706</div>					<div>Trial Pit No. TP 01</div> <div>Sheet 1 of 12</div> <div><div>Vane Head: 1900</div><div>Logged By: RG</div><div>Processor : PL</div><div>Date: 06.05.21</div></div>													
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details								
	Description: Refer to site plan																	
	SOIL DESCRIPTION																	
FILL	TOPSOIL																	
	clayey SILT, orange and light grey mottled dark brown. Very stiff, moist, medium plasticity, moderately sensitive, with trace rootlets at 0.3m, with minor fine gravel inculsions					0.5		111/49	2.3									
	with trace medium to coarse basaltic gravel inculsions					1.0												
ASH	BURIED TOPSOIL																	
	clayey SILT with trace fine sand, orange/brown. Very stiff, moist, medium to low plasticity					1.5		UTP										
EOTP at 1.6m. Target Depth.						2.0												
						2.5												
						3.0												
						3.5												
						4.0												
						4.5												
						5.0												
						5.5												
						6.0												
					<div></div> <div>Comments: groundwater inflow not encountered</div>					Excavator Used:	Topsoil		Sand		Sandstone		Plutonic	+++
										Checked: RG	Fill		Gravel		Siltstone		No Core	
Clay		Organic		Limestone														
Silt		Pumice		Volcanic														

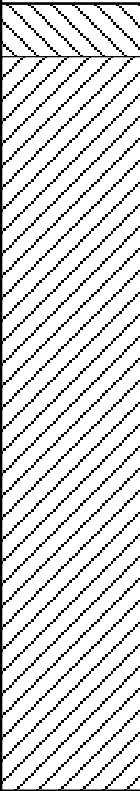
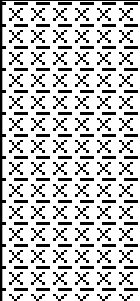













Client : AUCKLAND RACING CLUB					Trial Pit No. TP 02											
Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE					Sheet 2 of 12											
Job Number: J01706					Vane Head: 1900	Logged By: RG	Processor : RG	Date: 06.05.21								
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details						
	Description: Refer to site plan															
	SOIL DESCRIPTION															
FILL	TOPSOIL															
	clayey SILT with trace fine sand, orange and light grey mottled brown. Very stiff, moist, low to medium plasticity, with wood, basaltic, gravel, pipe, asphalt and brick fragments up to 30mm diameter					0.5										
RESIDUAL ECBF	clayey SILT, orange mottled light grey. Hard, moist, medium plasticity, with trace limonite at 1.1m, becoming moderately sensitive					1.0		UTP UTP 200/65	3.1							
	EOB at 1.1m. Target Depth.															
						1.5										
						2.0										
						2.5										
						3.0										
						3.5										
						4.0										
						4.5										
						5.0										
						5.5										
						6.0										
 LANDER geotechnical					Comments: groundwater inflow not encountered		Excavator Used:		Topsoil		Sand		Sandstone		Plutonic	+++
									Fill		Gravel		Siltstone		No Core	
									Clay		Organic		Limestone			
									Silt		Pumice		Volcanic			
					Checked: PL											



<div>Client : AUCKLAND RACING CLUB</div> <div>Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number: J01706</div>					<div>Trial Pit No. TP 03</div> <div>Sheet 3 of 12</div> <div><div>Vane Head: 1900</div><div>Logged By: RG</div><div>Processor : RG</div><div>Date: 06.05.21</div></div>												
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details							
	Description: Refer to site plan																
	SOIL DESCRIPTION																
FILL	TOPSOIL					0.5		132/52	2.5								
	clayey SILT, orange, brown, grey and black mottled. Very stiff, moist, medium plasticity, moderately sensitive, with asphalt, brick and basaltic fragments up to 150mm diameter																
RESIDUAL ECBF	becoming light grey, orange and black mottled dark brown					1.0		UTP	UTP								
	clayey SILT, orange mottled light grey. Hard, moist, medium plasticity																
RESIDUAL ECBF	EOB at 1.3m. Target depth.					1.5											
																	
											2.0						
												2.5					
													3.0				
														3.5			
															4.0		
																4.5	
																	5.0
6.0																	
		Comments: groundwater inflow not encountered	Excavator Used:	Topsoil		Sand		Sandstone		Plutonic	+++						
				Fill		Gravel		Siltstone		No Core							
				Clay		Organic		Limestone									
				Silt		Pumice		Volcanic									

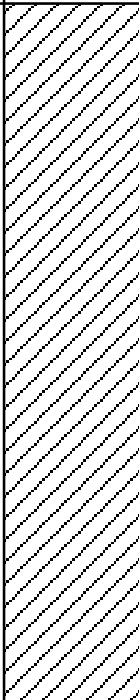
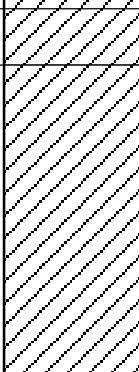
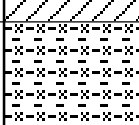














<div>Client :AUCKLAND RACING CLUB</div> <div>Project Location :RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number:J01706</div>					<div>Trial Pit No. TP 04</div> <div>Sheet 4 of 12</div> <div><div>Vane Head:1900</div><div>Logged By:RG</div><div>Processor :PL</div><div>Date:06.05.21</div></div>						
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details	
	Description:Refer to site plan										
	SOIL DESCRIPTION										
FILL	TOPSOIL										
	clayey SILT, orange, brown and light grey mottled. Very stiff, moist, medium plasticity, insensitive, with trace asphalt, concrete, gravel, scoria, brick, turf, plastic and wood becoming dark grey/brown, with minor scoria inculsions					0.5 1.0		171/92 1.9			
RESIDUAL ECBF	clayey SILT with minor fine sand, orange mottled light grey. Hard, moist, low to medium plasticity, with trace limonite EOTP at 1.4m. Target Depth.					1.5		215+ 215+			
						2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0					
<div></div> <div>Comments: groundwater inflow not encountered</div>		Excavator Used:		Topsoil		Sand		Sandstone		Plutonic	+++ +++
		Checked: RG		Fill		Gravel		Siltstone		No Core	
				Clay		Organic		Limestone			
				Silt		Pumice		Volcanic			

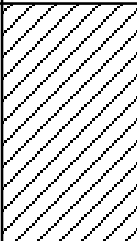
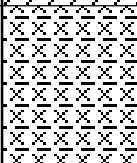

<div>Client : AUCKLAND RACING CLUB</div> <div>Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number: J01706</div>					<div>Trial Pit No. TP 05</div> <div>Sheet 5 of 12</div> <div><div>Vane Head: 1900</div><div>Logged By: RG</div><div>Processor : RG</div><div>Date: 06.05.21</div></div>							
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details		
		Description: Refer to site plan										
	SOIL DESCRIPTION											
ASH	TOPSOIL											
	clayey SILT with trace fine sand, orange/brown. Hard, moist, low plasticity, with trace rootlets					0.5 1.0		UTP 215+				
	EOTP at 1.2m. Target Depth.					1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0						
												
<div></div>		Comments: groundwater inflow not encountered		Excavator Used:	Topsoil		Sand		Sandstone		Plutonic	+++
					Fill		Gravel		Siltstone		No Core	
				Checked: PL	Clay		Organic		Limestone			
					Silt		Pumice		Volcanic			














<div>Client : AUCKLAND RACING CLUB</div> <div>Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number: J01706</div>					<div>Trial Pit No. TP 06</div> <div>Sheet 6 of 12</div> <div><div>Vane Head: 1900</div><div>Logged By: RG</div><div>Processor : PL</div><div>Date: 06.05.21</div></div>					
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details
	Description: Refer to site plan									
	SOIL DESCRIPTION									
FILL	TOPSOIL									
	clayey SILT with trace fine sand, brown. Very stiff, moist, low to medium plasticity, sensitive, with trace fine gravel, with trace brick, concrete, scoria and wood, with old hydrant becoming sensitive, with plastic pipe, metal rod and rebar									
RESIDUAL ECBF ALLUVIUM	organic clayey SILT, orange mottled dark grey. Hard, moist, medium plasticity, with minor rootlets, with trace limonite							132/28	4.7	
	clayey SILT, orange mottled light grey. Very stiff, moist, medium plasticity, moderately sensitive, with trace limonite									
RESIDUAL ECBF ALLUVIUM	EOTP at 2.4m. Target Depth.							141/55	2.6	
<div><div><div></div><div>Comments: groundwater inflow not encountered</div></div><div><div>Excavator Used:</div><div>Topsoil</div><div>Fill</div><div>Clay</div><div>Silt</div></div><div><div>Checked: RG</div><div>Clay</div><div>Silt</div></div></div>					Sand		Sandstone		Plutonic	+++
					Gravel		Siltstone		No Core	
					Organic		Limestone			
					Pumice		Volcanic			


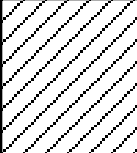















Client : AUCKLAND RACING CLUB				Trial Pit No. TP 07										
Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE				Sheet 7 of 12										
Job Number: J01706				Vane Head: 1900		Logged By: RG		Processor : PL		Date: 06.05.21				
Stratigraphy	Pit Location:		mN	mE	Ground R.L.		Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details		
	Description:		Refer to site plan											
	SOIL DESCRIPTION													
FILL	TOPSOIL						0.5	1.0	1.5	2.0	2.5	UTP	123/34	3.6
	clayey SILT with trace fine sand, orange, brown and light grey mottled. Very stiff, moist, low to medium plasticity, with minor fine to coarse gravel, with wood, asphalt, concrete blocks, scoria, brick, metal wire becoming grey mottled dark brown, with basaltic blocks, asbestos, glass becoming very stiff, moderately sensitive with concrete piles and metal wires													
RESIDUAL ECBF	clayey SILT with trace fine sand, orange mottled light grey. Very stiff, moist, medium plasticity, with trace limonite						3.0	3.5	4.0	4.5	5.0	5.5	6.0	
EOTP at 4.0m. Target Depth.														
Comments: groundwater inflow not encountered					Excavator Used:		Topsol		Sand		Sandstone		Plutonic	+++
					Checked:		Fill		Gravel		Siltstone		No Core	
					RG		Clay		Organic		Limestone			
							Silt		Pumice		Volcanic			

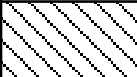
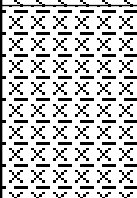













<div>Client :AUCKLAND RACING CLUB</div> <div>Project Location :RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number:J01706</div>					<div>Trial Pit No. TP 08</div> <div>Sheet 8 of 12</div> <div><div>Vane Head:1750</div><div>Logged By:PL</div><div>Processor :PL</div><div>Date:06.06.21</div></div>							
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details		
		Description:Refer to site plan										
	SOIL DESCRIPTION											
FILL	TOPSOIL, with trace boulders					0.5		162/54	3.0			
	silty CLAY, orange streaked light grey. Very stiff, moist, high plasticity, moderately sensitive, with fabric incursions											
	clayey SILT, dark grey. Very stiff, moist, low plasticity											
RESIDUAL ECBF	clayey SILT, black mottled orange/brown. Very stiff, moist, low plasticity, sensitive, with trace fine to medium gravel					1.0		131/31	4.2			
	silty CLAY, orange streaked light grey/white. Very stiff, moist, medium to high plasticity											
	EOTP at 2.0m. Target Depth.											
						2.0						
						2.5						
						3.0						
						3.5						
						4.0						
						4.5						
						5.0						
						5.5						
						6.0						
<div></div>		Comments: groundwater inflow at :		Excavator Used:	Topsoil		Sand		Sandstone		Plutonic	+++
				Checked: RG	Fill		Gravel		Siltstone		No Core	
					Clay		Organic		Limestone			
					Silt		Pumice		Volcanic			

Client : AUCKLAND RACING CLUB				Trial Pit No. TP 09										
Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE				Sheet 9 of 12										
Job Number: J01706				Vane Head: 1750		Logged By: PL		Processor : PL		Date: 07.05.21				
Stratigraphy	Pit Location:		mN	mE	Ground R.L.		Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details		
	Description: Refer to site plan													
	SOIL DESCRIPTION													
	clayey SILT, dark brown. Stiff, moist, low plasticity, moderately sensitive, with trace fine to medium gravel, with trace concrete, boulders, golf balls, with trace inclusions of silty CLAY, light grey streaked orange						0.5			89/35	2.5			
	becoming grey/blue, with trace coarse sand to fine gravel sized scoria inculsions													
RESIDUAL ECBF	silty CLAY, orange streaked light grey/blue. Very stiff, moist, medium to high plasticity						1.0							
	clayey SILT, dark brown/blue. Very stiff, moist, low plasticity, with trace fine gravel													
	silty CLAY, orange streaked grey. Very stiff, moist, medium to high plasticity						1.5			54/23	2.3			
	EOTP at 4.4m. Target Depth.													
														
		Comments: groundwater inflow not encountered			Excavator Used:		Topsoil		Sand		Sandstone		Plutonic	+++
					Checked: RG		Fill		Gravel		Siltstone		No Core	
							Clay		Organic		Limestone			
							Silt		Pumice		Volcanic			

Client : AUCKLAND RACING CLUB					Trial Pit No. TP 10											
Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE					Sheet 10 of 12											
Job Number: J01706					Vane Head: 1750	Logged By: PL	Processor : RG		Date: 07.05.21							
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details						
		Description: Refer to site plan														
	SOIL DESCRIPTION															
FILL	slightly clayey SILT, dark brown. Very stiff, moist, low to no plasticity, with some coarse gravel inclusions					0.5		116/54	2.1							
	with trace red coarse sand															
	silty CLAY, orange streaked light grey. Very stiff, moist, medium plasticity, moderately sensitive, with trace boulders, with trace rubbish															
	slightly clayey SILT, dark brown. Hard, dry, no plasticity															
	silty CLAY, orange streaked white. Very stiff, moist, medium plasticity															
RESIDUAL ECBF	clayey SILT, dark brown. Very stiff, moist, low plasticity					2.0		UTP								
	clayey SILT, orange/brown. Very stiff, moist, low plasticity becoming light grey streaked orange															
	EOTP at 2.9m. Target depth.											2.5				
					3.0											
					3.5											
					4.0											
					4.5											
					5.0											
					5.5											
					6.0											

	Comments: groundwater inflow not encountered	Excavator Used:	Topsoil		Sand		Sandstone		Plutonic	+++
			Fill		Gravel		Siltstone		No Core	
		Checked:	Clay		Organic		Limestone			
		PL	Silt		Pumice		Volcanic			

<div>Client : AUCKLAND RACING CLUB</div> <div>Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number: J01706</div>					<div>Trial Pit No. TP 11</div> <div>Sheet 11 of 12</div> <div><div>Vane Head: 1900</div><div>Logged By: RG</div><div>Processor : PL</div><div>Date: 06.05.21</div></div>							
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details		
	Description: Refer to site plan											
	SOIL DESCRIPTION											
FILL	TOPSOIL											
	clayey SILT with trace fine sand, orange and light grey mottled dark brown. Very stiff, moist, medium plasticity, moderately sensitive, with minor fine gravel incursions, with concrete, brick and glass fragments					0.5						
RESIDUAL ECBF	silty CLAY, orange mottled light grey. Very stiff, moist, medium plasticity, moderately sensitive, with trace limonite					1.0		169/46	3.7			
	EOTP at 1.1m. Target Depth.							151/43	3.5			
						1.5						
						2.0						
						2.5						
						3.0						
						3.5						
						4.0						
						4.5						
						5.0						
						5.5						
						6.0						
		Comments: groundwater inflow not encountered		Excavator Used:	Topsoil		Sand		Sandstone		Plutonic	+++
				Checked:	Fill		Gravel		Siltstone		No Core	
					Clay		Organic		Limestone			
					Silt		Pumice		Volcanic			

<div>Client : AUCKLAND RACING CLUB</div> <div>Project Location : RESIDENTIAL DEVELOPMENT ELLERSLIE RACECOURSE</div> <div>Job Number: J01706</div>					<div>Trial Pit No. TP 12</div> <div>Sheet 12 of 12</div> <div><div>Vane Head: 1900</div><div>Logged By: RG</div><div>Processor : RG</div><div>Date: 06.05.21</div></div>								
Stratigraphy	Pit Location:	mN	mE	Ground R.L.	Legend	Depth (m)	Groundwater	Vane Dial Reading	Soil Sensitivity	Sample and Laboratory Test Details			
		Description: Refer to site plan											
	SOIL DESCRIPTION												
ASH	TOPSOIL												
	clayey SILT with trace fine sand, orange/brown. Very stiff, moist, low to medium plasticity, moderately sensitive, with trace rootlets					0.5		108/46	2.4				
	at 1.0m, becoming sensitive					1.0		141/31	4.6				
	EOTP at 1.0m. Target Depth.												
													
						1.5							
						2.0							
						2.5							
						3.0							
						3.5							
						4.0							
						4.5							
						5.0							
						5.5							
						6.0							
<div><div>Comments: groundwater inflow not encountered</div></div>					Excavator Used:	Topsoil		Sand		Sandstone		Plutonic	+++
						Fill		Gravel		Siltstone		No Core	
					Checked:	Clay		Organic		Limestone			
					PL	Silt		Pumice		Volcanic			



Photograph 1: Remuera Precinct development area 1940.



Photograph 2: Remuera Precinct development area 1961.



Photograph 3: Remuera Precinct development area 1975.



Photograph 4: Remuera Precinct development area 1980.



Photograph 5: Remuera Precinct development area 1996.



Photograph 6: Remuera Precinct development area 2001.



Photograph 7: Remuera Precinct development area 2009.



Photograph 8: Remuera Precinct development area 2012.



Photograph 9: Remuera Precinct development area 2016.



Photograph 10: Remuera Precinct development area 2017.



Photograph 1: Looking southwest across the area of uncertified fill towards the stormwater detention pond.



Photograph 2: Looking east at the area of fill adjacent to Ladies Mile site boundary.



Photograph 3: Looking north at the area of fill adjacent to Ladies Mile site boundary.



Photograph 4: Looking north across the area of uncertified fill towards the excavated pond dredgings.



Photograph 5: Looking north east at the track camera tower.



Photograph 6: Looking west at the pump shed and the water tanks.



Photograph 7: Looking south west at the mixed yard/storage area.



Photograph 8: Front of track manager's house.



Photograph 9: Back of track manager's house.



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 4, 235 Broadway, Newmarket
Auckland 1149

Attention: Myra Belkot
Phone: 0223026110
Email: myra.belkot@pdp.co.nz

Lab Reference: 21-14665
Submitted by: Myra Belkot
Date Received: 31/03/2021
Testing Initiated: 31/03/2021
Date Completed: 7/04/2021
Order Number:
Reference: A03691100

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.
Specific testing dates are available on request.

Heavy Metals in Soil

Client Sample ID			HA02_0.1	HA02_0.5	HA08_0.1	HA08_0.3
Date Sampled			29/03/2021	29/03/2021	29/03/2021	29/03/2021
Analyte	Unit	Reporting Limit	21-14665-1	21-14665-2	21-14665-3	21-14665-4
Arsenic	mg/kg dry wt	0.125	5.5	4.2	4.3	4.8
Cadmium	mg/kg dry wt	0.005	0.039	0.0076	0.077	0.066
Chromium	mg/kg dry wt	0.125	28.5	22.7	33.9	29.1
Copper	mg/kg dry wt	0.075	18.2	8.17	29.4	23.7
Lead	mg/kg dry wt	0.25	18.7	6.06	76.1	45.5
Nickel	mg/kg dry wt	0.05	29.0	7.11	35.9	35.7
Zinc	mg/kg dry wt	0.05	46.1	15.4	79.7	60.3

Organochlorine Pesticides - Soil

Client Sample ID			HA08_0.1	HA08_0.3
Date Sampled			29/03/2021	29/03/2021
Analyte	Unit	Reporting Limit	21-14665-3	21-14665-4
2,4'-DDD	mg/kg dry wt	0.005	<0.005	<0.005
2,4'-DDE	mg/kg dry wt	0.005	<0.005	<0.005
2,4'-DDT	mg/kg dry wt	0.005	<0.005	<0.005
4,4'-DDD	mg/kg dry wt	0.003	<0.003	<0.003
4,4'-DDE	mg/kg dry wt	0.005	<0.005	<0.005
4,4'-DDT	mg/kg dry wt	0.005	<0.005	<0.005
Total DDT	mg/kg dry wt	0.02	<0.02	<0.02
alpha-BHC	mg/kg dry wt	0.005	<0.005	<0.005
Aldrin	mg/kg dry wt	0.005	<0.005	<0.005

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.
This test report shall not be reproduced except in full, without the written permission of Analytica Laboratories.

Organochlorine Pesticides - Soil

Client Sample ID			HA08_0.1	HA08_0.3
Date Sampled			29/03/2021	29/03/2021
beta-BHC	mg/kg dry wt	0.005	<0.005	<0.005
cis-Chlordane	mg/kg dry wt	0.005	<0.005	<0.005
cis-Nonachlor	mg/kg dry wt	0.01	<0.01	<0.01
delta-BHC	mg/kg dry wt	0.005	<0.005	<0.005
Dieldrin	mg/kg dry wt	0.05	<0.05	<0.05
Endosulfan I	mg/kg dry wt	0.005	<0.005	<0.005
Endosulfan II	mg/kg dry wt	0.01	<0.01	<0.01
Endosulfan sulfate	mg/kg dry wt	0.005	<0.005	<0.005
Endrin	mg/kg dry wt	0.05	<0.05	<0.05
Endrin aldehyde	mg/kg dry wt	0.01	<0.01	<0.01
Endrin ketone	mg/kg dry wt	0.005	<0.005	<0.005
gamma-BHC	mg/kg dry wt	0.005	<0.005	<0.005
Heptachlor	mg/kg dry wt	0.005	<0.005	<0.005
Heptachlor epoxide	mg/kg dry wt	0.005	<0.005	<0.005
Hexachlorobenzene	mg/kg dry wt	0.005	<0.005	<0.005
Methoxychlor	mg/kg dry wt	0.01	<0.01	<0.01
trans-nonachlor	mg/kg dry wt	0.01	<0.01	<0.01
trans-Chlordane	mg/kg dry wt	0.01	<0.01	<0.01
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020
TCMX (Surrogate)	%	1	99.2	98.9

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-concentrated 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)



Emily Hanna, B.Sc.

Trace Elements Team Leader



Rong Zhang

Technician



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 4, 235 Broadway, Newmarket
Auckland 1149

Attention: Myra Belkot
Phone: 022 302 6110
Email: myra.belkot@pdp.co.nz

Lab Reference: 21-18589
Submitted by: Myra Belkot
Date Received: 23/04/2021
Testing Initiated: 23/04/2021
Date Completed: 30/04/2021
Order Number:
Reference: A03691100

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.
Specific testing dates are available on request.

AMENDED REPORT. This report replaces in full a previous version R00 sent on 30/04/2021. Sample IDs changed as requested

Heavy Metals in Soil

Client Sample ID			MH03_5.3	MH03_9.5	MH05_8.0
Date Sampled			06/04/2021	06/04/2021	06/04/2021
Analyte	Unit	Reporting Limit	21-18589-1	21-18589-2	21-18589-3
Arsenic	mg/kg dry wt	0.125	11	3.9	4.1
Cadmium	mg/kg dry wt	0.005	0.28	0.016	0.025
Chromium	mg/kg dry wt	0.125	73.1	15.8	28.6
Copper	mg/kg dry wt	0.075	51.8	10.9	14.5
Lead	mg/kg dry wt	0.25	168	5.54	5.98
Nickel	mg/kg dry wt	0.05	97.7	20.8	29.3
Zinc	mg/kg dry wt	0.05	206	42.1	41.7

Organochlorine Pesticides - Soil

Client Sample ID			MH03_5.3	MH03_9.5	MH05_8.0
Date Sampled			06/04/2021	06/04/2021	06/04/2021
Analyte	Unit	Reporting Limit	21-18589-1	21-18589-2	21-18589-3
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050

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.
This test report shall not be reproduced except in full, without the written permission of Analytica Laboratories.

Organochlorine Pesticides - Soil

Client Sample ID			MH03_5.3	MH03_9.5	MH05_8.0
Date Sampled			06/04/2021	06/04/2021	06/04/2021
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	100	100	100

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			MH03_5.3	MH03_9.5	MH05_8.0
Date Sampled			06/04/2021	06/04/2021	06/04/2021
Analyte	Unit	Reporting Limit	21-18589-1	21-18589-2	21-18589-3
1-Methylnaphthalene	mg/kg dry wt	0.01	0.016	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	0.01	0.016	<0.010	<0.010
Acenaphthene	mg/kg dry wt	0.01	0.052	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	0.01	0.31	<0.010	<0.010
Anthracene	mg/kg dry wt	0.01	0.36	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	0.02	2.4	<0.020	<0.020
Benzo[a]pyrene	mg/kg dry wt	0.01	4.2	<0.010	0.011
Benzo[b] & [j] fluoranthene	mg/kg dry wt	0.02	3.9	<0.020	<0.020
Benzo[g,h,i]perylene	mg/kg dry wt	0.02	2.6	<0.020	<0.020
Benzo[k]fluoranthene	mg/kg dry wt	0.01	1.2	<0.010	<0.010
Chrysene	mg/kg dry wt	0.01	1.9	<0.010	<0.010
Dibenz(a,h)anthracene	mg/kg dry wt	0.01	0.46	<0.010	<0.010
Fluoranthene	mg/kg dry wt	0.02	4.0	<0.020	0.020
Fluorene	mg/kg dry wt	0.01	0.077	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	0.01	2.3	<0.010	<0.010
Naphthalene	mg/kg dry wt	0.01	0.036	<0.010	<0.010
Phenanthrene	mg/kg dry wt	0.01	1.2	<0.010	<0.010
Pyrene	mg/kg dry wt	0.02	4.7	<0.020	<0.020
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	0.03	5.7	0.030	0.030
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	0.01	5.7	<0.010	0.010
Anthracene-d10 (Surrogate)	%	1	95	110	100

Moisture Content

Client Sample ID			MH03_5.3	MH03_9.5	MH05_8.0
Date Sampled			06/04/2021	06/04/2021	06/04/2021
Analyte	Unit	Reporting Limit	21-18589-1	21-18589-2	21-18589-3
Moisture Content	%	1	22	22	34

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-concentrated 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)
PAH in Soil	Solvent extraction, silica cleanup, followed by GC-MS analysis. Benzo[a]pyrene TEQ (LOR): The most conservative TEQ estimate, where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the TEQ for that PAH. Benzo[a]pyrene TEQ (Zero): The least conservative TEQ estimate, PAHs reported as less than the limit of reporting (LOR) are not included in the TEQ calculation. Benzo[a]pyrene toxic equivalence (TEQ) is calculated according to ' <i>Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health</i> '. Ministry for the Environment. 2011. (In accordance with in-house procedure).
Moisture	Moisture content is determined gravimetrically by drying at 103 °C.



Sharelle Frank, B.Sc. (Tech)
Technologist



Kimmy Ignacio, B.Sc.
Technician



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 4, 235 Broadway, Newmarket
Auckland 1149

Attention: Myra Belkot
Phone: 0223026110
Email: myra.belkot@pdp.co.nz

Lab Reference: 21-21190
Submitted by: Myra Belkot
Date Received: 11/05/2021
Testing Initiated: 11/05/2021
Date Completed: 14/05/2021
Order Number:
Reference: A03691100

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.
Specific testing dates are available on request.

AMENDED REPORT. This report replaces in full a previous version R00 sent on 14/05/2021. Project ID was changed as requested

Heavy Metals in Soil

Client Sample ID			TP1_0.7	TP1_1.6	TP2_0.9	TP2_1.00	TP3_0.4
Date Sampled			06/05/2021	06/05/2021	06/05/2021	06/05/2021	06/05/2021
Analyte	Unit	Reporting Limit	21-21190-1	21-21190-2	21-21190-3	21-21190-4	21-21190-5
Arsenic	mg/kg dry wt	0.125	4.7	3.3	4.3	2.9	2.7
Cadmium	mg/kg dry wt	0.005	0.17	0.034	0.086	0.018	0.065
Chromium	mg/kg dry wt	0.125	58.1	68.8	80.1	23.0	25.0
Copper	mg/kg dry wt	0.075	32.5	31.7	33.4	6.4	23.8
Lead	mg/kg dry wt	0.25	62.7	12.2	33.3	8.14	47.6
Nickel	mg/kg dry wt	0.05	67.8	106	80.0	11.5	36.2
Zinc	mg/kg dry wt	0.05	104	77.8	75.2	21.0	82.0

Heavy Metals in Soil

Client Sample ID			TP3_1.0	TP4_0.8	TP4_1.45	TP5_0.4	TP6_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	06/05/2021	06/05/2021
Analyte	Unit	Reporting Limit	21-21190-6	21-21190-8	21-21190-9	21-21190-10	21-21190-12
Arsenic	mg/kg dry wt	0.125	6.3	4.7	1.5	3.4	3.1
Cadmium	mg/kg dry wt	0.005	0.19	0.10	0.0085	0.052	0.094
Chromium	mg/kg dry wt	0.125	56.3	59.6	8.1	67.7	119
Copper	mg/kg dry wt	0.075	40.1	54.9	3.0	31.0	53.2
Lead	mg/kg dry wt	0.25	110	44.8	2.3	9.43	15.1
Nickel	mg/kg dry wt	0.05	68.8	63.2	3.6	75.0	226
Zinc	mg/kg dry wt	0.05	130	96.1	4.7	80.6	86.6

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.
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Heavy Metals in Soil

Client Sample ID			TP6_1.7	TP7_1.5	TP7_3.1	TP8_0.4	TP8_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-13	21-21190-15	21-21190-16	21-21190-18	21-21190-19
Arsenic	mg/kg dry wt	0.125	5.3	4.7	10	3.3	3.3
Cadmium	mg/kg dry wt	0.005	0.11	0.27	0.24	0.020	0.049
Chromium	mg/kg dry wt	0.125	49.4	69.6	67.2	25.5	62.9
Copper	mg/kg dry wt	0.075	22.7	53.2	43.6	9.60	23.0
Lead	mg/kg dry wt	0.25	40.4	136	134	7.80	12.7
Nickel	mg/kg dry wt	0.05	55.9	120	97.5	19.6	54.0
Zinc	mg/kg dry wt	0.05	74.4	152	168	24.8	63.9

Heavy Metals in Soil

Client Sample ID			TP9_1.0	TP9_2.5	TP9_4.0	TP10_1.9	TP10_2.8
Date Sampled			07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-20	21-21190-22	21-21190-24	21-21190-27	21-21190-28
Arsenic	mg/kg dry wt	0.125	4.2	4.1	6.7	4.1	4.2
Cadmium	mg/kg dry wt	0.005	0.055	0.085	0.022	0.011	0.031
Chromium	mg/kg dry wt	0.125	48.6	38.9	37.7	19.3	69.2
Copper	mg/kg dry wt	0.075	23.1	20.1	28.2	5.6	29.5
Lead	mg/kg dry wt	0.25	17.6	29.5	9.94	3.2	13.2
Nickel	mg/kg dry wt	0.05	54.0	36.6	21.4	8.53	92.7
Zinc	mg/kg dry wt	0.05	56.1	61.6	36.2	12.0	56.9

Heavy Metals in Soil

Client Sample ID			TP11_0.7	TP11_0.9	TP12_0.5
Date Sampled			07/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-29	21-21190-30	21-21190-31
Arsenic	mg/kg dry wt	0.125	3.7	1.8	3.3
Cadmium	mg/kg dry wt	0.005	0.14	0.0083	0.053
Chromium	mg/kg dry wt	0.125	41.0	17.9	63.0
Copper	mg/kg dry wt	0.075	34.1	6.4	26.4
Lead	mg/kg dry wt	0.25	95.3	7.09	9.11
Nickel	mg/kg dry wt	0.05	107	6.69	66.1
Zinc	mg/kg dry wt	0.05	98.3	10.1	80.8

Elements in Soil

Client Sample ID			SS1	SS2	SS3	SS4	SS5
Date Sampled			07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-33	21-21190-34	21-21190-35	21-21190-36	21-21190-37
Lead	mg/kg dry wt	0.25	647	268	361	291	102

Elements in Soil

Client Sample ID			SS6	SS7
Date Sampled			07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-38	21-21190-39
Lead	mg/kg dry wt	0.25	382	88.0

Organochlorine Pesticides - Soil

Client Sample ID			TP1_0.7	TP1_1.6	TP2_0.9	TP2_1.00	TP3_0.4
Date Sampled			06/05/2021	06/05/2021	06/05/2021	06/05/2021	06/05/2021
Analyte	Unit	Reporting Limit	21-21190-1	21-21190-2	21-21190-3	21-21190-4	21-21190-5
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	90	93	96	98	99

Organochlorine Pesticides - Soil

Client Sample ID			TP3_1.0	TP4_0.8	TP4_1.45	TP5_0.4	TP6_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	06/05/2021	06/05/2021
Analyte	Unit	Reporting Limit	21-21190-6	21-21190-8	21-21190-9	21-21190-10	21-21190-12
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Organochlorine Pesticides - Soil

Client Sample ID			TP3_1.0	TP4_0.8	TP4_1.45	TP5_0.4	TP6_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	06/05/2021	06/05/2021
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	100	110	110	110	110

Organochlorine Pesticides - Soil

Client Sample ID			TP6_1.7	TP7_1.5	TP7_3.1	TP8_0.4	TP8_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-13	21-21190-15	21-21190-16	21-21190-18	21-21190-19
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010

Organochlorine Pesticides - Soil

Client Sample ID			TP6_1.7	TP7_1.5	TP7_3.1	TP8_0.4	TP8_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	07/05/2021	07/05/2021
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	86	82	110	120	120

Organochlorine Pesticides - Soil

Client Sample ID			TP9_1.0	TP9_2.5	TP9_4.0	TP10_1.9	TP10_2.8
Date Sampled			07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-20	21-21190-22	21-21190-24	21-21190-27	21-21190-28
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	120	110	120	120	120

Organochlorine Pesticides - Soil

Client Sample ID			TP11_0.7	TP11_0.9	TP12_0.5
Date Sampled			07/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-29	21-21190-30	21-21190-31
2,4'-DDD	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
2,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
2,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
4,4'-DDD	mg/kg dry wt	0.003	<0.0030	<0.0030	<0.0030
4,4'-DDE	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
4,4'-DDT	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Total DDT	mg/kg dry wt	0.02	<0.020	<0.020	<0.020

Organochlorine Pesticides - Soil

Client Sample ID			TP11_0.7	TP11_0.9	TP12_0.5
Date Sampled			07/05/2021	07/05/2021	07/05/2021
alpha-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Aldrin	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
beta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
cis-Chlordane	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
gamma-BHC	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Heptachlor	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Heptachlor epoxide	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Hexachlorobenzene	mg/kg dry wt	0.005	<0.0050	<0.0050	<0.0050
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	1	110	120	120

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			TP1_0.7	TP1_1.6	TP2_0.9	TP2_1.00	TP3_0.4
Date Sampled			06/05/2021	06/05/2021	06/05/2021	06/05/2021	06/05/2021
Analyte	Unit	Reporting Limit	21-21190-1	21-21190-2	21-21190-3	21-21190-4	21-21190-5
1-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthene	mg/kg dry wt	0.01	<0.010	<0.010	0.030	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	0.01	0.038	0.018	0.17	<0.010	0.015
Anthracene	mg/kg dry wt	0.01	0.071	<0.010	0.15	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	0.02	0.31	0.089	1.6	<0.020	0.053
Benzo[a]pyrene	mg/kg dry wt	0.01	0.54	0.14	3.0	0.029	0.11
Benzo[b]f]fluoranthene	mg/kg dry wt	0.02	0.58	0.14	2.9	0.030	0.12
Benzo[g,h,i]perylene	mg/kg dry wt	0.02	0.45	0.11	2.0	0.025	0.11
Benzo[k]fluoranthene	mg/kg dry wt	0.01	0.22	0.059	1.0	0.016	0.048
Chrysene	mg/kg dry wt	0.01	0.39	0.080	1.7	0.022	0.079
Dibenz(a,h)anthracene	mg/kg dry wt	0.01	0.085	0.018	0.46	<0.010	0.018
Fluoranthene	mg/kg dry wt	0.02	0.76	0.16	2.7	0.050	0.12
Fluorene	mg/kg dry wt	0.01	0.011	<0.010	0.031	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	0.01	0.40	0.099	2.1	0.022	0.099
Naphthalene	mg/kg dry wt	0.01	<0.010	<0.010	0.017	<0.010	<0.010
Phenanthrene	mg/kg dry wt	0.01	0.17	0.016	0.59	0.026	0.030
Pyrene	mg/kg dry wt	0.02	0.86	0.19	4.9	0.054	0.14
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	0.03	0.79	0.20	4.3	0.050	0.16
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	0.01	0.79	0.20	4.3	0.040	0.16
Anthracene-d10 (Surrogate)	%	1	87	89	86	90	85

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			TP3_1.0	TP4_0.8	TP4_1.45	TP5_0.4	TP6_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	06/05/2021	06/05/2021
Analyte	Unit	Reporting Limit	21-21190-6	21-21190-8	21-21190-9	21-21190-10	21-21190-12
1-Methylnaphthalene	mg/kg dry wt	0.01	0.011	<0.010	<0.010	<0.010	0.012
2-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthene	mg/kg dry wt	0.01	0.030	0.031	<0.010	<0.010	0.041
Acenaphthylene	mg/kg dry wt	0.01	0.17	0.11	<0.010	<0.010	<0.010
Anthracene	mg/kg dry wt	0.01	0.22	0.40	<0.010	<0.010	0.073
Benz[a]anthracene	mg/kg dry wt	0.02	1.4	0.97	<0.020	<0.020	0.13
Benzo[a]pyrene	mg/kg dry wt	0.01	2.0	1.2	<0.010	<0.010	0.19
Benzo[b]&[j]fluoranthene	mg/kg dry wt	0.02	2.1	1.2	<0.020	<0.020	0.22
Benzo[g,h,i]perylene	mg/kg dry wt	0.02	1.7	0.79	<0.020	<0.020	0.20
Benzo[k]fluoranthene	mg/kg dry wt	0.01	0.82	0.49	<0.010	<0.010	0.078
Chrysene	mg/kg dry wt	0.01	1.4	0.96	<0.010	<0.010	0.16
Dibenz(a,h)anthracene	mg/kg dry wt	0.01	0.36	0.21	<0.010	<0.010	0.033
Fluoranthene	mg/kg dry wt	0.02	3.1	2.3	<0.020	<0.020	0.40
Fluorene	mg/kg dry wt	0.01	0.050	0.13	<0.010	<0.010	0.035
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	0.01	1.7	0.85	<0.010	<0.010	0.18
Naphthalene	mg/kg dry wt	0.01	0.022	0.014	<0.010	<0.010	<0.010
Phenanthrene	mg/kg dry wt	0.01	0.90	1.7	<0.010	<0.010	0.33
Pyrene	mg/kg dry wt	0.02	3.4	2.5	<0.020	<0.020	0.42
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	0.03	3.0	1.8	0.030	0.030	0.29
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	0.01	3.0	1.8	<0.010	<0.010	0.29
Anthracene-d10 (Surrogate)	%	1	85	91	93	89	89

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			TP6_1.7	TP7_1.5	TP7_3.1	TP8_0.4	TP8_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-13	21-21190-15	21-21190-16	21-21190-18	21-21190-19
1-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	0.063	0.014	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	0.047	0.010	<0.010	<0.010
Acenaphthene	mg/kg dry wt	0.01	<0.010	0.22	0.054	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	0.01	<0.010	0.74	0.30	<0.010	<0.010
Anthracene	mg/kg dry wt	0.01	0.011	1.0	0.44	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	0.02	0.10	6.7	3.2	<0.020	0.032
Benzo[a]pyrene	mg/kg dry wt	0.01	0.19	10	5.3	0.019	0.045
Benzo[b]&[j]fluoranthene	mg/kg dry wt	0.02	0.19	9.3	4.8	0.021	0.049
Benzo[g,h,i]perylene	mg/kg dry wt	0.02	0.15	6.6	3.4	<0.020	0.033
Benzo[k]fluoranthene	mg/kg dry wt	0.01	0.082	3.8	1.9	0.012	0.030
Chrysene	mg/kg dry wt	0.01	0.14	6.1	3.0	0.017	0.046
Dibenz(a,h)anthracene	mg/kg dry wt	0.01	0.031	1.5	0.80	<0.010	<0.010
Fluoranthene	mg/kg dry wt	0.02	0.26	13	6.2	0.032	0.10
Fluorene	mg/kg dry wt	0.01	<0.010	0.28	0.073	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	0.01	0.14	7.0	3.7	0.015	0.032
Naphthalene	mg/kg dry wt	0.01	<0.010	0.078	0.029	<0.010	<0.010
Phenanthrene	mg/kg dry wt	0.01	0.076	5.4	1.6	0.010	0.043
Pyrene	mg/kg dry wt	0.02	0.30	15	7.3	0.035	0.11
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	0.03	0.27	15	7.5	0.040	0.070

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			TP6_1.7	TP7_1.5	TP7_3.1	TP8_0.4	TP8_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	07/05/2021	07/05/2021
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	0.01	0.27	15	7.5	0.020	0.060
Anthracene-d10 (Surrogate)	%	1	89	88	87	88	88

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			TP9_1.0	TP9_2.5	TP9_4.0	TP10_1.9	TP10_2.8
Date Sampled			07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-20	21-21190-22	21-21190-24	21-21190-27	21-21190-28
1-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	<0.010	<0.011	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	<0.010	<0.011	<0.010	<0.010
Acenaphthene	mg/kg dry wt	0.01	<0.010	<0.010	<0.011	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	0.01	0.026	0.016	<0.011	<0.010	<0.010
Anthracene	mg/kg dry wt	0.01	0.039	0.046	<0.011	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	0.02	0.20	0.20	<0.020	<0.020	<0.020
Benzo[a]pyrene	mg/kg dry wt	0.01	0.37	0.28	<0.011	<0.010	<0.010
Benzo[b]&[j]fluoranthene	mg/kg dry wt	0.02	0.37	0.29	<0.020	<0.020	<0.020
Benzo[g,h,i]perylene	mg/kg dry wt	0.02	0.29	0.20	<0.020	<0.020	<0.020
Benzo[k]fluoranthene	mg/kg dry wt	0.01	0.16	0.12	<0.011	<0.010	<0.010
Chrysene	mg/kg dry wt	0.01	0.26	0.26	<0.011	<0.010	<0.010
Dibenz(a,h)anthracene	mg/kg dry wt	0.01	0.059	0.040	<0.011	<0.010	<0.010
Fluoranthene	mg/kg dry wt	0.02	0.47	0.57	<0.020	<0.020	<0.020
Fluorene	mg/kg dry wt	0.01	<0.010	<0.010	<0.011	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	0.01	0.26	0.19	<0.011	<0.010	<0.010
Naphthalene	mg/kg dry wt	0.01	<0.010	<0.010	<0.011	<0.010	<0.010
Phenanthrene	mg/kg dry wt	0.01	0.12	0.18	<0.011	<0.010	<0.010
Pyrene	mg/kg dry wt	0.02	0.55	0.61	<0.020	<0.020	<0.020
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	0.03	0.54	0.41	0.030	0.030	0.030
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	0.01	0.54	0.41	<0.010	<0.010	<0.010
Anthracene-d10 (Surrogate)	%	1	85	89	93	88	90

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			TP11_0.7	TP11_0.9	TP12_0.5
Date Sampled			07/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-29	21-21190-30	21-21190-31
1-Methylnaphthalene	mg/kg dry wt	0.01	0.037	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	0.01	0.026	<0.010	<0.010
Acenaphthene	mg/kg dry wt	0.01	0.14	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	0.01	0.39	<0.010	<0.010
Anthracene	mg/kg dry wt	0.01	0.65	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	0.02	3.3	<0.020	<0.020
Benzo[a]pyrene	mg/kg dry wt	0.01	4.6	<0.010	<0.010
Benzo[b]&[j]fluoranthene	mg/kg dry wt	0.02	4.4	<0.020	<0.020
Benzo[g,h,i]perylene	mg/kg dry wt	0.02	3.8	<0.020	<0.020
Benzo[k]fluoranthene	mg/kg dry wt	0.01	1.8	<0.010	<0.010
Chrysene	mg/kg dry wt	0.01	3.0	<0.010	<0.010

Polycyclic Aromatic Hydrocarbons - Soil

Client Sample ID			TP11_0.7	TP11_0.9	TP12_0.5
Date Sampled			07/05/2021	07/05/2021	07/05/2021
Dibenz(a,h)anthracene	mg/kg dry wt	0.01	0.89	<0.010	<0.010
Fluoranthene	mg/kg dry wt	0.02	6.8	<0.020	<0.020
Fluorene	mg/kg dry wt	0.01	0.19	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	0.01	3.9	<0.010	<0.010
Naphthalene	mg/kg dry wt	0.01	0.039	<0.010	<0.010
Phenanthrene	mg/kg dry wt	0.01	3.5	<0.010	<0.010
Pyrene	mg/kg dry wt	0.02	7.5	<0.020	<0.020
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	0.03	7.0	0.030	0.030
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	0.01	7.0	<0.010	<0.010
Anthracene-d10 (Surrogate)	%	1	90	93	87

Moisture Content

Client Sample ID			TP1_0.7	TP1_1.6	TP2_0.9	TP2_1.00	TP3_0.4
Date Sampled			06/05/2021	06/05/2021	06/05/2021	06/05/2021	06/05/2021
Analyte	Unit	Reporting Limit	21-21190-1	21-21190-2	21-21190-3	21-21190-4	21-21190-5
Moisture Content	%	1	19	30	20	18	16

Moisture Content

Client Sample ID			TP3_1.0	TP4_0.8	TP4_1.45	TP5_0.4	TP6_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	06/05/2021	06/05/2021
Analyte	Unit	Reporting Limit	21-21190-6	21-21190-8	21-21190-9	21-21190-10	21-21190-12
Moisture Content	%	1	21	24	16	28	24

Moisture Content

Client Sample ID			TP6_1.7	TP7_1.5	TP7_3.1	TP8_0.4	TP8_1.0
Date Sampled			06/05/2021	06/05/2021	06/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-13	21-21190-15	21-21190-16	21-21190-18	21-21190-19
Moisture Content	%	1	20	10	20	25	25

Moisture Content

Client Sample ID			TP9_1.0	TP9_2.5	TP9_4.0	TP10_1.9	TP10_2.8
Date Sampled			07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-20	21-21190-22	21-21190-24	21-21190-27	21-21190-28
Moisture Content	%	1	28	28	40	27	35

Moisture Content

Client Sample ID			TP11_0.7	TP11_0.9	TP12_0.5
Date Sampled			07/05/2021	07/05/2021	07/05/2021
Analyte	Unit	Reporting Limit	21-21190-29	21-21190-30	21-21190-31
Moisture Content	%	1	8	23	25

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-concentrated 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)
PAH in Soil	Solvent extraction, silica cleanup, followed by GC-MS analysis. Benzo[a]pyrene TEQ (LOR): The most conservative TEQ estimate, where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the TEQ for that PAH. Benzo[a]pyrene TEQ (Zero): The least conservative TEQ estimate, PAHs reported as less than the limit of reporting (LOR) are not included in the TEQ calculation. Benzo[a]pyrene toxic equivalence (TEQ) is calculated according to ' <i>Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health</i> '. Ministry for the Environment. 2011. (In accordance with in-house procedure).
Moisture	Moisture content is determined gravimetrically by drying at 103 °C.



Emily Hanna, B.Sc.

Trace Elements Team Leader



Rong Zhang

Technician



Certificate of Analysis

Page 1 of 3

Client:	Pattle Delamore Partners Limited	Lab No:	2610504	A2Pv2
Contact:	R Lidgard	Date Received:	13-May-2021	
	C/- Pattle Delamore Partners Limited	Date Reported:	19-May-2021	(Amended)
	PO Box 9528	Quote No:	81087	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	A03691100	
		Submitted By:	Myra Belkot	

Sample Type: Soil

Sample Name:	TP7_1.7				
	06-May-2021				
Lab Number:	2610504.1				
Asbestos Presence / Absence	Asbestos NOT detected.	-	-	-	-
Description of Asbestos Form	-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	-	-	-	-
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	-	-	-	-
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	-	-	-	-
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	-	-	-	-
As Received Weight	g 804.9	-	-	-	-
Dry Weight	g 709.5	-	-	-	-
Moisture	% 12	-	-	-	-
Sample Fraction >10mm	g dry wt 73.4	-	-	-	-
Sample Fraction <10mm to >2mm	g dry wt 221.7	-	-	-	-
Sample Fraction <2mm	g dry wt 413.2	-	-	-	-
<2mm Subsample Weight	g dry wt 53.0	-	-	-	-
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001	-	-	-	-
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt < 0.00001	-	-	-	-
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	-	-	-	-

Glossary of Terms

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
- Trace - Trace levels of asbestos, as defined by AS4964-2004.

For further details, please contact the Asbestos Team.

Please refer to the **BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil.**

<https://www.branz.co.nz/asbestos>

The following assumptions have been made:

1. Asbestos Fines in the <2mm fraction, after homogenisation, is evenly distributed throughout the fraction
2. The weight of asbestos in the sample is unaffected by the ashing process.

Results are representative of the sample provided to Hill Laboratories only.



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Analyst's Comments

Amended Report: This certificate of analysis replaces report '2610504-A2Pv1' issued on 18-May-2021 at 2:25 pm.
Reason for amendment: Updated sample ID and Client Reference as requested.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Wgt of Asbestos as Asbestos Fines in <10mm >2mm Fraction*	Measurement on analytical balance, from the <10mm >2mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.00001 g dry wt	1
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1
Moisture	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1
Sample Fraction >10mm	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1
Sample Fraction <10mm to >2mm	Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1
Sample Fraction <2mm	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1
Weight of Asbestos in ACM (Non-Friable)	Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
Asbestos in ACM as % of Total Sample*	Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1
Weight of Asbestos as Fibrous Asbestos (Friable)	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
Asbestos as Fibrous Asbestos as % of Total Sample*	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
Asbestos as Asbestos Fines as % of Total Sample*	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed on 18-May-2021. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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Rhodri Williams BSc (Hons)
Technical Manager - Asbestos



Certificate of Analysis

Page 1 of 2

Client:	Pattle Delamore Partners Limited	Lab No:	2610941	A2Pv3
Contact:	R Lidgard	Date Received:	13-May-2021	
	C/- Pattle Delamore Partners Limited	Date Reported:	21-May-2021	(Amended)
	PO Box 9528	Quote No:	81087	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	A03691100	
		Add. Client Ref:	Date Sampled 6-7/5/21	
		Submitted By:	Myra Belkot	

Sample Type: Building Material

Sample Name	Lab Number	Sample Category	Sample Weight on receipt (g)	Asbestos Presence / Absence	Description of Asbestos in Non Homogeneous Samples
TP7	2610941.1	Fibre Cement	29.40	Amosite (Brown Asbestos) detected. Chrysotile (White Asbestos) detected.	-
ASB001	2610941.2	Fibre Cement	40.84	Amosite (Brown Asbestos) detected. Chrysotile (White Asbestos) detected.	-

Glossary of Terms

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
- Trace - Trace levels of asbestos, as defined by AS4964-2004.

For further details, please contact the Asbestos Team.

Analyst's Comments

Amended Report: This certificate of analysis replaces report '2610941-A2Pv2' issued on 19-May-2021 at 12:08 pm.
Reason for amendment: Updated sample name as requested.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Building Material

Test	Method Description	Default Detection Limit	Sample No
Asbestos in Bulk Material			
Sample Category	Assessment of sample type. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	-	1-2
Sample Weight on receipt	Sample weight. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.01 g	1-2
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-2
Description of Asbestos in Non Homogenous Samples	Form, dimensions and/or weight of asbestos fibres present. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	-	1-2



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 14-May-2021 and 15-May-2021. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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Mahaleel (May) Alfante BSc, PGDipSci
Laboratory Technician - Asbestos