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Alex Moore Park Development

Alex Moore Park Development, Detailed Site Investigation

Alex Moore Park Sport and Community Board

19 September 2017

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Aurecon New Zealand Limited

Spark Central
Level 8, 42-52 Willis Street
Wellington 6011

PO Box 1591
Wellington 6140
New Zealand

T +64 4 472 9589
F +64 4 472 9922
E wellington@aurecongroup.com
W aurecongroup.com

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Author signature	Nick King	Approver signature	Timothy Dee
Name	Nick King, C.Env	Name	Tim Dee, C.Chem
Title	Contaminated Sites Specialist	Title	Associate, Contaminated Land

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Executive Summary

Alex Moore Park Sport and Community Board engaged Aurecon to undertake a contaminated site assessment (a Detailed Site Investigation, DSI) to support development of a car park and a new two-storey building incorporating community clubrooms and a gym within Alex Moore Park, which is owned by Wellington City Council and is in use for public recreation. The park, which covers an area of 3.4 hectares, is divided into two terraces separated by an approx. 3.5 m high bank falling from the southern area towards the northern area.

The proposed development is to be constructed on the lower terrace on the car park located off Bannister Avenue in the northwestern part of the park. The proposed building is to be located such that the southern part of the building will penetrate the bank separating the two terraces, necessitating earthworks to excavate a large lateral space into the upper terrace.

This DSI was designed using the findings of the Preliminary Site Investigation (PSI) issued by Aurecon in 2016, along with geotechnical assessments issued by Aurecon in 2016 and 2010. These reports collated historical, environmental and geological data. The reports confirm several potentially contaminating activities (recognised by the MfE as 'HAILs') associated with current and historic industrial land uses within the study area, and the presence of waste materials and localised contaminated soil, that presents potential risk to the proposed development.

Intrusive ground investigation was undertaken, comprising five machine-excavated test pits, to allow characterisation of surficial and deeper fill material that will be excavated as part of the lateral earthworks into the upper terrace, and to make a preliminary assessment of the presence of contaminated material requiring disposal, and that could lead to risks from soil vapours which could potentially enter interior spaces within the proposed development.

The investigation confirmed the ground model assumed by the PSI and previous geotechnical reports, which comprises topsoil over a fill layer containing anthropogenic materials, underlain by Alluvium, and Greywacke bedrock at depth. This investigation did not encounter the Alluvium or bedrock, but did identify a thin topsoil layer underlain by a layer of silty and sandy fill up between approximately 3.5 – 4 m thick. This was underlain by a silty layer containing a very high proportion of (≥ 30%) anthropogenic materials, so was identified as a separate 'refuse' layer within the fill. This layer was observed to up to 0.6 m thick, but this was constrained by test pit depth and the layer is likely to be significantly thicker, potentially in the range of 2 – 3 m.

Laboratory analysis of soil indicates elevated heavy metals low concentrations of hydrocarbons. No detectable concentrations of volatile organic contaminants were reported, and none of the soil samples were found to contain asbestos. None of the detected contaminants exceeded Tier 1 human health criteria, but metals, and hydrocarbons were found to exceed background concentrations, and metals exceeded ecological screening criteria, in several locations. Class B landfill criteria were exceeded in multiple locations, and several metals were reported to exceed Class A (hazardous) landfill criteria. The highest concentrations of contaminants were associated with the 'refuse' layer.

A CSMP will be issued when the final development location (and therefore the earthworks requirements) have been decided.

We consider risks to development of the site to be significant, with specific engineering requirements likely to be required in order to manage risk from the ground conditions. Potential risks to excavations workers from the 'refuse' during earthworks, future site users from ingressing ground gas, and site infrastructure (particularly curing concrete) from hydrocarbons are among the issues which will need to be addressed by the design. We consider that consent under the NES will be required for the development, and groundwater monitoring may also be required for the wider site to be a permitted activity by the Greater Wellington Regional Plan. Further testing of soils for hazardous landfill disposal is also likely to be required to off-site disposal to be undertaken.

Contents

1 Introduction

Alex Moore Park Sport and Community Board ('the client') engaged Aurecon Group NZ Ltd (Aurecon) to undertake a Detailed Site Investigation (DSI) for a new sports complex at Alex Moore Park, Johnsonville, Wellington 6037 ('the site').

1.1 Proposed Works

The client intends to develop a new sports complex, which will consist of a single, two-storey building incorporating community clubrooms and a gym, in the northwest part of Alex Moore Park, in addition a new car park will be created. The footprint of the proposed development location is partially on the car park that is located off Bannister Avenue, and partially within the sports field located to the immediate south of the car park (this is discussed in more detail below).

Figure 1 shows the full extent of Alex Moore Park and its setting within Johnsonville, and Figure 2 shows the location of the proposed development and the layout of the upper and lower terraces within the park. Site layout plans and architectural drawings of the proposed development are provided in Appendix A.

Figure 1 **Boundary of Alex Moore Park shown in red. Johnsonville Town Centre is in the northeast (Image courtesy of http://wellington.govt.nz/webmap/wccmap.html)**

Figure 2 **Approximate location of proposed development and relative locations of the upper and lower terraces. Note that the car park is not present in this image (Image courtesy of http://wellington.govt.nz/webmap/wccmap.html)**

Alex Moore Park is divided into several levels with an approximately 3.5 m high bank separating the higher 'upper terrace' at the southern end of the park from the lower-lying 'lower terrace' at the northern end. The new building is proposed to be constructed at the level of the car park ('lower terrace') but the building will straddle the bank separating the terraces and therefore a significant part of the building will 'penetrate' into the upper terrace. As such, significant earthworks will be required to cut laterally into the 'upper terrace' to accommodate the new building.

Aurecon was engaged to carry out a geotechnical investigation for the site in 2016[1] (refer to Section 3.5) but since completion of that investigation the footprint of the proposed development has been moved by approximately 5 m to the south / southwest (primarily to avoid disturbance of major services that were identified as being present underneath the car park to north). The penetration into the upper terrace is therefore now significantly greater than had been initially proposed.

1.2 Previous Contamination Assessment

While the site is not registered on the SLUR, a review of the proposed site has identified a historical and current "sports turf" land use. Therefore, the site is known to contain a HAIL activity (A10 sports turf), as with many other sports fields in the vicinity of the site. Sports turfs are recognised by the MfE as a '*HAIL' (Hazardous Activity and Industry List*) activity (A10) with potential to cause soil contamination that presents a risk to human health and the environment. As such, the site can be defined under the *National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (the 'NES'*) regulations (2011) as a 'piece of land'. Any proposed soil disturbance and/or removal activity that may be expected as part of the proposed development is likely to trigger NES permitted activity criteria and resource consent will be required.

[1] Aurecon (2016) Alex Moore Park Community Clubrooms and Gym, Geotechnical Investigation Report

In addition, intrusive investigations at the site and discussed in the Preliminary Site Investigation (PSI) issued by Aurecon in September 2016 (Ref. R1 252094 PSI) identified that anthropogenic materials (including glass and metal), contaminated soil and strong odours (hydrocarbon and 'chemical') were present in soil between depths of approximately 2 and 8 metres below ground level (m bgl). This is strongly indicative of HAIL activity G5, waste disposal to land and may indicate HAIL activity G3 landfill sites.

In addition to the NES, potential contamination associated with historical uses may also present a risk to the health of construction workers (not currently legislated by the NES) and nearby environmental receptors; legislated in accordance with the Proposed Natural Resources Plan for the Wellington Region and the Greater Wellington Regional Discharges to Land Plan Updated July 2014.

A DSI is therefore required due to the planned earthworks and to assess the potential risk to human health and environmental receptors as a result of historical potentially contaminating activities.

1.3 Objective and Scope

This contamination assessment is being provided for the benefit of Alex Moore Park Sport and Community Board (a charitable trust), who are developing the new community clubrooms and gym on a plot of land within Alex Moore Park. The ownership of the land (comprising the plot of land for development, and the wider Alex Moore Park landholding) will remain with Wellington City Council (WCC) during development of, and following completion of the new sports complex.

This contamination assessment was undertaken to assess the risk to human health, ecological receptors and the built environment as a result of the proposed development works, and included soil sampling to assess contamination conditions.

This assessment comprises a review of the desktop study (refer to Section 3.5) with incorporation of updated background information and supplementary soil sampling to confirm conditions. The Aurecon 2016 PSI report should be read in conjunction with this document.

The following scope of works was undertaken:

- Soil sampling via mechanically-excavated test pits in five locations in the upper terrace where earthworks will be required to create a cutting;
- Use of a Photo-Ionisation Detector (PID) to assess the presence of volatile compounds in soil;
- Analysis of soil samples at an accredited laboratory for identified contaminants of concern; and
- Review and assessment of analytical results.

This assessment has been conducted in accordance with Ministry for the Environment *Contaminated Land Management Guidelines*, within the framework of the *Resource Management Act 1991*. This assessment has been undertaken, and reviewed and verified by Suitably Qualified and Experienced Practitioners (SQEPs).

2 Site Setting

2.1 Site Location

Alex Moore Park comprises approximately 3.4 hectares of publicly-accessible sports fields and recreational land owned by WCC, and is located approximately 500 m to the southwest of Johnsonville Town Centre. Johnsonville is a suburban centre located approximately 8 km north of the Wellington Central Business District, as shown in Figure 3.

Figure 3 Site location (Image courtesy of LINZ Data Service)

The development site, which covers an area of approximately 0.95 hectares (9,500 m^2), is located in the northwestern part of Alex Moore Park. The legal description of the properties that the development site covers are described as Lots 8 to 21 DP 2107, which includes the car park that the northern part of the development will partially occupy.

Bannister Avenue runs to the immediate west of the development area and forms the western boundary of Alex Moore Park. The majority of the surrounding site use is residential, and the Wellington-Johnsonville railway line runs north-south approximately 400 m to the east of the development site.

2.2 General Site Description

The development site is currently partially in use as the main car park serving Alex Moore Park, and partially in use as the northwest sports field (marked out as a football pitch at the time of the investigation) located on the upper terrace.

As described, the site is divided into two terraces separated by an approximately 3.5 m bank falling from the southern area of the site towards the northern area; each area of site is relatively level. The site is built up from the surrounding topography with an engineered slope down to Bannister Avenue. The engineered slope is thought to have been constructed during site levelling to develop playing fields. The regional topography slopes in a general northerly direction with hills to the east and west.

2.3 Geological and Hydrogeological Setting

The *1:50,000 'Geology of the Wellington Area' map (Institute of Geological and Nuclear Sciences, 1996)* describes the regional geology of the site as being '*Alluvium, silt, peat, and loess, including Haywards and Kaitoke gravels and subsurface Moera Gravel; sand; minor tephra, principally Rangitawa Tephra, on erosion surface*' (which comprises the majority of the site, including the development area) and Alluvium (two north-south trending strips at the east and western extremes of the site).

The geology beneath the site was described by Aurecon (2010; refer to Section 3.5) as follows:

- Fill from 0.0 – 3.0 m bgl, consisting of silty sand, sandy silt, silt and silty clay; and
- Alluvium from 3.0 – 3.2 m bgl (assumed to extend to greater depth), consisting of clayey silt.

Further geotechnical investigations undertaken by Aurecon in 2016 (refer to Section 3.5) which described the site ground conditions as:

- Fill from 0.0 – 6.0 m bgl, consisting of silt and clay;
- Alluvium from 6.0 – 15.1 m bgl, consisting of silty clay and sandy silt; and
- Greywacke bedrock from 15.1 m bgl to depth.

There are no significant freshwater watercourses or bodies of freshwater located within approximately 500 m of the site. The nearest major surface water body is Wellington Harbour which is located approximately 6 km to the east / southeast of Alex Moore Park.

Groundwater was identified in the 2016 Aurecon geotechnical investigation as being present within alluvium and fractured greywacke beneath the site. Regional groundwater flow is likely to be to the east towards the Wellington Harbour. However, there may be significant local variation due to the complex topography between the site and the Wellington foreshore and local geological heterogeneities.

The geotechnical investigations undertaken by Aurecon in 2010 and 2016 (refer to Sections 3.6.2 and 3.6.3) identified waste materials within fill material, as well as olfactory indicators of contaminants. This indicates that there is a potential for contaminants to migrate vertically to the water table from waste material present within the fill material.

2.4 Sensitive Aquifer Assessment

An assessment to establish whether the shallow aquifer below the site is a 'sensitive aquifer' has been undertaken and the results are provided in Table 1. It is noted that an aquifer is sensitive when either all of the first three criteria are met or the fourth criterion is met in accordance with *Module 5.2.3* of the *Ministry for the Environment (MfE), 2011 Guidelines for managing petroleum hydrocarbon contaminated sites*.

Table 1 Sensitive aquifer assessment

Criteria	Assessment
The aquifer is not artesian or confined; and	Yes – the aquifer is not artesian and is unconfined.
The aquifer is expected to be less than 10 m below the potential suspected source of contamination; and	Yes – perched groundwater may be present within Alluvium, but the aquifer is located within bedrock and so the groundwater surface is expected to be between 7 and 10 m bgl.
The aquifer is of quality appropriate for use, can yield water at a useful rate and is in an area where abstraction and use of groundwater may be reasonably foreseen; or	No – no groundwater bores or Consents for domestic supply, or irrigation/other agricultural use was recorded on the GWRC SLUR for the site. Three consents (two active, one expired) for 'Surface Water Diversion', 'Streamwork' and 'Reclamation' are recorded in the SLUR approximately 200 m north / northeast of the development area. These appear unlikely to be related to water supply. Refer to Section 3.2.
The source of contamination is less than 100 m from a sensitive receptor	No – no sensitive surface water receptors have been identified in close proximity to the site, and Wellington Harbour (the basin into which groundwater will eventually drain) is located approximately 6 km to the east / southeast.

Based on the above criteria, the aquifer is classified as **not sensitive** for the purpose of this assessment.

3 Site History and Record Search Review

This section includes a review and summary of previous assessments relating to the areas of investigation and information to supplement the findings of the previous reports including that held by the local councils, former ownership and publically available historical aerial photographs.

3.1 Greater Wellington Regional Council Selected Land Use Register (GWRC SLUR) – HAIL Sites

A search was undertaken of the GWRC online SLUR for the site, and this identified that the site is not recorded as having had activities listed as HAIL.

3.2 Previous Reports

Investigations undertaken by Aurecon in 2010 and 2016 reviewed historical information and undertook intrusive investigations that indicated that HAIL categories may be applicable to the site. These categories are as follows:

- A10 – Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds. While the site is not registered on the SLUR, a review of the proposed site has identified a historical and current "sports turf" land use. Therefore, the site is known to contain a HAIL activity;
- E1 – Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition. The disposal of uncontrolled waste to ground during approximately the 1930s – 50s (see below and Section 4.2) could have potentially have included Asbestos Containing Materials (ACM) and material (such as demolition rubble) that incorporates asbestos fibres;
- G5 – Waste disposal to land (excluding where biosolids have been used as soil conditioners) (G3 – Landfill Sites may also be applicable). Review of historical data indicates that landfilling of uncontrolled waste materials was undertaken during development of the site in approximately the 1930s – 50s. Uncontrolled fill material, which could include demolition rubble, domestic refuse and hazardous wastes, could potentially contain contaminants including (but not limited) asbestos, heavy metals, hydrocarbons and solvents;
- I – Any other land that been subject to intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health of the environment. This category relates to the emplacement of uncontrolled fill material, the nature of which is not understood and therefore this category captures the wide scope of risk to human health and the environment.

3.3 GWRC Database – Consents and Bores

A search of the GWRC Resource Consents and Wells database (which provides data on water take consents, resource consents, wells and bores) was undertaken and identified the following consents within 500m of the site:

- Consent File Number: WGN060081 (approximately 200 m north), Activity Type: WP – SURFACE WATER DIVERSION, Status: Granted, Commencement: 08/05/2006;
- Consent File Number: WGN060081 (approximately 200 m north), Activity Type: WP – STREAMWORK, Status: Granted, Commencement: 08/05/2006;

- Consent File Number: WGN060081 (approximately 200 m north), Activity Type: WP – RECLAMATION, Status: Expired, Commencement: 08/05/2006;
- Consent File Number: WGN99015001 (approximately 400 m north), Activity Type: WP – SURFACE WATER DIVERSION, Status: Granted, Commencement: 24/02/1999;
- Consent File Number: WGN99015002 (approximately 400 m north), Activity Type: LUC – RIVER CROSSING, Status: Granted, Commencement: 24/02/1999;
- Consent File Number: WGN99004201 (approximately 400 m west), Activity Type: LUC – RIVER CROSSING, Status: Granted, Commencement: 28/10/1998;
- Consent File Number: WGN99004202 (approximately 400 m west), Activity Type: WP – SURFACE WATER DIVERSION, Status: Granted, Commencement: 28/10/1998;
- Consent File Number: WGN070240 (approximately 520 m northeast), Activity Type: WP – GROUNDWATER TAKE, Status: Expired, Commencement: 14/05/2007; and
- Consent File Number: WGN070240 (approximately 520 m northeast), Activity Type: LUC - BORES, Status: Expired, Commencement: 14/05/2007.

3.4 Historical Ownership

A review of Council-held files was undertaken as part of the Aurecon's PSI to assess the potential for former land owners to have undertaken activities onsite that may have resulted in contamination. In summary the site (and parts of the site) have been owned by the following industries and users (note that dates and durations of ownership are approximate):

- The earliest reference to the site is the Gazette extract from April 1906 vesting the land in the Johnsonville Town Board as recreation and pleasure grounds.
- The Jonesville (*likely to be an archaic spelling*) Town Board records are disparate although there is a correspondence file from the 1920s that largely deals with loan repayments, but did have a list of subscriber funds for levelling and upgrading works at Alex Moore Park.
- Site levelling works commenced in 1930s under subsidised labour which was completed in the mid-1940s. In the mid-1940s the military (either the United States or New Zealand militaries, or potentially both) occupied Alex Moore Park and carried out restorative works when they left in 1945.
- The Waste Operations department of WCC has indicated that records for the site show that only cleanfill material was ever used at the site during earthworks in the 1930s – 50s, we note that filling records from this period generally have poor reliability.

3.5 Historical Aerial Photographs

Six historical aerial photographs (all of which were supplied by Opus International Consultants) were reviewed in the Aurecon's PSI and a summary is presented in Table 2:

Table 2 Summary of historical aerial photographs

Year	Observations
1945	The photograph shows the majority of the site pre-development, the northern portion of Alex Moore Park appears to be playing fields with a clubrooms building in the north eastern corner. Major earth works are being undertaken through the centre of the park with two small buildings located close to the north western boundary, the remainder of site appears to be utilised for grazing or scrubland.
1954	Major earthworks appear to be continuing through the centre and along the western boundary of Alex Moore Park, portions of the northern and southern areas of the park appear to be used as sports fields. Note that the 1945 and 1954 images show fill materials which appear to be soil.
1962	Alex Moore Park has been fully developed into playing fields apart from the north western corner which still contains two small buildings. A second clubroom-type building has been constructed along the eastern site boundary and in the south western site corner.

Year	Observations
1973	The site remains relatively unchanged apart from the demolition of the buildings in the north western corner which have been replaced with apartment blocks.
1984	No significant changes relative to 1973.
1992	No significant changes relative to 1984.

Based on these observations there have not been significant changes to the site since approximately the early 1970s.

3.6 Previous Reporting and Investigations

A total of three desk-based studies and intrusive investigation have been undertaken for the site; summaries of these reports are provided in the following subsections.

3.6.1 Aurecon Preliminary Site Investigation (September 2016)

This PSI (Ref. R1 252094 PSI) was undertaken to support the resource consent application for the proposed new clubrooms and gymnasium, and is the supporting document to this DSI. This PSI brought together the historical and background information on the development site (summarised in the preceding subsections).

The key findings were that the site is not recorded on the GWRC SLUR, has been in use as playing fields since the 1950s, and historical aerial photographs and geotechnical investigations have identified that waste materials (of unknown origin) may have been emplaced in the ground as part of earthworks to build up the site. HAIL category I was assigned to the site given the likely presence of wastes at depth in the ground.

A preliminary risk assessment was carried out as part of this PSI, which identified that there is overall a moderate risk level, which is primarily relevant to construction and maintenance workers, future site users and the built environment. Asbestos, heavy metals and persistent hydrocarbons were identified as contaminants of concern, but ground gas generated by the presence of waste materials was highlighted as one of the key future risks to the built environment.

The PSI provided a basic Contaminated Site Management Plan (CSMP, which is to be updated and reissued as a standalone document as part of this DSI) and recommendations for implementation of gas protection measures for the proposed development in line with Construction Industry Research and Information Association (*CIRIA) 665 Characteristic Situation 3 and BS8485 (2015)*.

3.6.2 Aurecon Geotechnical Investigation Report (July 2016)

Aurecon undertook a geotechnical investigation and issued a report (Ref. Alex Moore Park Geotechnical Investigation Report, Rev 1) in support of the development of the new clubrooms and gymnasium, and undertaken in parallel to the PSI. The ground investigation consisted of the following:

- Two mechanically drilled boreholes to a maximum depth of 15.1 m bgl with Standard Penetration Tests (SPT) at 1.5 m vertical intervals;
- BH-01 is the southernmost borehole located within the proposed building footprint on the upper terrace, and BH-02 is the northernmost borehole located within the building footprint on the lower terrace.
- Installation of groundwater monitoring piezometers to 15 m depth in the boreholes; and
- Seven cone penetration tests (CPT) to a maximum depth of 10.8 m.

The investigation found that ground conditions at the site were not consistent with the published geological information, with the borehole and CPT logs showing the site underlain by fill up to a depth of approximately 6 m bgl. Subsoil conditions indicated by the logs are summarised below:

- The borehole log BH-01 and BH-02 show 6 m and 4.5 m thick fill respectively. The fill was generally logged as clayey silt or silty clay. Much of the fill in BH-01 had a strong chemical odour with layers of very dark grey sand and rubbish material consisting of glass fragments, copper pieces, oily sand, etc.
- The fill is underlain by alluvium deposits comprising silty clay and sandy silt layers. They are logged as soft to very stiff and moderate to high plastic.
- Greywacke bedrock underlies the alluvium between 8.5 m (BH-01) and 6.7 m (BH-02) depths. It is generally highly to moderately weathered, weak, highly fractured siltstone.

The standpipe piezometers installed to 15 m depth, with screening between 10 and 15 m bgl, underwent a single round of monitoring on 26 June 2016. This identified the groundwater surface to be 7.2 m bgl in BH-01 (upper terrace), and 10.5 m bgl in BH-02 (lower terrace).

The most significant observations were chemical odours encountered in soils between 2.5 m and 7.5 m bgl with the strongest odours between 3.8 m and 6.0 m bgl. Between these depths the material was described as silty clay with dark grey sand with rubbish (including glass, copper, etc.) lenses up to 0.5 m thick and described as oily sand.

3.6.3 Aurecon Geotechnical Investigation Report (September 2010)

Aurecon undertook a geotechnical investigation and issued a report (Ref: 211384) in support of the upgrade of Alex Moore Park with the construction of an artificial sports field, a sports facility building and additional car parking (in an area located to the north / northeast of the development area). The ground investigation consisted of the following:

- Machine excavation of eight test pits to a maximum depth of 3.2 m bgl. Of the eight test pits excavated, TP4 and TP5 were the only test pits within the current proposed development area. In addition, TP5 was located within the building footprint on the upper terrace i.e. in the same area where test pits were excavated as part of the current investigation;
- Excavation by hand auger at seven locations to a maximum depth of 1.5 m bgl; and
- SPT at each test pit and hand auger location.

Over most of the site the target depth of the investigations was 1.5 m in order to assess the surficial ground conditions for car park pavement design and artificial sports field sub-base depth. However, investigations in the vicinity of the proposed sports facility building were targeted at 3 m depth in order to assess shallow foundation recommendations. The ground conditions encountered are summarised below:

- The ground conditions are generally consistent with published information with test pit logs showing that the site is predominantly covered in a shallow topsoil overlying light brown sandy silt fill material;
- The topsoil was logged as soft to firm dark brown silt and sand mixtures and was up logged as up to 0.7 m depth one location, but was no more than 0.3 m thick in all other areas;
- The fill was logged as light brown sandy silt in most locations and locally logged as silt or silty fine sand. Testing indicated that the silt was stiff to very stiff whilst the areas of sand were medium dense to dense;
- Alluvium was located in the base of TP4 and TP5 at 3.0 m and 2.2 m bgl, respectively. It was logged as greenish grey sandy silt and varied in consistency from firm to hard. The total depth of alluvium extended beyond the depth of this investigation;

- In the centre of the site (Locations HA2, HA6 and SP6) the investigations refused at 0.4 m to 0.8 m depth on what was inferred to be rock; and
- The ground water table was not located during these investigations. However, seepage was encountered in TP4 and TP5 at 3.0 and 0.6 m bgl, respectively.

The most significant observations of potential contamination were noted to be scrap metal encountered in soils between 2.2 and 2.3 m bgl in TP5, and was noted as having a strong hydrocarbon odour associated with it.

3.7 Summary of Potential Contaminating Sources

Based on the desk study review, a total of three HAIL activities have been identified to previously have taken place on the site. These HAIL activities are as follows:

- HAIL Category A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds. This HAIL category is associated with the potential application of fertilisers as part of its use as a sports field.
- HAIL Category E1: Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition. This HAIL category is associated with the potential disposal of fill material that may have included ACM.
- HAIL Category G5 – Waste disposal to land (excluding where biosolids have been used as soil conditioners) (G3 – Landfill Sites may also be applicable). This HAIL category is associated with the potential landfilling of uncontrolled wastes materials at the site during the development of the Alex Moore Park during approximately the 1950s.
- HAIL Category I – Any other land that been subject to intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health of the environment. This HAIL category is associated with the potential landfilling of uncontrolled wastes materials at the site during the development of the Alex Moore Park during approximately the 1950s.

4 Conceptual Site Model

Risk is assessed on the basis of a Conceptual Site Model (CSM) considering source–pathway–receptor linkages. Central to the requirements for the assessment of risk is the development of a CSM based on the existing available information.

4.1 Preliminary Ground Model

A preliminary ground model, compiled from previous intrusive site works, is presented in Table 3.

Table 3 Preliminary Ground Model (derived from Aurecon, 2016)

Geological Unit	Generalised Lithology	Depth below ground to top of layer	Thickness
Topsoil	Not stated; likely to be clayey silty material with rootlets and high organic content.	0 m bgl	0.1 m
Fill	Clayey silt to silty clay, some layers of rubbish / oily sand material.	0.1 m bgl	4.4 to 5.9 m
Alluvium	Clayey silt to silty clay, some wood fibres and pieces.	4.5 to 6.0 m bgl	2.2 to 2.5 m
Completely weathered greywacke rock	Clayey silt with some gravel.	5.5 m bgl	1.2 m
Greywacke rock	Highly to moderately weathered, weak siltstone.	6.7 to 8.5 m bgl	-

The groundwater surface was encountered in 2016 between 7.2 and 10.5 m bgl. The dominant flow direction is assessed to be east towards Wellington Harbour, but there is expected to be local heterogeneity in flow direction. Perched groundwater lenses are expected within the fill and Alluvium.

The predominance of clayey silty material in both fill and natural horizons suggest that the near-surface geology will have limited hydraulic conductivity, which may restrict groundwater movement and contaminant transport.

4.2 Contamination linkage assessment

This assessment was undertaken with consideration of the requirements of the proposed redevelopment of the site. Receptors considered to potentially be at risk from the proposed development and subsequent site use are:

- Future site users;
- Adjacent site users;
- Construction and maintenance workers;
- Surface water bodies (on-site stormwater system only, given that there are no nearby or adjacent surface water bodies);
- Groundwater;
- Future site infrastructure (such as foundations, buried services and utilities); and
- The appropriate on- or off-site management of excavated materials is also a key consideration.

The preliminary contamination linkage assessment has been developed from an assessment of potential sources of contaminants, potential exposure pathways, and feasible receptors. Table 4 presents the preliminary contamination linkage assessment (note that HAIL Categories G5 and I have been combined in this assessment).

Table 4 **Preliminary Contamination Linkage Assessment**

Site activity, likely affected areas and HAIL designation	Potential contaminants	Pathway	Critical Receptors	Comments
Residual concentrations of pesticides and heavy metals in shallow soil due to the application of chemicals for maintenance of the sports fields. All parts of the development footprint within the upper terrace are potentially impacted by these disposals. HAIL Category: A10	Organo-chlorine pesticides, heavy metals	Inhalation Ingestion Dermal Contact	Current site users Future site users Construction and maintenance workers Surface water	Pesticides and metal-bearing chemicals could feasibly have been applied to the ground surface, leading to accumulation in the upper soil profile over multiple applications.
ACM and / or asbestos dust / fibres within the soil matrix due to uncontrolled disposal of waste materials incorporating asbestos. All parts of the development footprint within the upper terrace are potentially impacted by these disposals. HAIL Category: E1	Asbestos	Inhalation	Current site users Future site users Adjacent site users Construction and maintenance workers	The disposal of uncontrolled waste to ground is understood to have taken place during approximately the 1930s – 50s, which is a period during which asbestos products were starting to be in widespread use. It is feasible that wastes such as demolition rubble, household refuse and other sources from the period of time may include asbestos.
Hazardous substances within the soil matrix due to uncontrolled disposal of waste materials. All parts of the development footprint within the upper terrace are potentially impacted by these disposals. HAIL Categories G5 (and potentially G3) and I	Various including heavy metals, hydrocarbons, solvents	Inhalation Ingestion Dermal Contact Leaching to groundwater and lateral migration from the site	Current site users Future site users Adjacent site users Construction and maintenance workers Groundwater Surface water Site Infrastructure	The disposal of uncontrolled waste to ground is understood to have taken place during approximately the 1930s – 50s, during which time controls on the disposals of waste were not stringent. As such, it is possible that a wide range of waste materials (including industrial and hazardous wastes) could be present.

5 Intrusive Investigations

The intrusive investigation, comprising the excavation of five test pits and soil sampling, was undertaken by an Aurecon contaminated sites specialist on 7 August 2017. All of the test pits were located on the upper terrace within the proposed building footprint. This is the location where excavation will be required to make way for the construction of the new building. All of the test pits were excavated into unsealed, grassed, soft ground currently in use as a sports field (refer to the figures in Appendix A). The results of this investigation will be used to make the following assessments:

- Current site users;
- Risks to construction workers during earthworks (bulk excavation and foundation installation) and building construction;
- Adjacent site users;
- Risks to future site users, particularly from ground gas;
- Groundwater quality and risk of off-site migration of contaminants;
- Risks to ecological and environmental receptors; and
- Management and disposal options for bulk soil that is to be excavated from the site (including assessment of scope for reuse of excavated materials on-site).

5.1 Investigation Approach

The intrusive investigation was undertaken using test pits. Test pitting allows observation of the geological profile and groundwater surface (where applicable) *in-situ,* including assessment of the presence of contaminated materials and anthropogenic materials, allowing sampling to be targeted accordingly.

A total of five test pits were completed by a subcontractor to Griffiths Drilling over a single day. All of the test pit excavations were carried out under the direct supervision of an Aurecon engineer, and the site was scanned for underground services and obstructions prior to excavation by Underground Service Locators based on available service plans, Ground Penetrating Radar (GPR) and a Cable Avoidance Tool (CAT).

All excavated soil was logged by an Aurecon engineer in general accordance with NZGS (2005) guidelines. Representative samples were also taken for environmental laboratory testing. Refer to Appendix A for the investigation location plan.

5.2 Sampling Methodology

5.2.1 Soil Sampling

Samples were collected from multiple depths within the test pits; this was steered by planned sampling frequency (i.e. sampling at regular and representative depth) and observations made during excavation and soil logging. In addition to sampling at regular and representative depths, samples were targeted to areas where evidence (visual and olfactory indicators, and 'head space' readings) of contaminants was observed, at the groundwater surface (where applicable), and where ground conditions and the underlying soil strata may have varied.

The ‘head space’ readings were taken by collecting soil samples (directly from the test pit walls at shallow depth, and the excavator bucket from greater depth in the test pits). The samples were placed into zip lock plastic bags and a PID was used to measure the presence of volatile compounds in the soil. The PID readings are included in Section 5.3. The soil used for ‘head space’ reading was disposed back into the test locations onsite and the used bags were appropriately managed.

Samples were collected in general accordance with Contaminated Land Management Guidelines (CLMG) Volume 5: *Site Investigation and Analysis of Soils.* Between each location, the sampling equipment was cleaned with Decon90 (phosphate free detergent) and disposable gloves were used to collect each sample to minimise the risk of cross contamination. Soil samples were placed directly into clean containers provided by the laboratory, which were then placed in a chilled container and sent to the laboratories under chain of custody documentation for analysis.

It is noted that in TP4 samples (‘FILL 1’ and ‘FILL 2’) were taken from a depth that was not precisely measured; this was due to pit wall collapses that made standing at the pit edge to take measurements hazardous. These samples clearly originated from the ‘Refuse Layer’ however, so their depth of origin can be estimated.

A total of 21 soil samples were collected from the test pits during the investigation. One of these samples were placed in cold storage at the lab, and may undergo future analysis, if required. The following describes the analyses that were carried out:

- 20 samples were analysed for heavy metals;
- 20 samples were analysed for Total Petroleum Hydrocarbons (TPH);
- 20 samples were analysed for Benzene, Toluene, Ethylbenzene and Xylenes (BTEX);
- 20 samples were analysed for Polycyclic Aromatic Hydrocarbons (PAH);
- 20 samples were analysed for Volatile Organic Compounds (VOC);
- 20 samples were analysed for Semi-Volatile Organic Compounds (SVOC);
- 20 samples were analysed for Organo-Chlorine Pesticides (OCP); and
- 20 samples were analysed for asbestos presence / absence (P/A).

5.3 Ground Conditions and Results of In-situ Testing

The area that underwent test pit investigation consisted of unsealed, soft, grassy silty topsoil at the surface. The topsoil was underlain by generally silt, silty clays and clays, with some limited anthropogenic materials starting to appear from approximately 3.0 m bgl. There was an abrupt transition to a silty layer with a very high concentration of anthropogenic material from approximately 3.7 – 4.3 m bgl (the ‘Refuse Layer’; see below). The Alluvium layer noted in previous investigations was not encountered during this intrusive investigation.

Table 5 is the ground model developed from logging of the test pits.

Table 5 Ground Model

Geological unit	Generalised lithology	Depth below ground level to top of unit (m bgl)	Thickness (m)
Topsoil	Grass at ground surface. Silt with trace sand and clay, very frequent rootlets.	0.0	0.1 – 0.15
Fill	Silt, sandy silt, silt with sand and clay, silty clay, clayey silt, clay. Trace anthropogenic material below approximately 3.0 m bgl, transitioning to very	0.1 – 0.15	3.6 – 4.15
Refuse Layer	Silt, silty clay, clayey silt with very frequent anthropogenic material (up to approx. 50% of soil mass made up of anthropogenic material).	3.7 – 4.3	0.2 – 0.6

The 'Refuse Layer' is described as a distinct geological layer, rather than being incorporated as part of the overlying fill layer, due to the abrupt transition with depth (from between 3.7 and 4.3 m bgl) into the material containing the refuse, and the high proportion of waste material contained within that layer.

Table 6 provides a summary of the locations and sample depths that refuse material or other evidence contamination was noted, along with corresponding PID readings obtained from head space tests. Test pit logs providing more detail of the soils encountered are attached in Appendix B.

Table 6 Soil sampling observations and PID readings of selected locations

Test Pit ID	Total Depth (m bgl)	Site observations	PID readings (max steady value, parts per million (ppm))
TP1	4.1	Occasional coarse brick fragments noted between 3.0 and 3.7 m bgl. Very frequent anthropogenic materials (timber sheet, metal piping, plastic piping, whole bricks and brick fragments) noted from 3.7 – 4.1 m bgl (base of excavation).	0.35 m bgl – 0.2 0.6 m bgl – 0.2 1.7 m bgl – 0.0 2.6 m bgl – 0.4 3.0 m bgl – 0.4 3.7 m bgl – 0.0 4.1 m bgl – 0.8
TP2	4.5	Very frequent anthropogenic materials (brick fragments, glass bottles, Paua shells / shell fragments, nails, metal wire, valve transistors, glass fragments, ceramic fragments, timber and animal bones) noted from 3.9 – 4.5 m bgl (base of excavation). A major pit wall collapse occurred when the excavation was at approximately 2.5 m bgl.	0.5 m bgl – 0.4 1.7 m bgl – 0.7 2.1 m bgl – 0.8 3.9 m bgl – 0.6 4.5 m bgl –0.4
TP3	4.3	Very frequent anthropogenic materials (crumpled metal ribbon, cloth, glass and brick fragments) noted from 4.0 – 4.3 m bgl (base of excavation). Groundwater seep noted at 0.7 m bgl. Smaller wall collapses occurring frequency at time hole has reached maximum depth.	0.5 m bgl – 0.0 1.2 m bgl – 0.4 3.2 m bgl – 0.6 4.0 m bgl – 0.7 4.3 m bgl – 1.0

Test Pit ID	Total Depth (m bgl)	Site observations	PID readings (max steady value, parts per million (ppm))
TP4	4.0 (approx.)	Very frequent anthropogenic materials (glass, metal / plastic crumpled metal ribbon, brick fragments) noted at approx. 4.0 m bgl (base of excavation). Water started pooling in base of hole at approximately 2.2 m bgl after 1 – 2 mins. Major pit wall collapses occurred between 2.2 – approx. 4.0 m bgl. Instability at pit edge made it hazardous to take depth measurements, so exact depth of anthropogenic material, 'FILL 1' and 'FILL 2' samples and base of pit not known. 'FILL 1' and 'FILL 2' were thus-named because the exact depth of their origin was not known, but the general material they were taken from was logged (refer to Appendix B) and from the layer that anthropogenic material was sourced from.	0.5 m bgl – 0.6 1.2 m bgl – 0.1 2.3 m bgl – 0.2 4.0 m bgl (approx.) – 0.1 4.0 m bgl (approx.) – 0.4
TP5	4.5	Very frequent anthropogenic materials (glass fragments, Paua shells / shell fragments, ceramic fragments, nails, timber, glass bottles and vials, brick fragments, crumpled metal ribbon, plastic) noted from 4.3 m bgl (base of excavation). Odour noted coming from soil at approximately 4.3 m bgl but PID did not register any elevated ambient reading. Possibly an 'anoxic' odour. Groundwater seep noted at 1.4 m bgl.	0.5 m bgl – 0.4 1.5 m bgl – 0.8 2.4 m bgl – 0.8 3.4 m bgl – 0.4 4.4 m bgl – 1.2

These waste materials observed in the 'Refuse Layer' appeared to be domestic-type refuse rather than of industrial origin (i.e. small plastic and metallic items, fabrics etc, rather than machinery parts or large metal drums, etc, that might be expected in waste from industrial sources). The majority of the thickness of the upper terrace (in terms of its elevation above the lower terrace) is made up of silty material which is largely free from refuse. This material contains only small and localised quantities of demolition wastes (brick fragments), and likely has a different origin, essentially forming a 'cap' over the layer of refuse material below.

The ground model produced by the 2016 geotechnical investigation indicates that the surface of the underlying alluvium (which was not encountered during this investigation) is present at between 4.5 and 6 m bgl, indicating that the 'landfill layer' varies in thickness from approximately 0 to 3 m, and is likely in most areas to be between 2 and 3 m thick.

The lateral extent of the landfill layer is unknown, however the logs for BH-02 (2016 investigation) in the lower terrace did not record any waste materials. This indicates that the 'landfill layer' does not extend beyond the embankment at the northern edge of the upper terrace. The only intrusive investigations undertaken outside the footprint of the proposed development but within the upper terrace were test pits as part of the 2010 investigation. However, these were not excavated to sufficient depth to encounter the 'landfill layer'.

No hydrocarbon or 'chemical' odours were noted from any of the soil, including the 'Refuse Layer', during this investigation and PID readings were uniformly low. No free-phase oil was noted in the soil matrix in any of the test pits. In addition, a large proportion of the anthropogenic material was observed to consist of inert materials such as glass and metal which are unlikely to produce volatiles.

The 'Refuse Layer' indicates that HAIL category G3 (Landfill Sites) is likely to be more applicable than G5 (Waste disposal to land (excluding where biosolids have been used as soil conditioners)) or I (Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment), as the distinct and (likely) widespread waste layer with an overlying capping layer suggest deliberate, mass waste disposal rather than localised or opportunistic disposals of limited waste volumes.

6 Analytical Results

The analytical results are summarised in the following sections for soil and groundwater. The laboratory transcripts are attached in Appendix C.

6.1 Assessment Criteria

The reported concentrations for each contaminant analyte were assessed against relevant human health and background levels selected from the following legislature / publications:

- MfE, 2011, Contaminated Land Management Guidelines (CLMG) No. 2, Hierarchy and Application in New Zealand of Environmental Guideline Values, ME No. 1072;
- Determination of Common Pollutant Background Soil Concentrations for the Wellington Region, URS 2003;
- Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, MfE 1999 (Revised 2011), Module 4 and Module 5 to assess human health for ongoing site use and excavation workers, protection of groundwater for soil samples and groundwater quality for groundwater samples;
- Landcare Research, 2016, User Guide: Background Soil Concentration and Soil Guidelines Values for the Protection of Ecological Receptors (Eco-SGVs) – CONSULTATION DRAFT;
- MfE, 2017, Landfill Waste Acceptance Criteria;
- MfE, 2002, A guide to the management of cleanfills;
- National Environmental Standard Soil Contaminant Standards for commercial/industrial and recreational land use; and
- Proposed Natural Resources Plan for the Wellington Region, Greater Wellington Regional Council 2015.

6.2 Heavy Metals

A total of 20 soil samples were analysed for 10 heavy metals (arsenic, beryllium, boron, cadmium, chromium, copper, lead, mercury, nickel and zinc). The results were compared to Tier 1 recreational human health screening criteria, the Wellington Regional Background concentrations for Greywacke soil, draft ecological screening criteria ('Eco-SGVs') for silt soil, and landfill criteria (the screening tables are provided in Appendix D). The results are summarised as follows:

- None of the samples contained heavy metal concentrations in excess of applicable Tier 1 human health criteria (Soil Contaminant Standards) for recreational site use.
- All of the samples submitted contained at least one metal (with the exception of beryllium) at a concentration in excess of the maximum published background concentration value for Greywacke soils in the Wellington Region.
- The concentration of chromium in all samples analysed and the concentration of nickel in 16 samples were found to be in excess of their corresponding published background concentration.
- The most significant background concentration exceedances were for lead, mercury and zinc.
- The largest exceedances for the lead maximum background value (78.8 mg/kg) were at TP1 at 4.1 m bgl (532 mg/kg), TP5 at 4.4 m bgl (403 mg/kg) and TP2 at 3.9 m bgl (318 mg/kg). The largest exceedance for the mercury maximum background value (0.2 mg/kg) was at TP4 ('FILL 1') (4

mg/kg). The largest exceedances for the zinc maximum background value (105 mg/kg) were at TP1 at 4.1 m bgl (1130 mg/kg), TP5 at 4.4 m bgl (369 mg/kg) and TP2 at 3.9 m bgl (336 mg/kg).

- The Eco-SGVs are more conservative that the regional background figures for all of the metals except chromium and nickel, and no Eco-SGVs are available for beryllium, boron or mercury. All of the arsenic and zinc results, and the majority of cadmium (16 of 20), copper and lead (both 17 of 20) results exceed their respective Eco-SGV value.
- 13 of the lead results were found to exceed the Class A (Hazardous) landfill Waste Acceptance Criteria (WAC); two results for copper, five for lead, one for mercury and five for zinc in TP1, 2, 4 and 5.
- All of the results for chromium, lead and zinc were found to be in excess of the Class B landfill WAC. In addition,16 copper, four arsenic, two mercury and five nickel results were found to be in excess of these WAC.

6.3 Total Petroleum Hydrocarbons

A total of 20 samples were analysed for TPHs, and the following subsections discuss the results, which were presented as numerical values and also as chromatograms.

6.3.1 Numerical Results

The numerical results were compared to Tier 1 human health (for silty clay soil) and groundwater protection screening criteria (for silty clay soil), the Wellington Regional Background concentrations for Greywacke soil, Eco-SGVs for 'fine' soil, and landfill WAC.

The results are summarised as follows:

- TPH results were speciated into molecular weight ranges; C7-C9, C10-C14, C15-C36 and C7-C36 (Total). For the C7-C9 and C10-C14 weight ranges only a single result in each case returned above the limit of reporting (> LoR); both of these were in TP5 at 1.5 m bgl. The concentrations were however below all of the applicable screening criteria.
- A total of eight results returned > LoR for the C15-C36 weight range, of which two were found to be in excess of the published background concentration for TPH (190 mg/kg) in TP1 at 4.1 m bgl (581 mg/kg) and TP4 'FILL 2' (370 mg/kg). All of the other results were below all of applicable screening criteria.
- A total of four results returned > LoR for the C7-C36 (Total) weight range of which two were found to be in excess of the published background concentration for TPH (190 mg/kg) in TP1 at 4.1 m bgl (581 mg/kg) and TP4 'FILL 2' (370 mg/kg). All of the other results were below all of the applicable screening criteria.
- For the criteria for the protection of groundwater, the applicable scenario (silty clay soil with contamination below 4 m depth, and the groundwater surface at 8 m bgl) none of the TPH weight ranges had an applicable limit.
- The Eco-SGV for C15-C36 and C7-C36 ranges where the majority of the > LoR results were returned has low conservatism (i.e. the figure is well above the published background concentration) and therefore all of the results were significantly below the applicable Eco-SGVs.
- No Class A or B landfill WAC are published for TPH.

6.3.2 Chromatograms

Two sets of results were presented as chromatograms, TP1 at 4.1 m bgl and TP4 'FILL 2', which exceeded the published background concentration for TPH.

The chromatogram for TP1 at 4.1 m bgl indicates that the predominant hydrocarbon fraction is likely to be fuel oil or another hydrocarbon with a heavy molecular weight. This is due to a well-defined and centred peak centred at approximately C32. This peak has a clear ‘shoulder’ in the range C14-C32, indicating lighter hydrocarbon fractions (most likely diesel) also form a significant fraction of the hydrocarbons present.

Localised peaks, are generally strong and well-defined in this lower range, and only moderately high around the peak at approximately C32. Thus indicating that the heavier hydrocarbon fractions are more extensively weathered than the lighter fractions. The heavier fractions could be of a different age (older) or the lighter fractions may originally have been present at much higher concentrations.

The chromatogram for TP4 ‘FILL 2’ shows a very similar profile to that for TP1 at 4.1 m bgl, but with a more clearly-defined and higher peak at C32. This indicates a significant proportion of heavy-molecular weight hydrocarbons at this location. As with the other chromatograph, there appears to be a greater degree of breakdown in these heavier fractions when compared to the lighter fractions.

The chromatograms indicate that TPH in the layer of landfilled waste is dominated by heavy molecular weight fractions that have undergone more extensive weathering than the lighter (likely diesel) fractions.

6.4 Benzene, Toluene, Ethylbenzene and Xylenes

A total of 20 samples were analysed for BTEX. All results returned < LoR, therefore no assessment against published criteria was undertaken.

6.5 Polycyclic Aromatic Hydrocarbons

A total of 20 samples were analysed for PAH (for which 18 separate analytes, and one calculated value, are reported; refer to Appendix D for the list of analytes). The results were compared to Tier 1 human health (recreational site use, inhalation pathway and maintenance / excavation workers), groundwater protection screening criteria, the Wellington Regional Background concentrations for Greywacke soil, Eco-SGVs (for recreational site use), and landfill WAC.

The results are summarised as follows:

- At least one result was returned > LoR for each of the analytes, except for 2-Methylnaphthalene and Naphthalene, for which all returned results were < LoR.
- None of the samples that returned results > LoR were in excess of applicable Tier 1 human health criteria (Soil Contaminant Standards) for recreational site use, applicable human health criteria for future site users (indoor inhalation pathway, silty clay soil, contamination at 1 – 4 m depth) or maintenance and excavation workers (silty clay soil, contamination at the surface).
- PAH analytes were returned at concentrations above the maximum published background concentration values for sandy soil in a total of 23 samples over the 18 PAH analytes.
- For the criteria for the protection of groundwater, the applicable scenario (silty clay soil with contamination below 4 m depth, and the groundwater surface at 8 m bgl) none of the PAH analytes had an applicable limit.
- Eco-SGVs are available for Benzo(a)pyrene, Fluoranthene and BaP TEQ, but these figures are in all cases significantly higher than the published background concentration values so all of the results were below the Eco-SGV values.
- Class A and B landfill WAC are available for Naphthalene only; all results for Naphthalene were returned < LoR, therefore no WAC are available for the PAH results received.

6.6 Volatile Organic Compounds

A total of 20 samples were analysed for VOC. All results were returned < LoR, therefore no assessment against published criteria was undertaken.

6.7 Semi-Volatile Organic Compounds

All results were returned < LoR for the 20 samples were analysed for SVOC, therefore no assessment against published criteria was carried required.

6.8 Organochlorine Pesticides

All results were returned < LoR for the 20 samples were analysed for OCP, therefore no assessment against published criteria was carried required.

6.9 Asbestos

A total of 20 samples were analysed for the presence / absence of asbestos. No asbestos was identified by the analysis.

6.10 Quality assurance / Quality Control

An assessment of duplicate samples as a measure of precision and for quality assurance and control was complicated at this site for several reasons. Firstly, the soil contamination at the site predominantly comprises organics (i.e. hydrocarbons and solvents) which are not suited to assessment by sample duplication. This is due to their volatile characteristics whereby concentrations can decrease with time even if samples are carefully managed. In addition, the site geology, being fill with a significant refuse component was spatially heterogeneous which resulted in sampling from the same 'location' within the ground impractical.

As such no QA outside of the IANZ required laboratory requirements has been completed

7 Risk Assessment

7.1 Investigation Summary

Five test pits were excavated to a maximum depth of 4.5 m bgl. A total of 21 samples were collected with 20 scheduled for laboratory analysis. A summary of the key findings are presented below:

- No heavy metal concentrations in excess of Tier 1 human health criteria (Soil Contaminant Standards) for recreational site use were identified. However, samples from numerous locations and depths exceeded the Wellington Regional Background concentrations and applicable Eco-SGVs, with notable exceedances recorded for lead, mercury and zinc. In addition, soil in 13 samples were found to exceed Class A landfill WAC for copper, lead, mercury and zinc.
- For majority of samples returned results below the laboratory detection limit. None of the TPH results above this detection limit exceeded applicable Tier 1 human health, groundwater protection criteria or Eco-SGVs. However, two results (C15-C36 and C7-C36 (Total)) exceeded the Wellington Regional Background concentrations.
- The concentration of PAH in all samples did not exceed applicable Tier 1 human health criteria groundwater protection criteria or Eco-SGVs. The Wellington Regional Background concentrations for Anthracene, Benzo(a)pyrene, Fluoranthene, Phenanthrene, Pyrene and BaP TEQ were exceeded in several locations.
- The concentrations of BTEX, VOC, SVOC and OCP were under laboratory detection limits for all samples.
- Asbestos fibres were not detected by the laboratory in the samples submitted for analysis.
- The majority of the higher concentrations of contaminants that were detected were associated with a layer of refuse from approximately 3.7 – 6.0m bgl.

7.2 Tier 1 Risk Assessment

A contaminated land risk assessment has been undertaken in order to assess the risk from contamination on the following receptors:

- Future site users;
- Adjacent site users;
- Construction and maintenance workers;
- Surface water bodies (the on-site stormwater system only, given that there are no nearby or adjacent surface water bodies);
- Groundwater;
- Sensitive ecosystems, flora and fauna; and
- Future site infrastructure (such as foundations, buried services and utilities);

Risk can be posed if a complete pathway between the source of contamination and the receptors is identified. This risk assessment takes into account site specific information including the contaminant levels and information obtained from the intrusive investigations. It also takes into account the specific development works for the site. The disposability of excavated soils and groundwater produced by dewatering is not explicitly included in the risk assessment.

In the CSM asbestos in soil was identified as a potential source, but no asbestos was identified in any of the samples taken from any of the test pits at any depth so it is not included in the risk assessment. This means that it is unlikely that asbestos is present but it cannot however be ruled out.

A CSMP will be issued in due course which will provide procedures for managing discoveries of asbestos during the course of earthworks. This will however only be made available once the final development location has been decided; refer to Section 9.2.

The CSM also identified the application of persistent pesticides as a potential source, but no OCP was identified in any of the samples taken from any of the test pits at any depth, so risks associated with this source are not included in the risk assessment.

The risk assessment is presented below in Table 8.

Table 8 Risk assessment

Source	Contaminants	Critical Receptor	Pathway	Potential Effects	Risk Considerations
Hazardous substances within the soil matrix due to uncontrolled disposal of waste materials. All parts of the development footprint within the upper terrace are likely to be impacted by these disposals.	Various including heavy metals, hydrocarbons, solvents	Future site Users	Ingestion, inhalation, dermal contact	Toxic, hazardous to human health	**▪ The proposed building will be a fully-enclosed structure with a high-integrity base slab. There will be no credible route for direct exposure (i.e. ingestion, dermal contact) to contaminants present underneath the building, or in the excavated wall adjacent to the building for future site users.** **▪ The primary risk to future site users arises from the ingress of ground gases and soil vapours directly from the soil containing the anthropogenic materials into building spaces. Although the concentrations of volatile organics detected in the soil in this investigation were very low, previous investigations have identified materials in the ground which could potentially be sources of ground gas and soil vapours.** **▪ The fill material, and the waste materials landfilled at the site in particular, will be highly heterogeneous in nature and so the low potential for gas generation as identified in five test pits is likely to be insufficient to discount the risk of significant gas generation.** **▪ Complete or partial removal of the capping layer over the 'Refuse Layer', combined with mechanical disturbance of waste materials has the potential to lead to increased ground gas and soil vapour generation. This could be caused by the uncovering or reconfiguration of the waste materials, and / or the creation of new gas flow pathways, with subsequent ingress into the new building.** **▪ Contaminants could also be released that could accumulate in the local surface environment (e.g. surficial soil), with potential future remobilisation impacting site users.**
		Adjacent site users	Ingestion, inhalation, dermal contact	Toxic, hazardous to human health	**▪ The sports fields immediately adjacent to the proposed development are in regular use, and Alex Moore Park is located in an area of moderate residential density, therefore there are potentially a significant number of receptors in the local area. The primary risk to these receptors is impact from vapours and contaminated dust during the period of excavation works.** **▪ None of the soil samples were found to contain contaminants above human health criteria. The locations where contaminants exceeded the Regional Background range are likely to be removed as part of the development of the site. Furthermore, access to the adjacent sports fields should be restricted during the earthworks, and sediment and dust control measures implemented as part of the CSMP; refer to Section 9.2. Therefore, the risks to adjacent site users will be controlled.**
		Construction and maintenance workers	Ingestion, inhalation, dermal contact	Toxic, hazardous to human health	**▪ None of the soil samples were found to contain contaminants above human health criteria for the protection of maintenance and excavation workers. However workers could potentially be impacted by inhalation of vapours and contaminated dust in addition to direct contact with contaminated soil and groundwater during site development.** **▪ In addition, the waste materials in the 'Refuse Layer' could pose risks over and above chemical contamination, such as biological hazards and sharps which if not properly managed could pose significant health risk to construction workers.** **▪ Measures as set out in the CSMP will require implementation to control this risk; refer to Section 9.2.**
		Groundwater	Permeation through soil profile	Groundwater Contamination	**▪ None of the soil samples were found to contain contaminants above groundwater protection criteria.** **▪ However, the mechanical disturbance of waste materials within the 'Refuse Layer' could potentially lead to the mobilisation of aqueous-phase contaminants associated with the waste, which could then permeate down to groundwater.**
		Surface water bodies	Groundwater Flow and Run off	Surface Water Contamination	**▪ The mechanical disturbance of the 'Refuse Layer' could lead to enhanced mobilisation of contaminants to groundwater.** **▪ However, the distance to surface water receptors (particularly Wellington Harbour) is such that any contaminants originating from disturbance of the waste would undergo huge dilution and attenuation prior to reaching the receptor, so the scope for risk due to waste materials having been landfilled at the site to surface water receptors is very low.**

		Sensitive ecosystems, flora and fauna	Transport in groundwater	Ecotoxic	▪ **Eco-SGVs were exceeded for a number of heavy metal analytes, and the mechanical disturbance of waste materials within the 'Refuse Layer could potentially lead to the mobilisation of these contaminants.** ▪ **The mobilisation of dust containing heavy metals during earthworks is the primary mechanism by which these contaminants could be spread to nearby ecological receptors.** ▪ **The mobilisation of silt from exposed waste material (and also potentially from stockpile) by rainwater could spread contaminants to ecological receptors, but this mechanism will be largely managed by the measures specified in the CSMP.** ▪ **The mechanical disturbance of the 'Refuse Layer' could potentially mobilise contaminants to groundwater, but these are unlikely to pose risk to sensitive marine ecosystems in Wellington Harbour (the nearest surface water ecological receptors) due to dilution and attenuation.** ▪ **There is a row of native Pohutukawa trees in and nearby the development area that could be labelled as 'sensitive flora'. The trees were noted as healthy (no sign of chemical stress) during the investigation. Potential impact to 'sensitive flora' will be addressed in the CSMP; refer to Section 9.2.**
		Future site infrastructure	Permeation through soil profile	Physical and chemical damage to structures	▪ **Hydrocarbons can cause damage to concrete foundations and underground services, as they can affect the strength of *in-situ* poured concrete and also plastics.** ▪ **Minor concentrations of hydrocarbons were detected during this investigation, but the mechanical disturbance of the 'Refuse Layer' could potentially mobilise greater concentrations of these contaminants, which would increase the risk to future site infrastructure** ▪ **It is recommended that consideration of the impact that contaminants could have on uncured concrete be incorporated into the design process.**

The proposed earthworks (lateral excavation into the ‘upper terrace’) will remove the ‘capping layer’ and result in the significant mechanical disturbance of the ‘Refuse Layer’. This results in significantly increased risks as follows:

- Potential for future site users to be impacted by the ingress and accumulation of ground gas and soil vapours within voids (rooms, basements), resulting from enhanced gas release (and potentially enhanced gas generation additionally);
- Potential for mobilisation of contaminants from the ‘Refuse Layer’ which could impact future sites users, groundwater (and surface water, though the impact to this receptor is likely to be very limited) and ecological receptors;
- Potential for hydrocarbon contaminants to affect future site infrastructure, with disturbance of the ‘Refuse Layer’ potentially exacerbating this, namely by impacting the curing of concrete and strength of plastic used in foundations and underground services (see below); and
- Potential for construction workers to be exposed to hazards associated with the ‘Refuse Layer’, with risks being predominantly chemical, biological and mechanical.

A literature review indicates that a reduction of 20% in concrete strength should be allowed for in the design of any in-situ concrete. This will be incorporated into the building design, including any concrete likely to come into contact with hydrocarbon contaminated soils. Note that this review also indicated there are no specific requirements for precast concrete that is completely cured as it meets its design strength prior to being placed in the ground. Use of plastics for critical infrastructure within the layer of refuse is unlikely to be required.

A CSMP will be issued as a separate document in due course, which will address potential impacts on human health, buildings and environment from contaminated soils and groundwater for the duration of the works. This will however only be made available once the final development location has been decided; refer to Section 9.2.

8 Development Implications

As a result of contamination being identified on the site there are implications for the proposed development works in relation to resource consents, appropriate offsite disposal facilities and health and safety requirements.

8.1 Resource Consents

8.1.1 National Environmental Standard

The NES is applicable to any HAIL sites with proposed development works that includes soil disturbance or sampling, removal of fuel storage systems, subdivision or change in land use.

A number of HAIL activities, including waste disposal to land, (HAIL categories G3 and G5), have been confirmed on this site. Due to the proposed soil disturbance, which will include significant and widespread disturbance of landfilled waste in the 'Refuse Layer', disposal volumes as part of the construction of the proposed clubrooms, the contaminant concentrations found onsite and the anticipated duration of works the requirements for land disturbance to be a permitted activity under Regulation 8(3) of the NES cannot be met, and as such consent under the NES is required.

Contaminants have not been encountered onsite at concentrations above human health guidelines and therefore the activity is controlled as assessed under Regulation 9 of the NES. It should be noted however that potential risk to human health from the HAIL activity is present due to the mechanical disturbance of landfilled waste potentially leading to enhanced ground gas risks. Wellington City Council may have policy requiring other controls in this regard.

A CSMP will be issued as a separate document in due course which will address potential impacts on human health and environment resulting from the ground disturbance activities. This will however only be made available once the final development location has been decided; refer to Section 9.2.

8.1.2 Proposed Natural Resources Plan for the Wellington Region

The Proposed Natural Resources Plan for the Wellington Region (PNRP, issued June 2015 and still in draft at the time of writing) contains requirements with regards to the management of impacts to groundwater through the consenting process.

Rule R55 of the PNRP states that discharges of contaminants onto or into land from contaminated land where the discharge may enter water (such as may be the case when the 'landfilled material' is mechanically disturbed during the course of earthworks to make way for the new development) is a permitted activity, provided applicable Drinking Water Standards, and groundwater quality standards (at the site boundary) are complied with.

The disturbance of landfilled waste in the 'Refuse Layer' could lead to mobilisation of contaminants that could then migrate to groundwater, so it is essential to assess groundwater conditions before (to establish baseline conditions), during and after earthworks to assess whether permitted activity criteria would be complied with during earthworks. The boreholes with standpipe piezometers that were installed at the site previously could provide this capability but will likely not provide sufficient spatial covered to robustly demonstrate compliance with the PNRP conditions and as such additional monitoring capability would likely have to be installed (refer to Section 9.2).

As described in Section 1.3, WCC will remain the owners of the land (and refuse contained therein) although the new clubroom and gym complex is being developed by the Alex Moore Park Sport and Community Board. Therefore, detailed assessment of potential impacts on groundwater (which are likely to be limited as described in Section 7; this is however a limited and high-level assessment of groundwater risks) from the development are outside the scope of this investigation.

If an assessment of groundwater risks were to be required, this would need to be undertaken by the landholder (WCC) as part of a separate investigation. This could potentially make use of the boreholes with standpipe piezometers installed as part of the 2016 Aurecon geotechnical investigation, but as stated additional boreholes may need to be installed.

8.2 Soil Waste Classification

There will likely be limited scope for reuse of materials on site due to ongoing use for public recreation, therefore all excavated material will likely require the identification of an off-site disposal route. If soil were to be retained on-site, screening to assess contaminant levels (particularly for metals and PAH) followed by segregation would be required.

Section 6 and Appendix D provides a detailed breakdown of how the analytical results for soil compare to key thresholds for disposal (landfill WAC). Due to the widespread exceedances of Regional Background figures for heavy metals and PAH (and some TPH concentrations in addition) soil excavated as part of the proposed earthworks does not meet the MfE definition of 'cleanfill' (MfE, 2002). A number of heavy metals at various depths in several of the test pits were found to be at concentrations in excess of Class A (Hazardous) landfill WAC, therefore it is likely that excavated fill will have to be disposed to hazardous landfill. Heavy metals exceeded Class B WAC at multiple depths in all of the boreholes and test pits.

Any soil that exceeds Class A WAC for heavy metals will require Toxicity Characteristic Leachate Procedure (TCLP) testing prior to disposal. This is to demonstrate that the landfill can accept the material and if criteria for TCLP leachate are exceeded pre-treatment is required. If required, pre-treatment can be undertaken at a facility in Seaview in Lower Hutt.

The presence of significant refuse in soils means that it should not be assessed as soil. This material is refuse and should be disposed of appropriately.

8.3 Occupational Health and Safety

As contaminated material has been identified, there is a risk to construction and maintenance workers, legislated by the *Health and Safety at Work Act (2015)*. Appropriate health and safety procedures will be included in the CSMP; refer to Section 9.2. It is noted that there are strict industry health and safety requirements that will be applicable to the site and these should not be compromised during the ground disturbance works.

9 Conclusions and Recommendations

9.1 Conclusions

This assessment comprised an intrusive investigation including soil sampling. A total of four HAIL activities with the potential to cause contamination were identified in the desktop studies (the 2016 Aurecon PSI, and further consideration of background data as part of this DSI report) for the site:

- A10 - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds;
- E1 – Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition;
- G5 – Waste disposal to land (excluding where biosolids have been used as soil conditioners) (G3 – Landfill Sites may also be applicable); and
- I – Any other land that been subject to intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health of the environment.

The proposed redevelopment of the site will require significant earthworks to create an excavation into the 'upper terrace' to accommodate the construction of a single, two-storey building incorporating community clubrooms and a gym. The estimated volume of material to be excavated is approximately 2000 m^3. There is limited scope for stockpiling of materials or reuse on site due to ongoing active use of the site as a public recreational space.

Intrusive investigations undertaken across the site comprised soil sampling from five machine-excavated test pits located in the 'upper terrace' where the largest cut is proposed for building construction. The key observations from the site investigation was that a discrete layer of refuse in a predominantly silty matrix is present at approximately 3.7 – 4.3 m bgl, which is labelled as the 'Refuse Layer'. This layer is readily identifiable as separate from overlying fill material due to the very high proportion of anthropogenic materials (including as bricks and metallic fragment). No free-phase oily substances or strong odours (as had been noted during previous investigations) were observed within the 'Refuse Layer' or in the overlying fill, and PID readings were uniformly low. The 'Refuse Layer' is overlain by a layer of silty fill material that makes up the bulk of the thickness of the 'upper terrace', and can be considered as a deliberately-placed 'capping layer'.

A total of 20 samples were analysed for heavy metals, TPH, BTEX, PAH, VOC, SVOC, OCP and asbestos presence / absence. No BTEX, VOC, SVOC, OCP or asbestos was detected in any of the soil samples analysed. For heavy metals, localised moderate concentrations (in excess of regional background and Class A landfill WAC) of copper, lead, mercury and zinc were detected; for TPH two localised moderate concentrations (above regional background) were detected; and for PAH several moderate concentrations (above regional background) of several PAH analytes were detected. The majority of these elevated results were associated with the refuse however the overlying silty fill was also affected.

Due to the identified presence of the 'Refuse Layer', HAIL category G3 is likely to be more applicable to the site than G5 or I. Also, due to no asbestos having been identified in any of the soil samples, HAIL category E1 is deemed as likely not being applicable. Therefore, A10 and G3 are the HAIL categories with the greatest applicability to the site.

The results from this site investigation, combined with evidence gathering during previous intrusive investigations, indicates that waste materials were emplaced as landfill during site levelling was undertaken, which are now present as a discrete layer. Elevated levels of contaminants (metals and hydrocarbons) are present within this layer, but are below human health and groundwater protection criteria.

9.2 Recommendations

This contamination assessment was undertaken to assess the risk from ground contamination to human health (future site users, adjacent site users and maintenance / construction workers), groundwater, surface water, ecological receptors and the built environment as a result of the proposed redevelopment of the site.

The proposed location of the new community clubrooms and gym building will require significant earthworks to create a large lateral cavity in the 'upper terrace' to accommodate the development. This will require the removal of the 'capping layer' over a significant area and direct mechanical disturbance of a large volume of the 'Refuse Layer'. This is likely to result in the realisation of the following potential risks and costs:

- Removal of the 'capping layer' over a significant area could have serious impacts on key landfill engineering parameters such as infiltration rate, drainage, gas sealing and percolation flow paths;
- The mechanical disturbance of the 'Refuse Layer' could result in the direct mobilisation of contaminants (which had otherwise likely been in a stable condition) and the opening of flow paths for aqueous and gaseous contaminants;
  - The receptors most likely to be impacted by this mobilisation are construction / maintenance workers and groundwater;
- The construction of the building onto the 'Refuse Layer' (whether the base slab was directly in contact with the 'Refuse Layer', or separated by a suspended floor) would create significant ground gas and soil vapour risks, and the flow path for ingress into the building would be short and direct;
  - There are a number of case studies for construction on landfills (e.g Pikes Point Landfill in Auckland, Victoria Park also in Auckland), but these involve the new developments being separated from waste material by layers of material with a thickness of no less than 500 mm, the detailing of these layers is complex and required the specialist skills of a landfill engineer. Construction directly onto waste material has no precedent in New Zealand, and therefore risks would have to be assessed and quantified from scratch;
- The generation of a large volume of waste material that will likely require off-site disposal in a Class A (hazardous) landfill, which will incur large expenses given the quantity of spoil likely to be generated. Furthermore, if waste material does not meet Class A WAC (as was identified to be the case in several locations) then pre-treatment will be required, which will add to overall disposal costs; and
- The intrusion into this previously-unrecorded landfill may obligate WCC to undertake costly site investigation and retrospective licencing.

The following recommendations are made in light of these risks and costs:

- Further ground investigation should be carried out in the area to be excavated for the new development, likely comprising boreholes and the excavation of further test pits (deeper test pits that potentially reach the base of the 'Refuse Layer' could be achieved using a larger excavator). This would achieve the following aims;
  - Expanded ground model to improve understanding of nature and composition of the waste material and its gas generation potential, and the potential for mobilisation of aqueous contaminants;

  - More borehole piezometers for establishment of baseline ground gas and groundwater conditions (multiple screened sections would be required to achieve this);
  - Undertaking of at least three gas monitoring rounds using installed boreholes, and calculation of gas screening values and allocation of a gas risk assessment categorisation for the site in line with international guidance;
  - Boreholes would (also) be required at the downgradient site boundary to allow monitoring to ensure compliance with PNRP requirements for groundwater (for the activity to be permitted);
- Design and costing of passive and active ground gas protection measures for the development should be started;
- Consultation with an experienced landfill engineer to gain an understanding of the implications (for the new development, the landfill itself and the wider environment) of 'capping layer' removal and large-scale mechanical disturbance of the 'Refuse Layer'.
- Calculation of earthworks volumes with a high degree of confidence and liaison with Class A landfill (Silverstream landfill is the only Class A landfill in the Wellington Region) operator to assess acceptability of waste and requirements for pre-treatment, for calculation of total disposal costs.
- Liaison with WCC to start understanding the implications of the presence of a large, previously-unrecorded landfill.

A key action should be comparison of the costs of carrying out the further site investigations described above with the costs of relocation of the underground services in the car park, should the development be relocated to the previous position further to the north. Relocation to the north would require far less disturbance of the 'upper terrace' with a corresponding significant reduction in risks, and would result in a significant number of the factors discussed above no longer being applicable.

A CSMP document will be issued in due course, but there will be little value in the document if issued prior to the final location of the development being decided (a high-level, generic document would have to be issued if the location was undecided). Once the location is known, the CSMP can be tailored to the requirements of development in that location i.e. if significant penetration into the 'upper terrace' will not be required, discussion of measures related to landfill management will not be included in the document.

10 Limitations

Aurecon has prepared this report for Alex Moore Park Sport and Community Board in accordance with the brief described at the start of this report. This report is based on field work undertaken on 7 August 2017 and is based on the conditions encountered and information reviewed at the time of preparation of the report. Aurecon does not make any representation or warranty that the conclusions in the report can be extrapolated for future use as there may be changes in the condition of the site, applicable legislation or other factors that would affect the conclusions contained in this report.

This report has been prepared on instruction of Alex Moore Park Sport and Community Board and may be used by and relied on by Alex Moore Park Sport and Community Board and its related parties and the following entities: other consultants to Alex Moore Park Sport and Community Board, Contractors completing work on Alex Moore Park Sport and Community Board's request. Aurecon accepts no responsibility or liability for damages, if any, suffered by any other third party. This report should be read in full and no excerpts are to be taken as representative of the whole report. To ensure its contextual integrity Alex Moore Park Sport and Community Board must not distribute the report to third parties in part only.

Soil and rock formations are often variable, resulting in heterogeneous distribution of contaminants across a site. Contaminant concentrations may be estimated at chosen sample locations, however, conditions between sample sites can only be inferred on the basis of geological and hydrological conditions and the nature and the extent of identified contamination. Boundaries between zones of variable contamination are often indistinct, and therefore interpretation is based on available information and the application of professional judgement.

Only a finite amount of information has been collected to meet the specific technical requirements of the Client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgment and it must be appreciated that actual conditions could vary from the assumed model.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should further information become available regarding the conditions at the site, including previously unknown likely sources of contamination, Aurecon reserves the right to review the report in the context of the additional information.

Where this report indicates that information has been provided to Aurecon by Alex Moore Park Sport and Community Board or third parties, Aurecon has made no independent verification of this information except as expressly stated in the report.

All relevant legislation in the jurisdiction in which the site is located and relating to the works has been complied with by Aurecon as at the date of this report.

11 References

1. Contaminated Land Management Guidelines No. 2, Hierarchy and Application in New Zealand of Environmental Guideline Values, MfE 2011;
2. Determination of Common Pollutant Background Soil Concentrations for the Wellington Region, URS 2003;
3. GWRC, 2002, Erosion and Sediment Control Guidelines for the Wellington Region;
4. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, MfE 1999 (Revised 2011), Module 4 and Module 5 to assess human health for ongoing site use and excavation workers, protection of groundwater for soil samples and groundwater quality for groundwater samples;
5. Landcare Research, 2016, User Guide: Background Soil Concentrations and Soil Guideline Values for the Protection of Ecological Receptors (Eco-SGVs) – CONSULTATION DRAFT;
6. MfE, 2011, Contaminated Land Management Guidelines (CLMG) No. 2, Hierarchy and Application in New Zealand of Environmental Guideline Values, ME No. 1072;
7. MfE, 2017, Landfill Waste Acceptance Criteria;
8. MfE, 2002, A guide to the management of cleanfills;
9. National Environmental Standard Soil Contaminant Standards for commercial/industrial and recreational land use to assess against human health criteria and offsite disposal options;
10. National Environmental Standard Soil Contaminant Standards for residential and industrial/commercial land use – Refer Table B1 of the NES User Guide;
11. Proposed Natural Resources Plan for the Wellington Region, Greater Wellington Regional Council 2015; and
12. User Guide: Background Soil Concentrations and Soil Guideline Values for the Protection of Ecological Receptors (Eco-SGVs) – Consultation Draft, Landcare Research 2016.

Appendices

Appendix A
Figures

Figures

NOTES:

1. Do not scale off this drawing. Use figured dimensions only. Drawings printed from .pdf files will NOT be to scale.
2. Contractor to verify all details and dimensions on site before commencing work.
3. Contractor to report any apparent discrepancy to the Architect for interpretation prior to affected work proceeding.

PROJECT

N

REVISIONS:

REV	DATE	AMMENDMENT
P1	08.02.13	Issued for RC
P2	18.03.13	RC revisions-Car Park
P3	04.04.13	RC Revision-Median

Resource Consent

ARCHITECTURE HDT

Alex Moore Park
Alex Moore Park, Johnsonville
for Alex Moore Park Sport & Community

Aerial Photo-Site Plan

Architecture HDT Ltd
PO Box 6435 , 24 Blair Street
Wellington 6141. New Zealand
T 04 3852621 F 04 3852629
E architects@hdt.co.nz W www.hdt.co.nz

Scale (A1) 1 : 500	Job No. 9064
Drawing No. RC1.05	Revision No. P2

NOTES:

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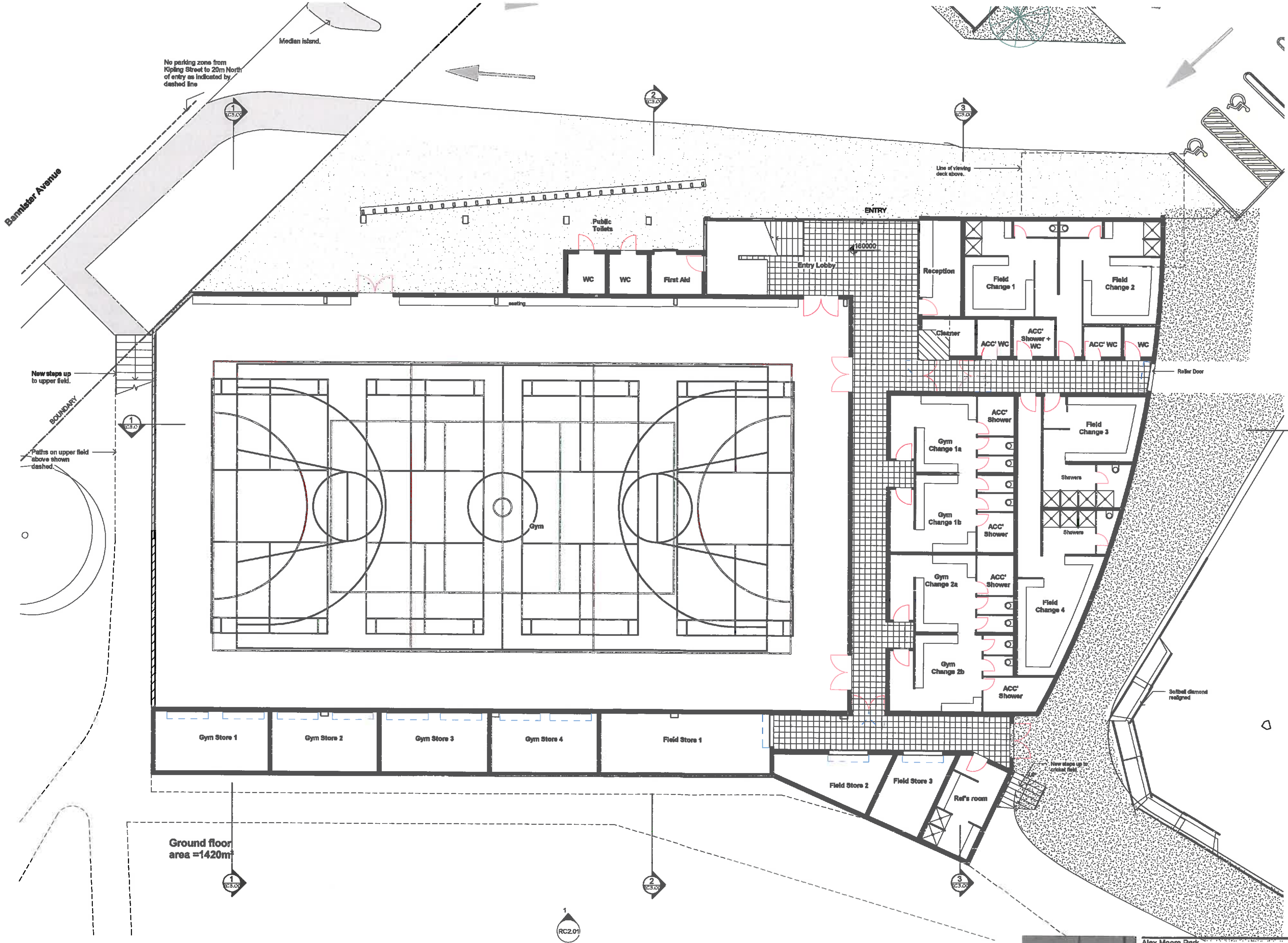
2. Contractor to verify all details and dimensions on site before commencing work.
3. Contractor to report any apparent discrepancy to the Architect for interpretation prior to affected work proceeding.

PROJECT



REVISIONS:

REV	DATE	AMMENDMENT
P1	08.02.13	Issued for RC
P2	18.03.13	RC revisions-Car Park

Resource Consent

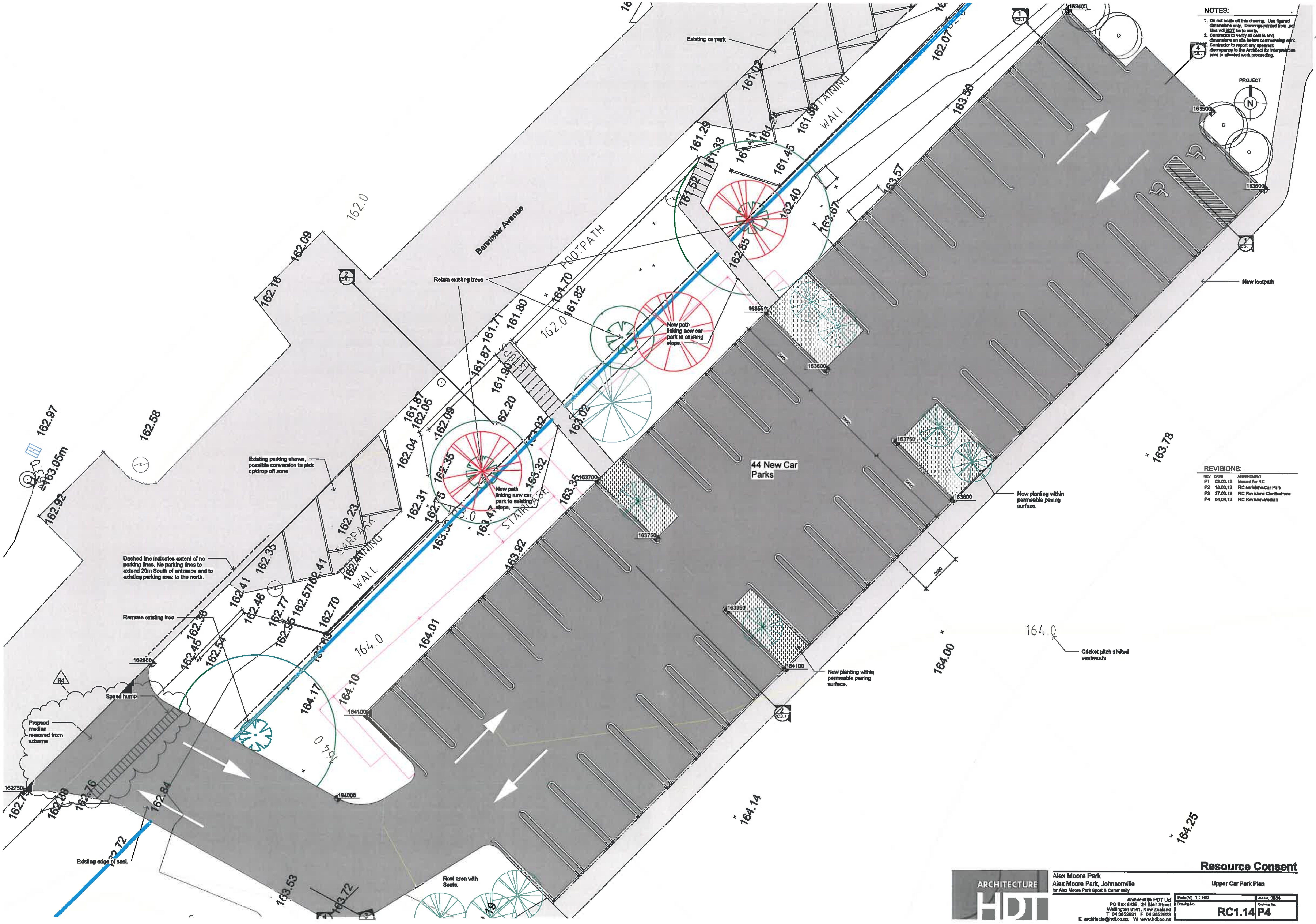
ARCHITECTURE HDT

Alex Moore Park
Alex Moore Park, Johnsonville
for Alex Moore Park Sport & Community

Ground Floor Plan

Architecture HDT Ltd
PO Box 6435 . 24 Blair Street
Wellington 6141. New Zealand
T 04 3852621 F 04 3852629
E architects@hdt.co.nz W www.hdt.co.nz

Scale (A1) 1 : 100	Job No. 9084
Drawing No. RC1.10	Revision No. P2



NOTES:
1. Do not scale off this drawing. Use figured dimensions only. Drawings printed from .pdf files will NOT be to scale.
2. Contractor to verify all details and dimensions on site before commencing work
3. Contractor to report any apparent discrepancy to the Architect for interpretation prior to affected work proceeding.
PROJECT
N
Existing carpark
Bannister Avenue
FOOTPATH
RETAINING WALL
CARPARK RETAINING WALL
STAIRCASE
Retain existing trees
New path linking new car park to existing steps.
Existing parking shown, possible conversion to pick up/drop off zone
Dashed line indicates extent of no parking lines. No parking lines to extend 20m South of entrance and to existing parking area to the north.
Remove existing tree
Speed hump
Propsed median removed from scheme
Existing edge of seal.
Rest area with Seats.
44 New Car Parks
New footpath
New planting within permeable paving surface.
Cricket pitch shifted eastwards
163.05m
REVISIONS:
REV DATE AMMENDMENT
P1 08.02.13 Issued for RC
P2 18.03.13 RC revisions-Car Park
P3 27.03.13 RC Revisions-Clarifications
P4 04.04.13 RC Revision-Median
Resource Consent
ARCHITECTURE HDT
Alex Moore Park
Alex Moore Park, Johnsonville
for Alex Moore Park Sport & Community
Upper Car Park Plan
Architecture HDT Ltd
PO Box 6435 , 24 Blair Street
Wellington 6141. New Zealand
T 04 3852621 F 04 3852629
E architects@hdt.co.nz W www.hdt.co.nz
Scale (A1) 1 : 100
Job No. 9084
Drawing No. RC1.14
Revision No. P4

NOTES:

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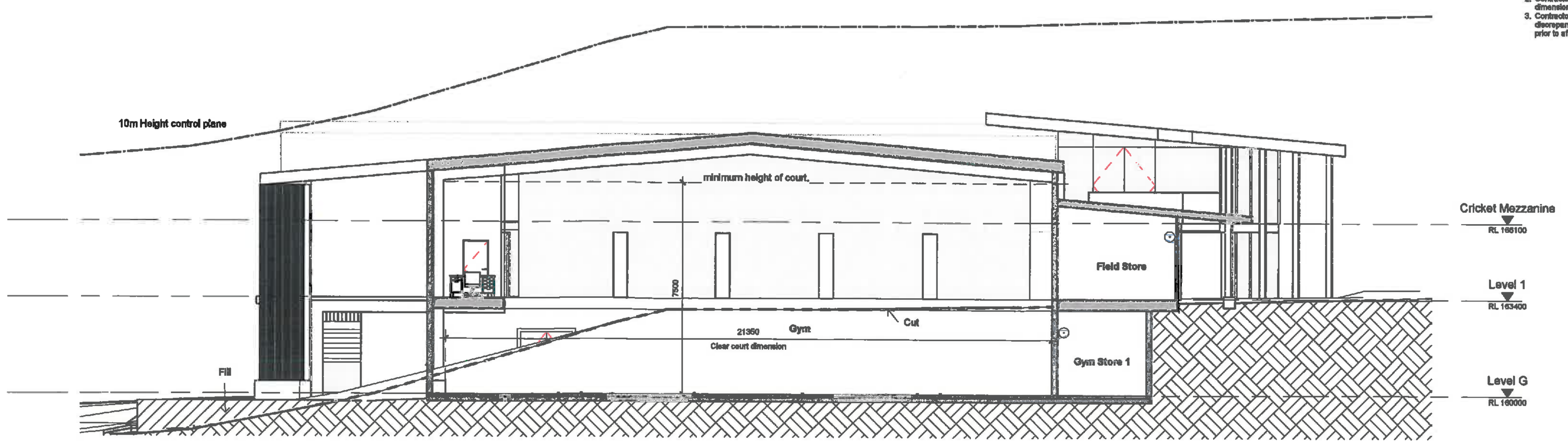
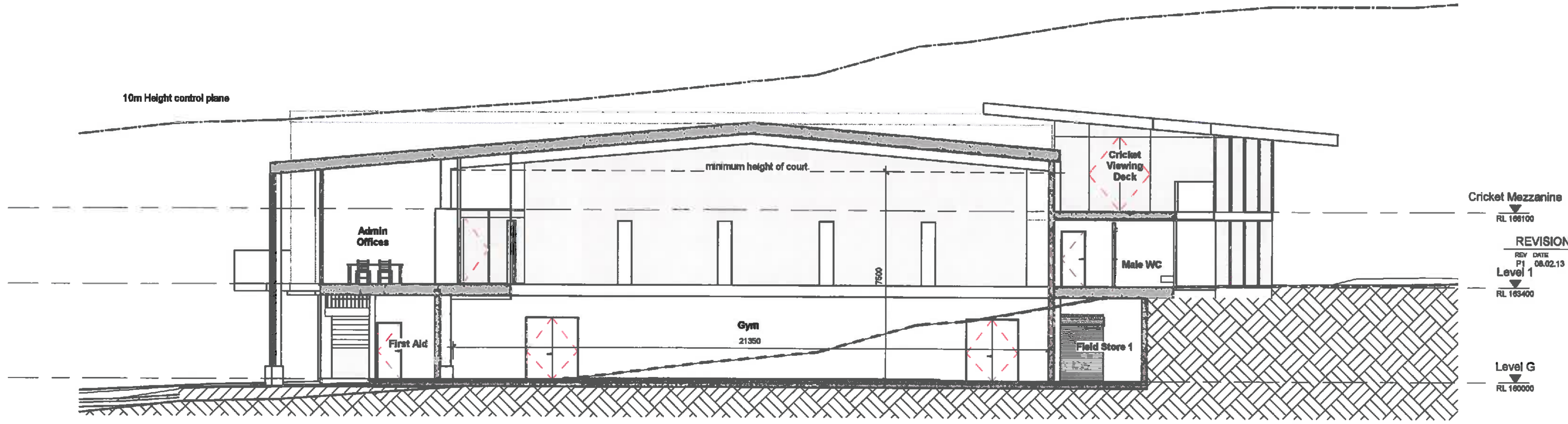
2. Contractor to verify all details and dimensions on site before commencing work.
3. Contractor to report any apparent discrepancy to the Architect for interpretation prior to affected work proceeding.



1 Section 1
RC1.10 1 : 100



2 Section 2
RC1.10 1 : 100

REVISIONS:

REV	DATE	AMMENDMENT
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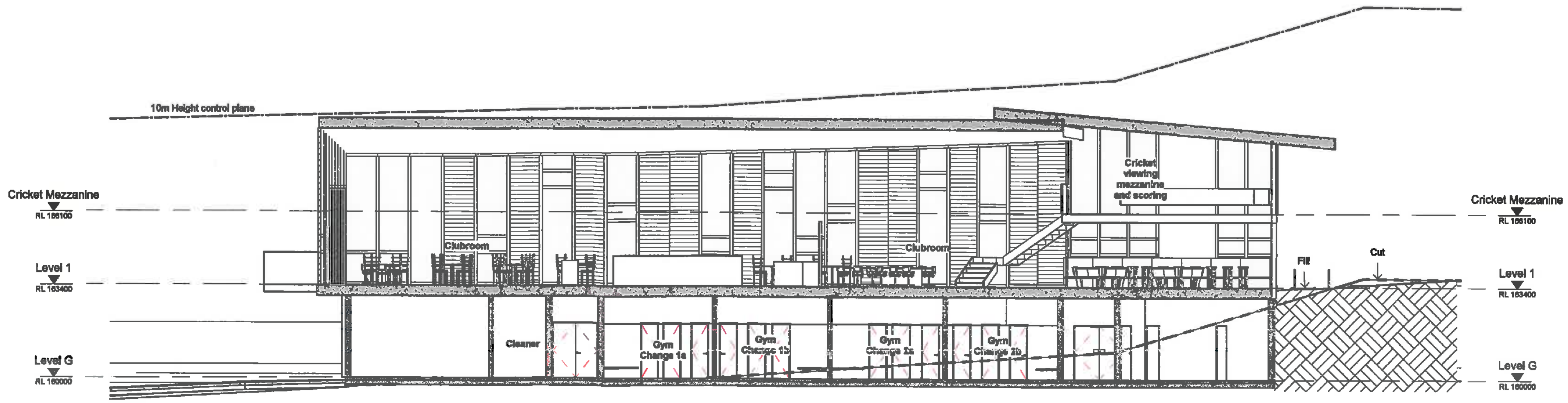


3 Section 3
RC1.10 1 : 100

Resource Consent

ARCHITECTURE HDT

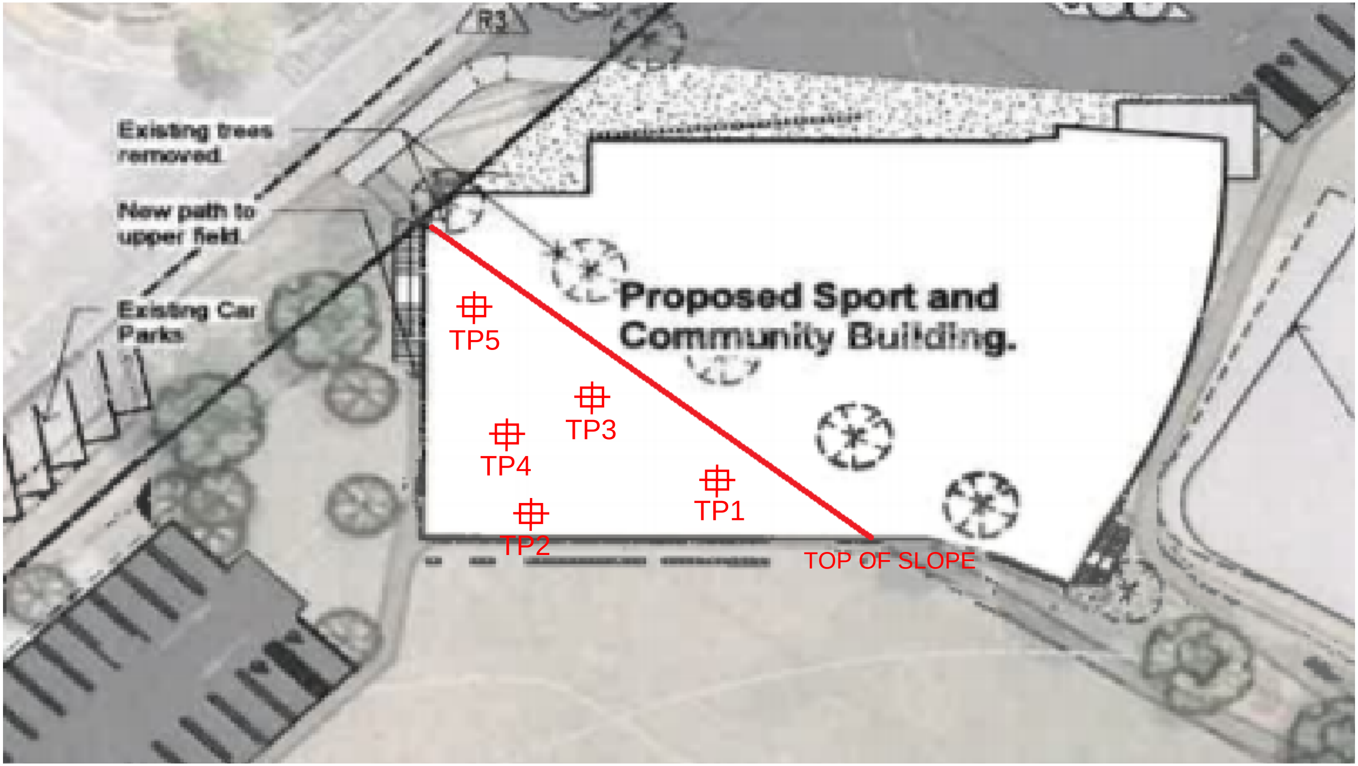
Alex Moore Park
Alex Moore Park, Johnsonville
for Alex Moore Park Sport & Community

Sections

Architecture HDT Ltd
PO Box 6435 , 24 Blair Street
Wellington 6141. New Zealand
T 04 3852621 F 04 3852629
E architects@hdt.co.nz W www.hdt.co.nz

Scale (A1) 1 : 100	Job No. 9084
Drawing No. RC3.00	Revision No. P1

aurecon



NOT TO SCALE

252094 - ALEX MOORE PARK DEVELOPMENT

DETAILED SITE INVESTIGATION

Figure B - Test Pit Locations

Appendix B
Test Pit Logs

TEST PIT RECORD

TEST PIT NO.	**TP1**
PROJECT NO.	**252094**

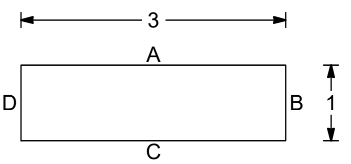
PROJECT **Alex Moore Park Development**
Alex Moore Park, Johnsonville, Wellington

METHOD **Test Pit**	CO-ORDINATES ()	LOGGED **N KING**	CHECKED **T DEE**
MACHINE & NO. **12T excavator**			
CONTRACTOR **Griffiths Drilling**	GROUND LEVEL m RL	DATE **7/08/2017**	DATE **11/09/2017**

STRATA / SAMPLES & TESTS

Depth	Legend	Description	Depth	No	Remarks/Tests
0.00-0.10		SILT with trace sand (sand f-m), very frequent rootlets, high organic content (including occasional small timber fragments), brown-light brown, soft-very soft, LP, moist [TOPSOIL]			
0.10-0.50		SILT with sand (sand f-m), rootlets in the top 0.1 m of stratum, yellowish brown, soft, LP, moist [FILL]			
0.50-2.00		Silty CLAY with trace sand (sand f-m), yellowish brown with grey bands and mottling, grey, orange and red-brown mottling becoming more frequent with depth, clay content increasing with depth, sand content diminishing to zero below approximately 0.6 m bgl, soft-firm, LP, moist [FILL]			
2.00-3.00		CLAY with trace silt and occasional sandy inclusions (sand f-m), roots present at 2.1 m bgl, grey with occasional orange mottling, very soft, HP, moist-wet [FILL]			
3.00-3.70		Silty CLAY with trace sand (sand f-m) and occasional gravel (gravel m-c, subangular), occasional coarse brick fragments, grey to orangey-brown, soft-firm, LP, moist [FILL]			
3.70-4.10		SILT with sand (sand f-c), gravel and cobbles (gravel coarse, angular-subangualr) and trace clay, frequent anthropogenic material (timber sheet, metal piping, plastic piping, whole bricks and brick fragments), brown to grey-brown, soft-firm, LP, moist [FILL]			
		End of Test Pit at 4.10m, on 07/08/2017 *Termination Reason:* Target depth reached, walls collapsing			

SHORING/SUPPORT: **None**
STABILITY:



GENERAL REMARKS

PID readings at: 0.35 m bgl - 0.2, 0.6 m bgl - 0.2, 1.7 m bgl - 0.0, 2.6 m bgl - 0.4, 3.0 m bgl - 0.4, 3.7 m bgl - 0.0, 4.1 m bgl - 0.8
Samples taken at: 0.5, 1.7, 2.6, 3.0

All dimensions in metres | CLIENT **Alex Moore Park Sport and Community Board** | Pocket Penetrometer Test | Insitu Vane Shear Test | Water Level

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TEST PIT RECORD

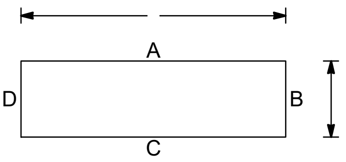
TEST PIT NO.	**TP2**
PROJECT NO.	**252094**

PROJECT **Alex Moore Park Development**
Alex Moore Park, Johnsonville, Wellington

METHOD **Test Pit**	CO-ORDINATES ()	LOGGED **N KING**	CHECKED **T DEE**
MACHINE & NO. **12T Excavator**			
CONTRACTOR **Griffiths Drilling**	GROUND LEVEL m RL	DATE **7/08/2017**	DATE **11/09/2017**

STRATA			SAMPLES & TESTS		
Depth	Legend	Description	Depth	No	Remarks/Tests
0.00-0.15		SILT with trace sand (f-m) and clay, frequent rootlets, organic content, brown, soft, LP, moist [FILL]			
0.15-0.50		SILT with trace sand (f-m), yellow brown, soft-firm, LP, moist [FILL]			
0.50-1.40		Clayey SILT with trace sand (fine), orangey brown, firm, LP, moist [FILL]			
1.40-2.00		Slighly silty CLAY, grey to brownish grey with orange mottling, soft-firm, HP, moist [FILL]			
2.00-3.90		CLAY with slightly sandy (sand f-c, black and orange) inclusions (becomes slightly siltier and sandier / orange coloured with depth), blue-grey, very soft, HP, moist-wet [FILL]			
3.90-4.50		SILT with trace sand (sand f-m), frequent anthropogenic material (brick fragments, glass bottles, Paua shells / shell fragments, nails, metal wire, valve transistors, glass fragments, ceramic fragments, timber and animal bones), blueish-grey with purple-red and black inclusions, soft-firm, L to HP, moist [FILL]			
		End of Test Pit at 4.50m, on 07/08/2017 *Termination Reason:* Target depth reached, walls collapsing			

SHORING/SUPPORT: **None**
STABILITY:



GENERAL REMARKS

PID readings at: 0.5 m bgl - 0.4, 1.7 m bgl - 0.7, 2.1 m bgl - 0.8, 3.9 m bgl - 0.6, 4.5 m bgl -0.4
Samples at: 0.5, 2.1, 3.9, 4.5
A major pit wall collapse occurred when the excavation was at approximately 2.5 m bgl.

All dimensions in metres	CLIENT **Alex Moore Park Sport and Community Board**	Pocket Penetrometer Test Insitu Vane Shear Test Water Level

TEST PIT RECORD

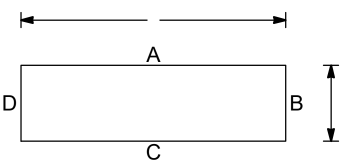
TEST PIT NO.	**TP3**
PROJECT NO.	**252094**

PROJECT **Alex Moore Park Development**
Alex Moore Park, Johnsonville, Wellington

METHOD **Test Pit**	CO-ORDINATES ()	LOGGED **N KING**	CHECKED **T DEE**
MACHINE & NO. **12T Excavator**			
CONTRACTOR **Griffiths Drilling**	GROUND LEVEL m RL	DATE **7/08/2017**	DATE **11/09/2017**

STRATA			SAMPLES & TESTS		
Depth	Legend	Description	Depth	No	Remarks/Tests
0.00-0.10		SILT with trace sand (sand f-m), frequent rootlets, organic content, brown, soft-very soft, LP, moist [TOPSOIL]			
0.10-0.80		Sandy SILT with infrequent gravel (coarse, weathered, angular greywacke fragments), occasional timber fragments, rootlets in top 0.2 m, orange brown, soft, LP, moist-wet [FILL]			
0.80-1.10		SILT with sand (sand f-m) and clay, orange-brown with grey banding, firm-very firm, LP, moist [FILL]			
1.10-4.00		CLAY with trace silt, rootlets from approximately 1.8 - 2.5 m bgl, grey with some orange mottling, orange banding at 2.2 m bgl, grey-black inclusions below 1.8 m bgl, soft, HP, moist-wet (becoming firmer and drier with depth) [FILL]			
4.00-4.30		Silty CLAY with infrequent gravel (medium-coarse, angular greywacke fragments), very frequent anthropogenic materials (crumpled metal ribbon, cloth, glass and brick fragments), grey brown with orange mottling, grey-black and greenish-grey inclusions, soft-firm, HP, moist [FILL]			
		End of Test Pit at 4.30m, on 07/08/2017 *Termination Reason:* Target depth reached			

SHORING/SUPPORT: **None**
STABILITY:



GENERAL REMARKS

PID readings at: 0.5 m bgl - 0.0, 1.2 m bgl - 0.4, 3.2 m bgl - 0.6, 4.0 m bgl - 0.7, 4.3 m bgl - 1.0
Samples taken at: 0.5, 3.2, 4.0, 4.3
Groundwater seep at 0.7 m bgl
Small wall collapses at base of hole

All dimensions in metres	CLIENT **Alex Moore Park Sport and Community Board**	Pocket Penetrometer Test Insitu Vane Shear Test Water Level

Report ID: AGS4 TEST PIT RECORD (NO SKETCH) \|\| Project: TEST PIT LOGS.GPJ \|\| Library: AGS 4_0.GLB \|\| Date: 12 September 2017

TEST PIT RECORD

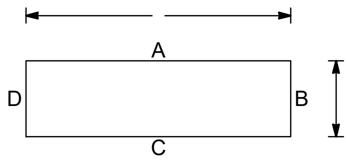
TEST PIT NO.	TP4
PROJECT NO.	252094

PROJECT **Alex Moore Park Development**
Alex Moore Park, Johnsonville, Wellington

METHOD **Test Pit**	CO-ORDINATES ()	LOGGED **N KING**	CHECKED **T DEE**
MACHINE & NO. **12T Excavator**			
CONTRACTOR **Griffiths Drilling**	GROUND LEVEL m RL	DATE **7/08/2017**	DATE **11/09/2017**

STRATA			SAMPLES & TESTS		
Depth	Legend	Description	Depth	No	Remarks/Tests
0.00-0.15		Clayey SILT, frequent rootlets and earthworms, high organic content, brown, soft, LP, moist [TOPSOIL]			
0.15-0.40		SILT with trace sand (sand f-c), yellow brown, soft-firm, LP, moist [FILL]			
0.40-1.20		SILT with trace sand (sand fine) and clay, orangey to yellow-brown, soft-firm, HP, moist [FILL]			
1.20-2.20		CLAY with trace silt and sand (sand fine), orangey grey with grey and dark grey inclusions, soft-very soft, HP, moist-wet [FILL]			
2.20-3.80		SILT with trace sand (sand medium), grey and black with orange inclusions and mottling, very soft, HP, moist-wet [FILL]			
3.80-4.00		SILT with trace sand (sand medium), very frequent anthropogenic materials (glass, plastic, crumpled metal ribbon, brick fragments), grey and black with orange inclusions and mottling, very soft, HP, moist-wet [FILL] (note depths are approximate as wall collapses made measurements of pits depths hazardous)			
		End of Test Pit at 4.00m, on 07/08/2017 *Termination Reason:* Major wall collapse			

SHORING/SUPPORT: **None**
STABILITY:



GENERAL REMARKS

PID readings at: 0.5 m bgl - 0.6, 1.2 m bgl - 0.1, 2.3 m bgl - 0.2, 4.0 m bgl (approx.) - 0.1, 4.0 m bgl (approx.) - 0.4
Samples taken at: 0.5, 2.3, FILL 1, FILL 2
Water started pooling in base of hole at approximately 2.2 m bgl after 1 - 2 mins.

All dimensions in metres

CLIENT **Alex Moore Park Sport and Community Board**

Pocket Penetrometer Test
Insitu Vane Shear Test
Water Level

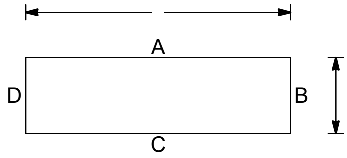
aurecon www.aurecongroup.com	TEST PIT RECORD	TEST PIT NO. **TP5**
		PROJECT NO. **252094**

PROJECT **Alex Moore Park Development**
Alex Moore Park, Johnsonville, Wellington

METHOD **Test Pit**	CO-ORDINATES ()	LOGGED **N KING**	CHECKED **T DEE**
MACHINE & NO. **12T Excavator**			
CONTRACTOR **Griffiths Drilling**	GROUND LEVEL m RL	DATE **7/08/2017**	DATE **11/09/2017**

STRATA			SAMPLES & TESTS		
Depth	Legend	Description	Depth	No	Remarks/Tests
0.00-0.15		SILT with trace sand (sand m-c) and clay, frequent rootlets and earthworms, high organic content, brown, soft, LP, moist [TOPSOIL]			
0.15-0.55		Sandy SILT (sand f-m), infrequent rootlets in top 0.2 m, yellow brown, soft-firm, LP, moist [FILL]			
0.55-1.50		SILT with clay and trace sand (sand fine), yellow brown, firm, LP, moist [FILL]			
1.50-2.10		CLAY with trace sand (sand fine) and silt, orange brown with grey mottles and bands, firm, HP, moist [FILL]			
2.10-4.30		Clayey SILT with trace sand (sand very fine), grey to slightly greenish grey, soft-firm, HP, moist-wet [FILL]			
4.30-4.50		Clayey SILT with silty/sandy inclusions (sand f-c), frequent gravel and cobbles (coarse, subangular-angular greywacke fragments), very frequent anthropogenic materials (glass fragments, Paua shells / shell fragments, ceramic fragments, nails, timber, glass bottles and vials, brick fragments, crumpled metal ribbon, plastic), grey-brown to greenish brown, soft-firm, H to LP, moist [FILL]			
		End of Test Pit at 4.50m, on 07/08/2017 *Termination Reason:* Target depth reached, walls collapsing			

SHORING/SUPPORT: **None**
STABILITY:



GENERAL REMARKS

PID readings taken at: 0.5 m bgl - 0.4, 1.5 m bgl - 0.8, 2.4 m bgl - 0.8, 3.4 m bgl - 0.4, 4.4 m bgl - 1.2
Samples taken at: 0.5, 1.5, 2.4, 4.4
Groundwater seep noted at 1.4 m bgl, groundwater accumulation at base of pit

All dimensions in metres	CLIENT **Alex Moore Park Sport and Community Board**	Pocket Penetrometer Test / Insitu Vane Shear Test / Water Level

Report ID: AGS4 TEST PIT RECORD (NO SKETCH) || Project: TEST PIT LOGS.GPJ || Library: AGS 4_0.GLB || Date: 12 September 2017

Aurecon NZ Ltd, , . Tel: Fax:

Appendix C
Lab Certificates

Report Date: 15 Aug 2017

Certificate Number: P1708110804

PRECISE
CONSULTING & LABORATORY

Analytica Laboratory
10 Bisley Rd, Ruakura, Hamilton 3240

Client Reference: 17-18678

Dear Hariata Anderson,

Re: Asbestos Soil Identification Analysis – AMP

20 sample(s) received on 10 Aug 2017 by Kristina Prokhanova.

The results of fibre analysis were performed by Laura Liu of Precise Consulting and Laboratory Ltd on 15 Aug 2017.

The sample(s) were stated to be from AMP.

Sample analysis was performed using polarised light microscopy with dispersion staining in accordance with *AS4964-2004 Method for the qualitative identification of asbestos in soil samples.*

The results of the fibre analysis are presented in the appended table.

Should you require further information please contact Laura Liu .

Yours sincerely

刘敏子

Laura Liu
PRECISE LABORATORY IDENTIFIER

Sample Analysis Results

Certificate Number: P1708110804
Report Date: 15 Aug 2017
Site Location: AMP

PRECISE
CONSULTING & LABORATORY

Note 1: The reporting limit for this analysis is 0.1g/kg (0.01%) by application of polarised light microscopy, dispersion staining and trace analysis techniques.

Note 2: If mineral fibres of unknown type are detected (UMF), by PLM and dispersion staining, these may or may not be asbestos fibres. To confirm the identity of this fibre, another independent analytical technique such as XRD analysis is advised.

Note 3: The samples in this report are "As Received". The laboratory does not take responsibility for the sampling procedure or accuracy of sample location description. This document may not be reproduced except in full.

Identified by:

刘敏子

Approved Identifier: Laura Liu

Reviewed by:

刘敏子

Key Technical Person: Laura Liu

Sample ID	Client Sample ID	Sample Location/Description/Dimensions	Analysis Results
TP1 0.5	TP1 0.5	- Non-Homogeneous Soil 96.0g	No Asbestos Detected Organic Fibres
TP1 2.6	TP1 2.6	- Non-Homogeneous Soil 281.0g	No Asbestos Detected Organic Fibres
TP1 3.0	TP1 3.0	- Non-Homogeneous Soil 98.0g	No Asbestos Detected Organic Fibres
TP1 4.1	TP1 4.1	- Non-Homogeneous Soil 161.5g	No Asbestos Detected Organic Fibres
TP2 0.5	TP2 0.5	- Non-Homogeneous Soil 153.0g	No Asbestos Detected Organic Fibres
TP2 2.1	TP2 2.1	AMP Non-Homogeneous Soil 238.0g	No Asbestos Detected Organic Fibres
TP2 3.9	TP2 3.9	- Non-Homogeneous Soil 224.5g	No Asbestos Detected Organic Fibres
TP2 4.5	TP2 4.5	- Non-Homogeneous Soil 209.5g	No Asbestos Detected Organic Fibres

Precise Consulting & Laboratory Limited
Unit 1, 30 Greenpark Road, Penrose, Auckland 8023
P: 09 282 3886 W: www.preciseconsulting.co.nz

Sample Analysis Results

Certificate Number: P1708110804
Report Date: 15 Aug 2017
Site Location: AMP

PRECISE
CONSULTING & LABORATORY

Sample ID	Client Sample ID	Sample Location/Description/Dimensions	Analysis Results
TP3 0.5	TP3 0.5	- Non-Homogeneous Soil 216.5g	No Asbestos Detected Organic Fibres
TP3 3.2	TP3 3.2	- Non-Homogeneous Soil 247.0g	No Asbestos Detected Organic Fibres
TP3 4.0	TP3 4.0	- Non-Homogeneous Soil 239.0g	No Asbestos Detected Organic Fibres
TP3 4.3	TP3 4.3	- Non-Homogeneous Soil 241.5g	No Asbestos Detected Organic Fibres
TP4 0.5	TP4 0.5	- Non-Homogeneous Soil 235.5g	No Asbestos Detected Organic Fibres
TP4 2.3	TP4 2.3	- Non-Homogeneous Soil 188.5g	No Asbestos Detected Organic Fibres
TP4 Fill 1	TP4 Fill 1	- Non-Homogeneous Soil 237.0g	No Asbestos Detected Organic Fibres
TP4 Fill 2	TP4 Fill 2	AMP Non-Homogeneous Soil 159.0g	No Asbestos Detected Organic Fibres
TP5 0.5	TP5 0.5	- Non-Homogeneous Soil 172.5g	No Asbestos Detected Organic Fibres
TP5 1.5	TP5 1.5	- Non-Homogeneous Soil 141.5g	No Asbestos Detected Organic Fibres
TP5 2.4	TP5 2.4	- Non-Homogeneous Soil 134.0g	No Asbestos Detected Organic Fibres
TP5 4.4	TP5 4.4	- Non-Homogeneous Soil 203.5g	No Asbestos Detected Organic Fibres

Appendix 1: Soil Analysis Raw Data

Certificate Number: P1708110804
Report Date: 15 Aug 2017
Site Location: AMP

PRECISE
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Sample ID	Client Sample ID	Total Sample Weight (g)	ACM Approximate Dimensions (g)*	Form	Trace Asbestos Detected**
TP1 0.5	TP1 0.5	96.0	-	-	N
TP1 2.6	TP1 2.6	281.0	-	-	N
TP1 3.0	TP1 3.0	98.0	-	-	N
TP1 4.1	TP1 4.1	161.5	-	-	N
TP2 0.5	TP2 0.5	153.0	-	-	N
TP2 2.1	TP2 2.1	238.0	-	-	N
TP2 3.9	TP2 3.9	224.5	-	-	N
TP2 4.5	TP2 4.5	209.5	-	-	N
TP3 0.5	TP3 0.5	216.5	-	-	N
TP3 3.2	TP3 3.2	247.0	-	-	N
TP3 4.0	TP3 4.0	239.0	-	-	N
TP3 4.3	TP3 4.3	241.5	-	-	N
TP4 0.5	TP4 0.5	235.5	-	-	N
TP4 2.3	TP4 2.3	188.5	-	-	N
TP4 Fill 1	TP4 Fill 1	237.0	-	-	N
TP4 Fill 2	TP4 Fill 2	159.0	-	-	N

Precise Consulting & Laboratory Limited
Unit 1, 30 Greenpark Road, Penrose, Auckland 8023

P: 09 282 3886 W: www.preciseconsulting.co.nz

Appendix 1: Soil Analysis Raw Data

Certificate Number: P1708110804
Report Date: 15 Aug 2017
Site Location: AMP

PRECISE
CONSULTING & LABORATORY

Sample ID	Client Sample ID	Total Sample Weight (g)	ACM Approximate Dimensions (g)*	Form	Trace Asbestos Detected**
TP5 0.5	TP5 0.5	172.5	-	-	N
TP5 1.5	TP5 1.5	141.5	-	-	N
TP5 2.4	TP5 2.4	134.0	-	-	N
TP5 4.4	TP5 4.4	203.5	-	-	N

* The reporting limit for this standard is 0.1g/kg
** Trace asbestos present is indicative that freely liberated respirable fibres are present and dust control measures should be implemented or increased

17-18678

Page2

ENVIRONMENTAL TESTING:

CHAIN OF CUSTODY

ANALYTICA LABORATORIES

CLIENT INFORMATION				Page #	2	of	2
Client	AURECON			Customer Comments/Instructions			
Address	42-52 WILLIS ST						
Project Leader	NICK KING						
Project ID	252094	PO #					
Site	AMP						
Sampler	NICK KING						
Phone	027 471 3030						
Email	NICK.KING@AURECONGROUP.COM						
Invoice Email	NZAP@AURECONGROUP.COM						

LABORATORY USE ONLY							
Laboratory Job #		Seal Status		Priority (mark with X)			
Date Received		Received By		Sample Chilled		Routine		Urgent	

TESTS REQUESTED

Lab ID	Sample ID	Depth	Date	Time	Matrix	# Cont	[Enter Test Name]	[Enter Test Name]	[Enter Test Name]	[Enter Test Name]	[Enter Test Name]	Sample Comments
	TP5	0.5			SOIL		HEAVY METALS, TPH,					
	TP5	1.5			"		VOC, SVOC,					
	TP5	2.4			"		ASBESTOS P/A					
	TP5	4.4			"				"			
	TP1	1.7					COLD HOLD					

Relinquished by				Relinquished by			Courier	
Date		Time		Date		Time	Courier #	

17-18678

Asbestos

S

ENVIRONMENTAL TESTING:

CHAIN OF CUSTODY

ANALYTICA LABORATORIES

CLIENT INFORMATION				Page #	1	of	2
Client	AURECON			Customer Comments/Instructions			
Address	42-52 WILLIS STREET						
Project Leader	NICK KING						
Project ID	252094	PO #	—				
Site	ALEX MOORE PARK (AMP)						
Sampler	NICK KING						
Phone	027 471 3030						
Email	NICK.KING@AURECONGROUP.COM						
Invoice Email	NZAP@AURECONGROUP.COM						

LABORATORY USE ONLY								
Laboratory Job #	17-18678		Seal Status	—	Priority (mark with X)			
Date Received	9/8/17	Received By	RC	Sample Chilled	—	Routine	—	Urgent

TESTS REQUESTED

Lab ID	Sample ID	Depth	Date	Time	Matrix	# Cont	[Enter Test Name]	[Enter Test Name]	[Enter Test Name]	[Enter Test Name]	[Enter Test Name]	Sample Comments
	TP1	0.5			SOIL		HEAVY METALS, TPH,					
	TP1	2.6			↑		VOC, SVOC,					
	TP1	3.0					ASBESTOS P/A					
	TP1	4.1							↑			
	TP2	0.5										
	TP2	2.1										
	TP2	3.9										
	TP2	4.5			↓				↓			
	TP3	0.5			"				"			
	TP3	3.2			↑				↑			
	TP3	4.0										
	TP3	4.3										
	TP4	0.5										
	TP4	2.3										
	TP4	FILL 1										
	TP4	FILL 2			↓				↓			

Relinquished by			Relinquished by	RC	Courier	NZC
Date		Time	Date	6.30	Time 9/8/17	Courier # 3DG00002422

Analytica Laboratories Ltd
Ruakura Research Centre

10 Bisley Road, Private Bag 3123
Hamilton 3240, New Zealand

Phone +64 7 974 4740
Email enviro.reception@analytica.co.nz

analytica.co.nz

SUBCONTRACT

Test Type Asbestos

Analytica to Invoice ☐

Subcontractor to Invoice ☐

PRECISE
CONSULTING & LABORATORY

17-18678

LAB003 Chain of Custody

Laboratory Locations			
Christchurch ☐ Unit 4/91 Byron Street Sydenham, Christchurch 8023	**Dunedin** ☐ 186 Macandrew Road South Dunedin, 9012	**Wellington** ☐ Level 2, 10 Hutt Road Petone,5012	**Auckland** ☑ 1/30 Greenpark Road Penrose
E: admin@preciseconsulting.co.nz			P:0800 002 712

Company Name: Analytica Laboratories	**Email: enviro.reception@analytica.co.nz**
Contact Person: Hariata Anderson	**Phone/Mobile: (07)444 5574**
Office Address: Ruakura Research Centre, 10 Bisley Road, Hamilton	

Site Address: AMP	
Client Reference: 17-18678	**Purchase Order Number:** 252094
PCL Job Number: **Internal** ☐	**External** ☐

Date Results Requested: (Bulk ID) 24hr / Urgent (<24hr)	**Soil Anaylsis:** Quant. (5 days) / Qual. (3days) **Urgent Request (Tick)** ☐

Relinquished By: MattB Date: 9/8/17	**Received By:** Date:

	Client Sample ID / Sample #	Qualitative	Quantitative (Soil Only)	Bulk	Soil	Tape	Lead in Paint	Other	Sample Location and Sample Description and Notes
1	TP1 0.5	X							
2	TP1 2.6	X							Please send report to enviro.reception@analytica.co.nz
3	TP1 3.0	X							
4	TP1 4.1	X							
5	TP2 0.5	X							
6	TP2 2.1	X							
7	TP2 3.9	X							
8	TP2 4.5	X							
9	TP3 0.5	X							
10	TP3 3.2	X							
11	TP3 4.0	X							
12	TP3 4.3	X							
13	TP4 0.5	X							
14	TP4 2.3	X							
15	TP4 Fill 1	X							
16	TP4 Fill 2	X							
17	TP5 0.5	X							
18	TP5 1.5	X							
19	TP5 2.4	X							
20	TP5 4.4	X							

Lab Only:

Report Checked by (Initials): Date:	**Report sent by (Initials):** Date:
Payment Received: Yes ☐ No ☐	Payment Method: COD ☐ CC ☐ Account ☐

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

Certificate of Analysis

Aurecon New Zealand Ltd
42-52 Willis Street
Wellington 6011
Attention: Nick King
Phone: 027 471 3030
Email: nick.king@aurecongroup.com

Lab Reference: 17-18678
Submitted by: Nick King
Date Received: 9/08/2017
Date Completed: 15/08/2017
Order Number:
Reference: 252094

Sampling Site: Alex Moore Park (AMP)

Heavy Metals in Soil

		Client Sample ID	TP1 Depth 0.5	TP1 Depth 2.6	TP1 Depth 3.0	TP1 Depth 4.1	TP2 Depth 0.5
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-1	17-18678-2	17-18678-3	17-18678-4	17-18678-5
Arsenic	mg/kg dry wt	*0.125*	4.94	3.82	5.12	12.3	4.34
Beryllium	mg/kg dry wt	*0.013*	0.53	0.36	0.43	0.91	0.60
Boron	mg/kg dry wt	*1.25*	1.90	2.47	2.49	5.67	1.58
Cadmium	mg/kg dry wt	*0.005*	0.044	0.017	0.028	0.88	0.025
Chromium	mg/kg dry wt	*0.125*	30.1	21.9	21.4	57.1	28.0
Copper	mg/kg dry wt	*0.075*	14.8	7.63	11.3	71.9	15.5
Lead	mg/kg dry wt	*0.05*	20.6	13.2	18.4	532	17.1
Mercury	mg/kg dry wt	*0.025*	0.065	0.081	0.076	0.28	0.055
Nickel	mg/kg dry wt	*0.05*	18.1	13.5	13.5	14.4	22.4
Zinc	mg/kg dry wt	*0.05*	49.5	44.4	55.0	1,130	50.9

Heavy Metals in Soil

		Client Sample ID	TP2 Depth 2.1	TP2 Depth 3.9	TP2 Depth 4.5	TP3 Depth 0.5	TP3 Depth 3.2
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-6	17-18678-7	17-18678-8	17-18678-9	17-18678-10
Arsenic	mg/kg dry wt	*0.125*	4.01	23.2	6.78	4.55	4.32
Beryllium	mg/kg dry wt	*0.013*	0.42	0.94	0.73	0.57	0.36
Boron	mg/kg dry wt	*1.25*	2.37	25.1	13.1	2.31	2.34
Cadmium	mg/kg dry wt	*0.005*	0.032	0.54	0.83	0.033	0.055
Chromium	mg/kg dry wt	*0.125*	19.3	21.6	18.3	28.8	18.6
Copper	mg/kg dry wt	*0.075*	9.67	73.5	62.6	16.2	10.7
Lead	mg/kg dry wt	*0.05*	19.2	318	200	15.9	22.6
Mercury	mg/kg dry wt	*0.025*	0.091	0.31	0.91	0.082	0.090
Nickel	mg/kg dry wt	*0.05*	12.1	18.9	14.0	21.0	11.0
Zinc	mg/kg dry wt	*0.05*	51.6	336	250	50.1	49.7

IANZ ACCREDITED LABORATORY

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

Heavy Metals in Soil

Client Sample ID			TP3 Depth 4.0	TP3 Depth 4.3	TP4 Depth 0.5	TP4 Depth 2.3	TP4 Fill 1
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-11	17-18678-12	17-18678-13	17-18678-14	17-18678-15
Arsenic	mg/kg dry wt	*0.125*	9.12	5.70	4.78	3.32	11.2
Beryllium	mg/kg dry wt	*0.013*	0.96	0.76	0.60	0.33	0.85
Boron	mg/kg dry wt	*1.25*	10.0	3.29	2.06	2.32	4.48
Cadmium	mg/kg dry wt	*0.005*	0.085	0.049	0.048	0.039	0.66
Chromium	mg/kg dry wt	*0.125*	29.5	27.0	27.6	17.5	20.1
Copper	mg/kg dry wt	*0.075*	33.8	24.3	15.4	7.56	239
Lead	mg/kg dry wt	*0.05*	49.4	26.1	16.9	14.2	253
Mercury	mg/kg dry wt	*0.025*	0.11	0.12	0.079	0.093	4.0
Nickel	mg/kg dry wt	*0.05*	32.7	18.1	18.2	10.3	15.9
Zinc	mg/kg dry wt	*0.05*	82.5	64.8	48.1	40.7	243

Heavy Metals in Soil

Client Sample ID			TP4 Fill 2	TP5 Depth 0.5	TP5 Depth 1.5	TP5 Depth 2.4	TP5 Depth 4.4
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-16	17-18678-17	17-18678-18	17-18678-19	17-18678-20
Arsenic	mg/kg dry wt	*0.125*	5.10	5.14	4.95	3.41	10.2
Beryllium	mg/kg dry wt	*0.013*	0.99	0.60	0.54	0.36	0.80
Boron	mg/kg dry wt	*1.25*	5.99	2.05	2.15	2.33	21.8
Cadmium	mg/kg dry wt	*0.005*	1.0	0.037	0.049	0.025	0.30
Chromium	mg/kg dry wt	*0.125*	19.9	31.1	28.4	18.8	31.7
Copper	mg/kg dry wt	*0.075*	25.8	19.0	15.7	8.50	233
Lead	mg/kg dry wt	*0.05*	83.8	17.9	18.4	14.1	403
Mercury	mg/kg dry wt	*0.025*	0.14	0.066	0.070	0.089	0.26
Nickel	mg/kg dry wt	*0.05*	14.5	22.6	19.3	11.2	25.4
Zinc	mg/kg dry wt	*0.05*	130	51.9	50.9	41.0	369

Total Petroleum Hydrocarbons - Soil

Client Sample ID			TP1 Depth 0.5	TP1 Depth 2.6	TP1 Depth 3.0	TP1 Depth 4.1	TP2 Depth 0.5
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-1	17-18678-2	17-18678-3	17-18678-4	17-18678-5
C7-C9	mg/kg dry wt	*10*	<10	<10	<10	<10	<10
C10-C14	mg/kg dry wt	*15*	<15	<15	<15	<15	<15
C15-C36	mg/kg dry wt	*25*	39	<25	<25	581	<25
C7-C36 (Total)	mg/kg dry wt	*50*	<50	<50	<50	581	<50

Total Petroleum Hydrocarbons - Soil

Client Sample ID			TP2 Depth 2.1	TP2 Depth 3.9	TP2 Depth 4.5	TP3 Depth 0.5	TP3 Depth 3.2
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-6	17-18678-7	17-18678-8	17-18678-9	17-18678-10
C7-C9	mg/kg dry wt	*10*	<10	<10	<10	<10	<10
C10-C14	mg/kg dry wt	*15*	<15	<15	<15	<15	<15
C15-C36	mg/kg dry wt	*25*	<25	<25	<25	<25	<25
C7-C36 (Total)	mg/kg dry wt	*50*	<50	<50	<50	<50	<50

Total Petroleum Hydrocarbons - Soil

		Client Sample ID	TP3 Depth 4.0	TP3 Depth 4.3	TP4 Depth 0.5	TP4 Depth 2.3	TP4 Fill 1
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-11	17-18678-12	17-18678-13	17-18678-14	17-18678-15
C7-C9	mg/kg dry wt	*10*	<10	<10	<10	<10	<10
C10-C14	mg/kg dry wt	*15*	<15	<15	<15	<15	<15
C15-C36	mg/kg dry wt	*25*	45	33	<25	<25	176
C7-C36 (Total)	mg/kg dry wt	*50*	<50	<50	<50	<50	176

Total Petroleum Hydrocarbons - Soil

		Client Sample ID	TP4 Fill 2	TP5 Depth 0.5	TP5 Depth 1.5	TP5 Depth 2.4	TP5 Depth 4.4
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-16	17-18678-17	17-18678-18	17-18678-19	17-18678-20
C7-C9	mg/kg dry wt	*10*	<10	<10	13	<10	<10
C10-C14	mg/kg dry wt	*15*	<15	<15	16	<15	<15
C15-C36	mg/kg dry wt	*25*	370	<25	32	<25	48
C7-C36 (Total)	mg/kg dry wt	*50*	370	<50	60	<50	<50

Semivolatile Organic Compounds - Soil

		Client Sample ID	TP1 Depth 0.5	TP1 Depth 2.6	TP1 Depth 3.0	TP1 Depth 4.1	TP2 Depth 0.5
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-1	17-18678-2	17-18678-3	17-18678-4	17-18678-5
Phenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Chlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Nitrophenol	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4-Dichlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,6-Dichlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chloro-3-methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4,5-Trichlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
2,4,6-Trichlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
2,3,4,6-Tetrachlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
4-Methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Nitrophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
Naphthalene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
2-Chloronaphthalene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Acenaphthene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	0.1	<0.1
Acenaphthylene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	1.2	<0.1
Fluorene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	1.0	<0.1
Phenanthrene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	11.6	<0.1
Anthracene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	2.1	<0.1
Fluoranthene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	17.0	<0.1
Benzo[a]anthracene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	8.4	<0.1
Chrysene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	9.0	<0.1
Benzo[b]fluoranthene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	8.0	<0.1
Benzo[k]fluoranthene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	3.2	<0.1
Benzo[a]pyrene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	6.7	<0.1
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	*0.2*	<0.2	<0.2	<0.2	10.2	<0.2
Dibenzo[a,h]anthracene	mg/kg dry wt	*0.2*	<0.2	<0.2	<0.2	2.7	<0.2
Benzo[g,h,i]perylene	mg/kg dry wt	*0.2*	<0.2	<0.2	<0.2	8.1	<0.2

Semivolatile Organic Compounds - Soil

		Client Sample ID	TP1 Depth 0.5	TP1 Depth 2.6	TP1 Depth 3.0	TP1 Depth 4.1	TP2 Depth 0.5
		Date Sampled					
Pyrene	mg/kg dry wt	*0.2*	<0.2	<0.2	<0.2	16.3	<0.2
4,4'-DDD	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4,4'-DDE	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4,4'-DDT	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
alpha-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
beta-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
gamma-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
delta-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Aldrin	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
cis-Chlordane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
trans-Chlordane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Dieldrin	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan I	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Endosulfan II	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulphate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	mg/kg dry wt	*0.3*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin ketone	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Heptachlor	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Heptachlor epoxide	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Methoxychlor	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-ethylhexyl) phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Butyl benzyl phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Di-n-butyl phthalate	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Di-n-octyl phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Dimethyl phthalate	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
N-Nitrosodiphenylamine	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
N-Nitrosodi-n-propylamine	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4-Dinitrotoluene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,6-Dinitrotoluene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Azobenzene	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	2.1	<0.5
Isophorone	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Bromophenyl phenyl ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chlorophenyl phenyl ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloroethyl) ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloro-1-methylethyl) ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloroethoxy) methane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,2-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,3-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,4-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachlorobutadiene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachlorocylopenta diene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachloroethane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chloroaniline	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
2-Nitroaniline	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
3-Nitroaniline	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Aniline	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0

Semivolatile Organic Compounds - Soil

		Client Sample ID	TP1 Depth 0.5	TP1 Depth 2.6	TP1 Depth 3.0	TP1 Depth 4.1	TP2 Depth 0.5
		Date Sampled					
3,3'-Dichlorobenzidine	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenzofuran	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	0.3	<0.3
Methyl methanesulfonate	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl methanesulfonate	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Benzyl alcohol	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Phenol-d5 (Surrogate)	%	*1*	68.1	78.7	64.1	72.9	76.4
2-Fluorophenol (Surrogate)	%	*1*	71.7	83.3	69.0	76.5	79.2
2-Fluorobiphenyl (Surrogate)	%	*1*	115.1	108.1	109.1	105.5	108.0
2,4,6-Tribromophenol (Surrogate)	%	*1*	68.9	64.4	62.6	86.9	91.3
p-Terphenyl-d14 (Surrogate)	%	*1*	116.9	110.1	110.2	112.6	115.2
Nitrobenzene-d5 (Surrogate)	%	*1*	89.9	92.2	87.7	90.8	93.2

Semivolatile Organic Compounds - Soil

		Client Sample ID	TP2 Depth 2.1	TP2 Depth 3.9	TP2 Depth 4.5	TP3 Depth 0.5	TP3 Depth 3.2
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-6	17-18678-7	17-18678-8	17-18678-9	17-18678-10
Phenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Chlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Nitrophenol	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4-Dichlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,6-Dichlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chloro-3-methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4,5-Trichlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
2,4,6-Trichlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
2,3,4,6-Tetrachlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
4-Methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Nitrophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
Naphthalene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
2-Chloronaphthalene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Acenaphthene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg dry wt	*0.1*	<0.1	0.2	<0.1	<0.1	<0.1
Fluorene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg dry wt	*0.1*	<0.1	1.3	0.1	<0.1	<0.1
Benzo[a]anthracene	mg/kg dry wt	*0.1*	<0.1	1.4	<0.1	<0.1	<0.1
Chrysene	mg/kg dry wt	*0.1*	<0.1	1.2	<0.1	<0.1	<0.1
Benzo[b]fluoranthene	mg/kg dry wt	*0.1*	<0.1	1.8	0.2	<0.1	<0.1
Benzo[k]fluoranthene	mg/kg dry wt	*0.1*	<0.1	0.8	<0.1	<0.1	<0.1
Benzo[a]pyrene	mg/kg dry wt	*0.1*	<0.1	1.5	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	*0.2*	<0.2	2.0	0.3	<0.2	<0.2
Dibenzo[a,h]anthracene	mg/kg dry wt	*0.2*	<0.2	0.5	<0.2	<0.2	<0.2
Benzo[g,h,i]perylene	mg/kg dry wt	*0.2*	<0.2	1.2	0.2	<0.2	<0.2
Pyrene	mg/kg dry wt	*0.2*	<0.2	2.3	<0.2	<0.2	<0.2

Semivolatile Organic Compounds - Soil

		Client Sample ID	TP2 Depth 2.1	TP2 Depth 3.9	TP2 Depth 4.5	TP3 Depth 0.5	TP3 Depth 3.2
		Date Sampled					
4,4'-DDD	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4,4'-DDE	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4,4'-DDT	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
alpha-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
beta-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
gamma-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
delta-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Aldrin	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
cis-Chlordane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
trans-Chlordane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Dieldrin	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan I	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Endosulfan II	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulphate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	mg/kg dry wt	*0.3*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin ketone	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Heptachlor	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Heptachlor epoxide	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Methoxychlor	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-ethylhexyl) phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Butyl benzyl phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Di-n-butyl phthalate	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Di-n-octyl phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Dimethyl phthalate	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
N-Nitrosodiphenylamine	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
N-Nitrosodi-n-propylamine	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4-Dinitrotoluene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,6-Dinitrotoluene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Azobenzene	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Isophorone	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Bromophenyl phenyl ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chlorophenyl phenyl ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloroethyl) ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloro-1-methylethyl) ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloroethoxy) methane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,2-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,3-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,4-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachlorobutadiene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachlorocylopenta diene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachloroethane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chloroaniline	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
2-Nitroaniline	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
3-Nitroaniline	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Aniline	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
3,3'-Dichlorobenzidine	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5

Semivolatile Organic Compounds - Soil

Client Sample ID			TP2 Depth 2.1	TP2 Depth 3.9	TP2 Depth 4.5	TP3 Depth 0.5	TP3 Depth 3.2
Date Sampled							
Dibenzofuran	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Methyl methanesulfonate	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl methanesulfonate	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Benzyl alcohol	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Phenol-d5 (Surrogate)	%	*1*	83.0	78.1	75.9	75.5	74.0
2-Fluorophenol (Surrogate)	%	*1*	87.3	80.6	79.2	78.5	79.9
2-Fluorobiphenyl (Surrogate)	%	*1*	108.0	104.0	109.8	112.4	92.6
2,4,6-Tribromophenol (Surrogate)	%	*1*	85.4	90.1	92.6	84.0	69.9
p-Terphenyl-d14 (Surrogate)	%	*1*	112.9	110.8	120.7	117.2	99.5
Nitrobenzene-d5 (Surrogate)	%	*1*	91.8	85.2	91.7	93.7	81.1

Semivolatile Organic Compounds - Soil

Client Sample ID			TP3 Depth 4.0	TP3 Depth 4.3	TP4 Depth 0.5	TP4 Depth 2.3	TP4 Fill 1
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-11	17-18678-12	17-18678-13	17-18678-14	17-18678-15
Phenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Chlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Nitrophenol	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4-Dichlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,6-Dichlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chloro-3-methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4,5-Trichlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
2,4,6-Trichlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
2,3,4,6-Tetrachlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
4-Methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Nitrophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
Naphthalene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
2-Chloronaphthalene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Acenaphthene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	0.1
Fluorene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	0.1
Phenanthrene	mg/kg dry wt	*0.1*	0.2	<0.1	<0.1	<0.1	1.3
Anthracene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	0.2
Fluoranthene	mg/kg dry wt	*0.1*	0.4	<0.1	<0.1	<0.1	2.9
Benzo[a]anthracene	mg/kg dry wt	*0.1*	0.3	<0.1	<0.1	<0.1	1.3
Chrysene	mg/kg dry wt	*0.1*	0.3	<0.1	<0.1	<0.1	1.6
Benzo[b]fluoranthene	mg/kg dry wt	*0.1*	0.3	<0.1	<0.1	<0.1	1.5
Benzo[k]fluoranthene	mg/kg dry wt	*0.1*	0.1	<0.1	<0.1	<0.1	0.7
Benzo[a]pyrene	mg/kg dry wt	*0.1*	0.2	<0.1	<0.1	<0.1	1.1
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	*0.2*	0.4	<0.2	<0.2	<0.2	1.8
Dibenzo[a,h]anthracene	mg/kg dry wt	*0.2*	<0.2	<0.2	<0.2	<0.2	0.4
Benzo[g,h,i]perylene	mg/kg dry wt	*0.2*	0.3	<0.2	<0.2	<0.2	1.2
Pyrene	mg/kg dry wt	*0.2*	0.3	<0.2	<0.2	<0.2	2.5
4,4'-DDD	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3

Semivolatile Organic Compounds - Soil

Client Sample ID			TP3 Depth 4.0	TP3 Depth 4.3	TP4 Depth 0.5	TP4 Depth 2.3	TP4 Fill 1
Date Sampled							
4,4'-DDE	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4,4'-DDT	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
alpha-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
beta-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
gamma-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
delta-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Aldrin	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
cis-Chlordane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
trans-Chlordane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Dieldrin	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan I	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Endosulfan II	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulphate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	mg/kg dry wt	*0.3*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin ketone	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Heptachlor	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Heptachlor epoxide	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Methoxychlor	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-ethylhexyl) phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Butyl benzyl phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Di-n-butyl phthalate	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Di-n-octyl phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Dimethyl phthalate	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
N-Nitrosodiphenylamine	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
N-Nitrosodi-n-propylamine	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4-Dinitrotoluene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,6-Dinitrotoluene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Azobenzene	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Isophorone	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Bromophenyl phenyl ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chlorophenyl phenyl ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloroethyl) ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloro-1-methylethyl) ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloroethoxy) methane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,2-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,3-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,4-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachlorobutadiene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachlorocylopenta diene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachloroethane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chloroaniline	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
2-Nitroaniline	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
3-Nitroaniline	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Aniline	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
3,3'-Dichlorobenzidine	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenzofuran	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3

Semivolatile Organic Compounds - Soil

		Client Sample ID	TP3 Depth 4.0	TP3 Depth 4.3	TP4 Depth 0.5	TP4 Depth 2.3	TP4 Fill 1
		Date Sampled					
Methyl methanesulfonate	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl methanesulfonate	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Benzyl alcohol	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Phenol-d5 (Surrogate)	%	*1*	63.1	68.9	70.5	47.6	71.7
2-Fluorophenol (Surrogate)	%	*1*	66.8	73.5	74.0	53.4	74.5
2-Fluorobiphenyl (Surrogate)	%	*1*	98.5	93.2	114.0	102.5	101.4
2,4,6-Tribromophenol (Surrogate)	%	*1*	73.3	67.0	65.9	56.4	74.8
p-Terphenyl-d14 (Surrogate)	%	*1*	107.7	100.6	118.9	103.0	110.5
Nitrobenzene-d5 (Surrogate)	%	*1*	78.2	79.5	90.7	73.3	83.1

Semivolatile Organic Compounds - Soil

		Client Sample ID	TP4 Fill 2	TP5 Depth 0.5	TP5 Depth 1.5	TP5 Depth 2.4	TP5 Depth 4.4
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-16	17-18678-17	17-18678-18	17-18678-19	17-18678-20
Phenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Chlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2-Nitrophenol	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4-Dichlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,6-Dichlorophenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chloro-3-methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4,5-Trichlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
2,4,6-Trichlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
2,3,4,6-Tetrachlorophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
4-Methylphenol	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Nitrophenol	mg/kg dry wt	*5*	<5	<5	<5	<5	<5
Naphthalene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
2-Chloronaphthalene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Acenaphthene	mg/kg dry wt	*0.1*	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg dry wt	*0.1*	0.2	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg dry wt	*0.1*	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg dry wt	*0.1*	1.3	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg dry wt	*0.1*	0.2	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg dry wt	*0.1*	3.3	<0.1	<0.1	<0.1	0.2
Benzo[a]anthracene	mg/kg dry wt	*0.1*	1.4	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg dry wt	*0.1*	1.8	<0.1	<0.1	<0.1	0.1
Benzo[b]fluoranthene	mg/kg dry wt	*0.1*	1.7	<0.1	<0.1	<0.1	0.2
Benzo[k]fluoranthene	mg/kg dry wt	*0.1*	0.8	<0.1	<0.1	<0.1	<0.1
Benzo[a]pyrene	mg/kg dry wt	*0.1*	1.2	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	*0.2*	1.9	<0.2	<0.2	<0.2	0.3
Dibenzo[a,h]anthracene	mg/kg dry wt	*0.2*	0.5	<0.2	<0.2	<0.2	<0.2
Benzo[g,h,i]perylene	mg/kg dry wt	*0.2*	1.3	<0.2	<0.2	<0.2	0.2
Pyrene	mg/kg dry wt	*0.2*	2.7	<0.2	<0.2	<0.2	<0.2
4,4'-DDD	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4,4'-DDE	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3

Semivolatile Organic Compounds - Soil

Client Sample ID			TP4 Fill 2	TP5 Depth 0.5	TP5 Depth 1.5	TP5 Depth 2.4	TP5 Depth 4.4
Date Sampled							
4,4'-DDT	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
alpha-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
beta-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
gamma-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
delta-BHC	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Aldrin	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
cis-Chlordane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
trans-Chlordane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Dieldrin	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan I	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Endosulfan II	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulphate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	mg/kg dry wt	*0.3*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin ketone	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Heptachlor	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Heptachlor epoxide	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Methoxychlor	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-ethylhexyl) phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Butyl benzyl phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Di-n-butyl phthalate	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Di-n-octyl phthalate	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Dimethyl phthalate	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
N-Nitrosodiphenylamine	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
N-Nitrosodi-n-propylamine	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,4-Dinitrotoluene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
2,6-Dinitrotoluene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Azobenzene	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Isophorone	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Bromophenyl phenyl ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chlorophenyl phenyl ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloroethyl) ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloro-1-methylethyl) ether	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Bis(2-Chloroethoxy) methane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,2-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,3-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
1,4-Dichlorobenzene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachlorobutadiene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachlorocylopenta diene	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
Hexachloroethane	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
4-Chloroaniline	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
2-Nitroaniline	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3
3-Nitroaniline	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Aniline	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
3,3'-Dichlorobenzidine	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenzofuran	mg/kg dry wt	*0.3*	<0.3	<0.3	<0.3	<0.3	<0.3

Semivolatile Organic Compounds - Soil

		Client Sample ID	TP4 Fill 2	TP5 Depth 0.5	TP5 Depth 1.5	TP5 Depth 2.4	TP5 Depth 4.4
		Date Sampled					
Methyl methanesulfonate	mg/kg dry wt	*1.0*	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl methanesulfonate	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Benzyl alcohol	mg/kg dry wt	*1*	<1	<1	<1	<1	<1
Phenol-d5 (Surrogate)	%	*1*	88.9	84.2	85.1	81.4	75.1
2-Fluorophenol (Surrogate)	%	*1*	92.8	89.9	89.6	86.1	80.1
2-Fluorobiphenyl (Surrogate)	%	*1*	109.4	125.6	123.8	110.7	124.2
2,4,6-Tribromophenol (Surrogate)	%	*1*	100.1	86.7	82.3	76.7	102.9
p-Terphenyl-d14 (Surrogate)	%	*1*	119.9	134.3	128.5	117.3	135.5
Nitrobenzene-d5 (Surrogate)	%	*1*	97.8	106.0	105.3	91.3	101.0

Volatile Organic Compounds - Soil

		Client Sample ID	TP1 Depth 0.5	TP1 Depth 2.6	TP1 Depth 3.0	TP1 Depth 4.1	TP2 Depth 0.5
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-1	17-18678-2	17-18678-3	17-18678-4	17-18678-5
2,2-Dichloropropane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichloropropane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Cis-1,3-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Trans-1,3-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dibromoethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Carbon disulfide	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl acetate	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
4-Methyl-2-pentanone	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
2-Hexanone	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
2-Methoxy-2-methylpropane (MTBE)	mg/kg dry wt	*0.25*	<0.25	<0.25	<0.25	<0.25	<0.25
Benzene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Ethylbenzene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
m,p-Xylene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
o-Xylene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Styrene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Isopropylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
n-Propylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3,5-Trimethylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
sec-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trimethylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
tert-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
p-Isopropyltoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
n-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
2-Chlorotoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
4-Chlorotoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trichlorobenzene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10

Volatile Organic Compounds - Soil

		Client Sample ID	TP1 Depth 0.5	TP1 Depth 2.6	TP1 Depth 3.0	TP1 Depth 4.1	TP2 Depth 0.5
		Date Sampled					
1,2,3-Trichlorobenzene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Carbon tetrachloride	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene chloride	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1-Dichloroethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Trans-1,2-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Cis-1,2-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Trichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromomethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Iodomethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
2-Chloroethyl vinyl ether	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,3-Trichloropropane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dibromo-3-chloropropane	mg/kg dry wt	*0.15*	<0.15	<0.15	<0.15	<0.15	<0.15
Hexachlorobutadiene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chloroform	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromodichloromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Bromoform	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Dichlorodifluoro methane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chloromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromomethane	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane-d4 (Surrogate)	%	*1*	99.0	102.2	99.2	100.8	99.5
p-Bromofluorobenzene (Surrogate)	%	*1*	102.8	103.8	104.5	101.9	104.2
Toluene-d8 (Surrogate)	%	*1*	97.1	100.8	99.9	98.9	97.6

Volatile Organic Compounds - Soil

		Client Sample ID	TP2 Depth 2.1	TP2 Depth 3.9	TP2 Depth 4.5	TP3 Depth 0.5	TP3 Depth 3.2
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-6	17-18678-7	17-18678-8	17-18678-9	17-18678-10
2,2-Dichloropropane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichloropropane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Cis-1,3-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Trans-1,3-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dibromoethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Carbon disulfide	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05

Volatile Organic Compounds - Soil

		Client Sample ID	TP2 Depth 2.1	TP2 Depth 3.9	TP2 Depth 4.5	TP3 Depth 0.5	TP3 Depth 3.2
		Date Sampled					
Vinyl acetate	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
4-Methyl-2-pentanone	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
2-Hexanone	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
2-Methoxy-2-methylpropane (MTBE)	mg/kg dry wt	*0.25*	<0.25	<0.25	<0.25	<0.25	<0.25
Benzene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Ethylbenzene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
m,p-Xylene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
o-Xylene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Styrene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Isopropylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
n-Propylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3,5-Trimethylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
sec-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trimethylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
tert-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
p-Isopropyltoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
n-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
2-Chlorotoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
4-Chlorotoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trichlorobenzene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,3-Trichlorobenzene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Carbon tetrachloride	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene chloride	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1-Dichloroethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Trans-1,2-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Cis-1,2-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Trichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromomethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Iodomethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
2-Chloroethyl vinyl ether	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,3-Trichloropropane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dibromo-3-chloropropane	mg/kg dry wt	*0.15*	<0.15	<0.15	<0.15	<0.15	<0.15
Hexachlorobutadiene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chloroform	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05

Volatile Organic Compounds - Soil

Client Sample ID			TP2 Depth 2.1	TP2 Depth 3.9	TP2 Depth 4.5	TP3 Depth 0.5	TP3 Depth 3.2
Date Sampled							
Bromodichloromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Bromoform	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Dichlorodifluoro methane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chloromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromomethane	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane-d4 (Surrogate)	%	*1*	104.6	99.3	96.1	103.8	98.2
p-Bromofluorobenzene (Surrogate)	%	*1*	104.7	104.9	100.4	104.2	104.2
Toluene-d8 (Surrogate)	%	*1*	101.1	98.0	97.5	98.9	98.8

Volatile Organic Compounds - Soil

Client Sample ID			TP3 Depth 4.0	TP3 Depth 4.3	TP4 Depth 0.5	TP4 Depth 2.3	TP4 Fill 1
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-11	17-18678-12	17-18678-13	17-18678-14	17-18678-15
2,2-Dichloropropane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichloropropane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Cis-1,3-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Trans-1,3-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dibromoethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Carbon disulfide	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl acetate	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
4-Methyl-2-pentanone	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
2-Hexanone	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
2-Methoxy-2-methylpropane (MTBE)	mg/kg dry wt	*0.25*	<0.25	<0.25	<0.25	<0.25	<0.25
Benzene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Ethylbenzene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
m,p-Xylene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
o-Xylene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Styrene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Isopropylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
n-Propylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3,5-Trimethylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
sec-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trimethylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
tert-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
p-Isopropyltoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
n-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
2-Chlorotoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
4-Chlorotoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05

Volatile Organic Compounds - Soil

		Client Sample ID	TP3 Depth 4.0	TP3 Depth 4.3	TP4 Depth 0.5	TP4 Depth 2.3	TP4 Fill 1
		Date Sampled					
1,2,4-Trichlorobenzene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,3-Trichlorobenzene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Carbon tetrachloride	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene chloride	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1-Dichloroethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Trans-1,2-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Cis-1,2-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Trichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromomethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Iodomethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
2-Chloroethyl vinyl ether	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,3-Trichloropropane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dibromo-3-chloropropane	mg/kg dry wt	*0.15*	<0.15	<0.15	<0.15	<0.15	<0.15
Hexachlorobutadiene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chloroform	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromodichloromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Bromoform	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Dichlorodifluoro methane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chloromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromomethane	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane-d4 (Surrogate)	%	*1*	100.3	100.0	101.0	96.6	95.5
p-Bromofluorobenzene (Surrogate)	%	*1*	103.9	100.7	104.0	101.2	106.6
Toluene-d8 (Surrogate)	%	*1*	98.7	99.5	98.6	99.4	99.4

Volatile Organic Compounds - Soil

		Client Sample ID	TP4 Fill 2	TP5 Depth 0.5	TP5 Depth 1.5	TP5 Depth 2.4	TP5 Depth 4.4
		Date Sampled					
Analyte	Unit	*Reporting Limit*	17-18678-16	17-18678-17	17-18678-18	17-18678-19	17-18678-20
2,2-Dichloropropane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichloropropane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Cis-1,3-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Trans-1,3-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dibromoethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10

Volatile Organic Compounds - Soil

Client Sample ID			TP4 Fill 2	TP5 Depth 0.5	TP5 Depth 1.5	TP5 Depth 2.4	TP5 Depth 4.4
Date Sampled							
Carbon disulfide	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl acetate	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
4-Methyl-2-pentanone	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
2-Hexanone	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
2-Methoxy-2-methylpropane (MTBE)	mg/kg dry wt	*0.25*	<0.25	<0.25	<0.25	<0.25	<0.25
Benzene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Ethylbenzene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
m,p-Xylene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
o-Xylene	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Styrene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Isopropylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
n-Propylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3,5-Trimethylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
sec-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trimethylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
tert-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
p-Isopropyltoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
n-Butylbenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
2-Chlorotoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
4-Chlorotoluene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trichlorobenzene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,3-Trichlorobenzene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Carbon tetrachloride	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene chloride	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1-Dichloroethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Trans-1,2-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Cis-1,2-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Trichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromomethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Iodomethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
2-Chloroethyl vinyl ether	mg/kg dry wt	*0.5*	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1-Dichloropropene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethene	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,3-Trichloropropane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dibromo-3-chloropropane	mg/kg dry wt	*0.15*	<0.15	<0.15	<0.15	<0.15	<0.15
Hexachlorobutadiene	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10

Volatile Organic Compounds - Soil

Client Sample ID			TP4 Fill 2	TP5 Depth 0.5	TP5 Depth 1.5	TP5 Depth 2.4	TP5 Depth 4.4
Date Sampled							
Chloroform	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromodichloromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Bromoform	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Dichlorodifluoro methane	mg/kg dry wt	*0.10*	<0.10	<0.10	<0.10	<0.10	<0.10
Chloromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Bromomethane	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	mg/kg dry wt	*0.50*	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane-d4 (Surrogate)	%	*1*	94.6	99.1	101.0	98.1	96.7
p-Bromofluorobenzene (Surrogate)	%	*1*	101.0	103.7	105.6	102.3	102.6
Toluene-d8 (Surrogate)	%	*1*	96.4	99.8	100.8	102.7	98.6

Moisture Content

Client Sample ID			TP1 Depth 0.5	TP1 Depth 2.6	TP1 Depth 3.0	TP1 Depth 4.1	TP2 Depth 0.5
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-1	17-18678-2	17-18678-3	17-18678-4	17-18678-5
Moisture Content	%	*1*	26	25	28	20	24

Moisture Content

Client Sample ID			TP2 Depth 2.1	TP2 Depth 3.9	TP2 Depth 4.5	TP3 Depth 0.5	TP3 Depth 3.2
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-6	17-18678-7	17-18678-8	17-18678-9	17-18678-10
Moisture Content	%	*1*	25	23	25	25	24

Moisture Content

Client Sample ID			TP3 Depth 4.0	TP3 Depth 4.3	TP4 Depth 0.5	TP4 Depth 2.3	TP4 Fill 1
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-11	17-18678-12	17-18678-13	17-18678-14	17-18678-15
Moisture Content	%	*1*	23	27	25	28	19

Moisture Content

Client Sample ID			TP4 Fill 2	TP5 Depth 0.5	TP5 Depth 1.5	TP5 Depth 2.4	TP5 Depth 4.4
Date Sampled							
Analyte	Unit	*Reporting Limit*	17-18678-16	17-18678-17	17-18678-18	17-18678-19	17-18678-20
Moisture Content	%	*1*	24	26	26	23	25

Method Summary

Elements in Soil Acid digestion followed by ICP-MS analysis. US EPA method 200.8.

TPH in Soil Solvent extraction, silica cleanup, followed by GC-FID analysis. (C7-C36)

SVOC in Soil Solvent extraction, followed by GC-MS analysis.

VOC in Soil Methanol extraction using US-EPA 5030A, analysis by US-EPA Method 5021A (modified) using GCMS with headspace sample introduction.

Method Summary

Moisture Moisture content is determined gravimetrically by drying at 103 °C.

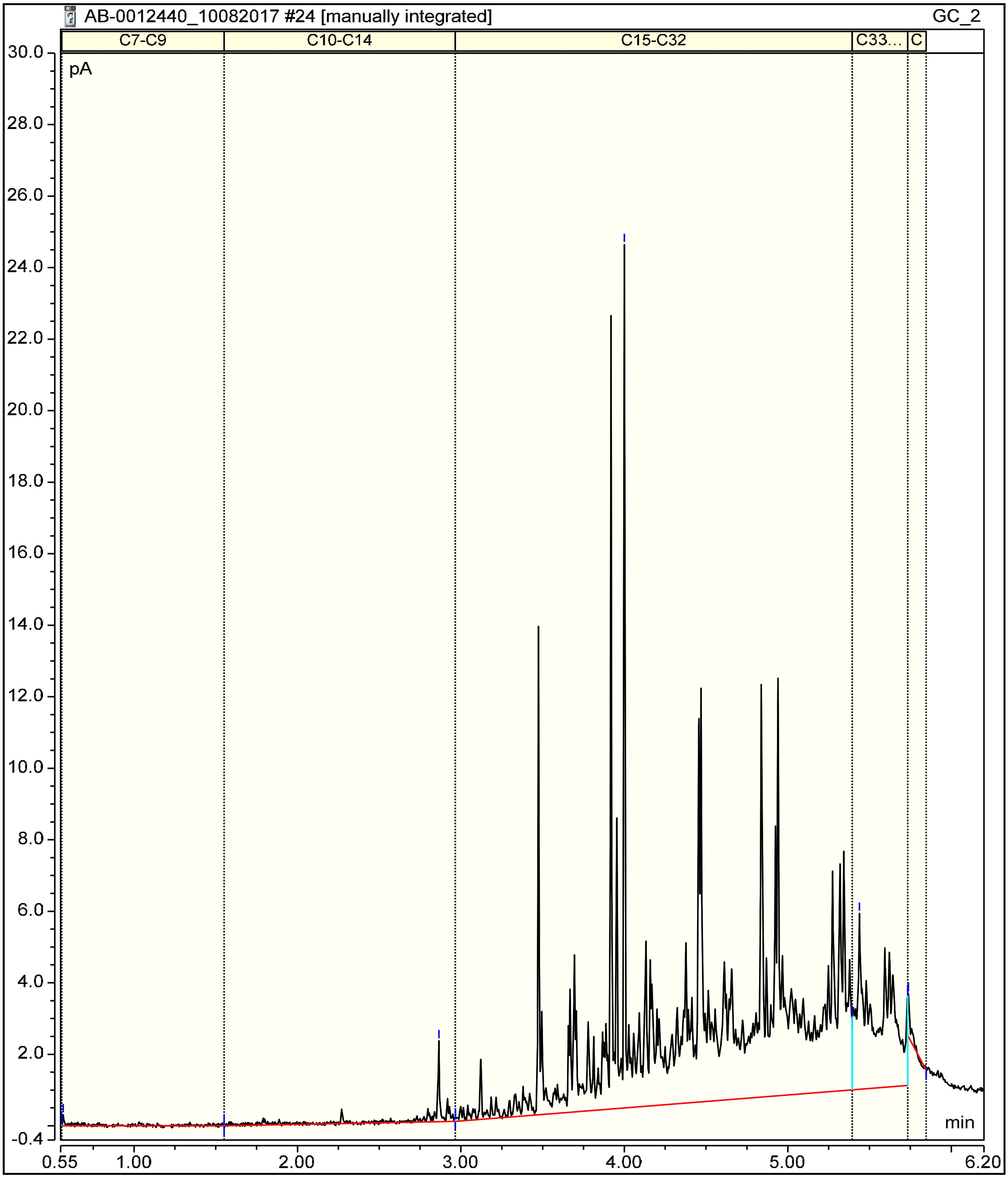
Report Comments

Samples were received by Analytica Laboratories in acceptable condition unless otherwise noted on this report.

Karam Wadi, B.E. (Hons)
Technologist

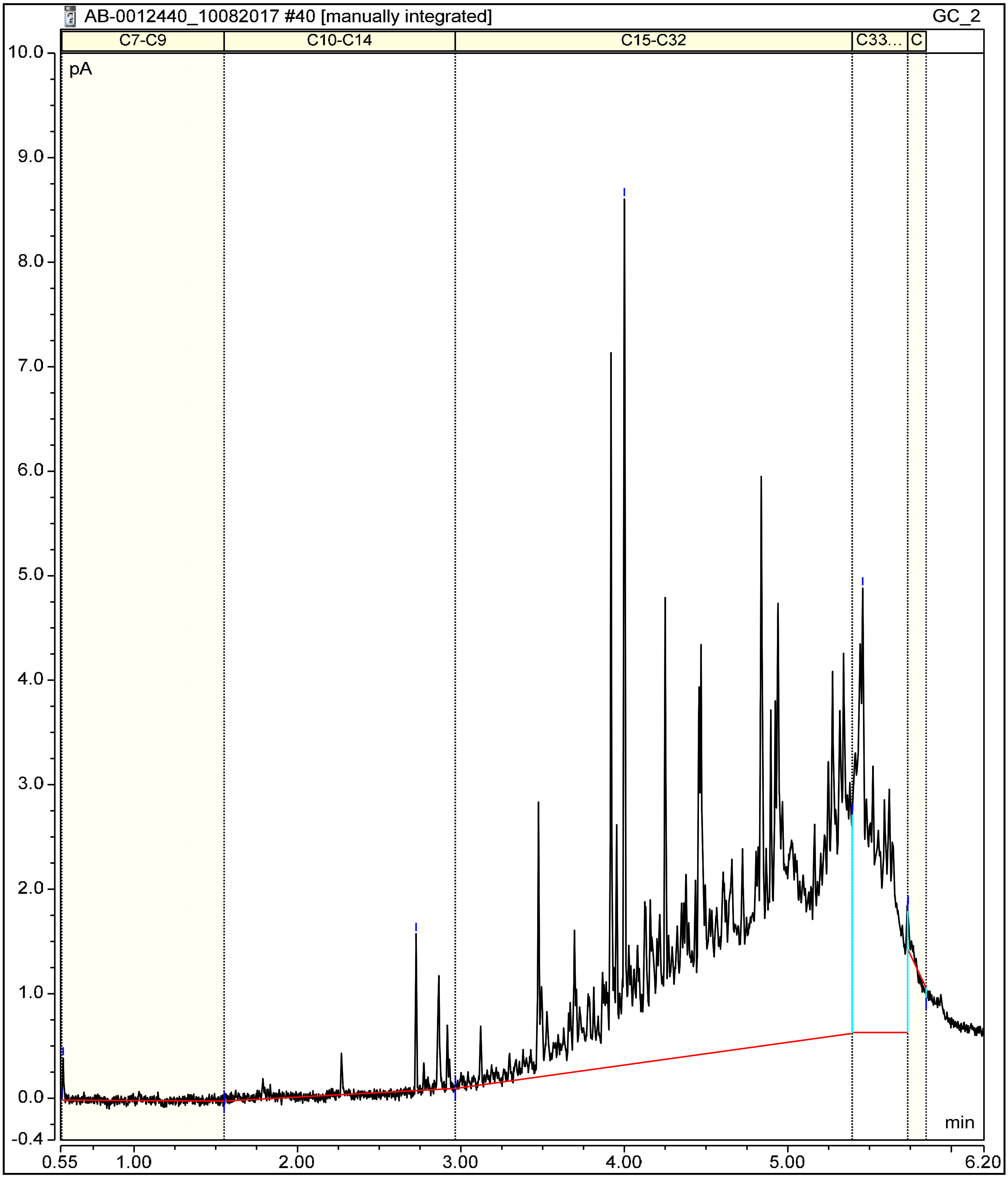
Chromatogram

17-18678-4



Chromatogram

17-18678-16



Appendix D
Screening Tables

LANDFILL SCREENING – METALS

		Arsenic	Beryllium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Class A landfill screening criteria		**100**	**200**	**400**	**20**	**100**	**100**	**100**	**4**	**200**	**200**
Class B landfill screening criteria	**Depth**	**10**	**20**	**40**	**2**	**10**	**10**	**10**	**0.4**	**20**	**20**
TP1	0.5	4.94	0.53	1.9	0.044	30.1	14.8	20.6	0.065	18.1	49.5
TP1	2.6	3.82	0.36	2.47	0.017	21.9	7.63	13.2	0.081	13.5	44.4
TP1	3	5.12	0.43	2.49	0.028	21.4	11.3	18.4	0.076	13.5	55
TP1	4.1	12.3	0.91	5.67	0.88	57.1	71.9	532	0.28	14.4	1130
TP2	0.5	4.34	0.6	1.58	0.025	28	15.5	17.1	0.055	22.4	50.9
TP2	2.1	4.01	0.42	2.37	0.032	19.3	9.67	19.2	0.091	12.1	51.6
TP2	3.9	23.2	0.94	25.1	0.54	21.6	73.5	318	0.31	18.9	336
TP2	4.5	6.78	0.73	13.1	0.83	18.3	62.6	200	0.91	14	250
TP3	0.5	4.55	0.57	2.31	0.033	28.8	16.2	15.9	0.082	21	50.1
TP3	3.2	4.32	0.36	2.34	0.055	18.6	10.7	22.6	0.09	11	49.7
TP3	3.2	4.08	0.38	2.31	0.055	18.7	10.9	20	0.082	11.3	51.7
TP3	4	9.12	0.96	10	0.085	29.5	33.8	49.4	0.11	32.7	82.5
TP3	4.3	5.7	0.76	3.29	0.049	27	24.3	26.1	0.12	18.1	64.8
TP4	0.5	4.78	0.6	2.06	0.048	27.6	15.4	16.9	0.079	18.2	48.1
TP4	2.3	3.32	0.33	2.32	0.039	17.5	7.56	14.2	0.093	10.3	40.7
TP4	FILL1	11.2	0.85	4.48	0.66	20.1	239	253	4	15.9	243
TP4	FILL2	5.1	0.99	5.99	1	19.9	25.8	83.8	0.14	14.5	130
TP5	0.5	5.14	0.6	2.05	0.037	31.1	19	17.9	0.066	22.6	51.9
TP5	1.5	4.95	0.54	2.15	0.049	28.4	15.7	18.4	0.07	19.3	50.9
TP5	2.4	3.41	0.36	2.33	0.025	18.8	8.5	14.1	0.089	11.2	41
TP5	4.4	10.2	0.8	21.8	0.3	31.7	233	403	0.26	25.4	369

Lab duplicate

Above Class A

Above Class B

LANDFILL SCREENING - PAH

	Depth	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo[a]pyrene	Benzo[b]&[j] fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Chrysene	Dibenz(a,h) anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo[a]pyrene TEQ
Class A landfill screening criteria		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-
Class B landfill screening criteria		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	-	-	-
TP1	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP1	0.5		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP1	2.6	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP1	3	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP1	4.1	-	<0.1	0.1	1.2	2.1	8.4	6.7	8	8.1	3.2	9	2.7	17	1	10.2	<0.1	11.6	16.3	10.04
TP2	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP2	2.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP2	3.9	-	<0.1	<0.1	0.2	<0.1	1.4	1.5	1.8	1.2	0.8	1.2	0.5	1.3	<0.1	2	<0.1	<0.1	2.3	2.16
TP2	4.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.2	0.1	<0.1	0.3	<0.1	<0.1	<0.2	0.05
TP3	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP3	3.2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP3	4	-	<0.1	<0.1	<0.1	<0.1	0.3	0.2	0.3	0.3	0.1	0.3	<0.2	0.4	<0.1	0.4	<0.1	0.2	0.3	0.31
TP3	4.3	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP4	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP4	2.3	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP4	FILL1	-	<0.1	<0.1	0.1	0.2	1.3	1.1	1.5	1.2	0.7	1.6	0.4	2.9	0.1	1.8	<0.1	1.3	2.5	1.69
TP4	FILL2	-	<0.1	<0.1	0.2	0.2	1.4	1.2	1.7	1.3	0.8	1.8	0.5	3.3	0.1	1.9	<0.1	1.3	2.7	1.85
TP5	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP5	1.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP5	2.4	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP5	4.4	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	<0.1	0.1	<0.2	0.2	<0.1	0.3	<0.1	<0.1	<0.2	0.03

Lab duplicate

Above Class A

Above Class B

Calculated value

HEAVY METALS

	Depth	Arsenic	Beryllium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Wellington Regional Background (max value) (Greywacke)		**7**	**-**	**-**	**0.1**	**16**	**25**	**78.6**	**0.2**	**13**	**105**
Recreational (human health)	**Depth**	**80**	**-**	**>10,000**	**400**	**2,700**	**>10,000**	**880**	**1,800**	**-**	**-**
TP1	0.5	4.94	0.53	1.9	0.044	30.1	14.8	20.6	0.065	18.1	49.5
TP1	2.6	3.82	0.36	2.47	0.017	21.9	7.63	13.2	0.081	13.5	44.4
TP1	3	5.12	0.43	2.49	0.028	21.4	11.3	18.4	0.076	13.5	55
TP1	4.1	12.3	0.91	5.67	0.88	57.1	71.9	532	0.28	14.4	1130
TP2	0.5	4.34	0.6	1.58	0.025	28	15.5	17.1	0.055	22.4	50.9
TP2	2.1	4.01	0.42	2.37	0.032	19.3	9.67	19.2	0.091	12.1	51.6
TP2	3.9	23.2	0.94	25.1	0.54	21.6	73.5	318	0.31	18.9	336
TP2	4.5	6.78	0.73	13.1	0.83	18.3	62.6	200	0.91	14	250
TP3	0.5	4.55	0.57	2.31	0.033	28.8	16.2	15.9	0.082	21	50.1
TP3	3.2	4.32	0.36	2.34	0.055	18.6	10.7	22.6	0.09	11	49.7
TP3	3.2	4.08	0.38	2.31	0.055	18.7	10.9	20	0.082	11.3	51.7
TP3	4	9.12	0.96	10	0.085	29.5	33.8	49.4	0.11	32.7	82.5
TP3	4.3	5.7	0.76	3.29	0.049	27	24.3	26.1	0.12	18.1	64.8
TP4	0.5	4.78	0.6	2.06	0.048	27.6	15.4	16.9	0.079	18.2	48.1
TP4	2.3	3.32	0.33	2.32	0.039	17.5	7.56	14.2	0.093	10.3	40.7
TP4	FILL1	11.2	0.85	4.48	0.66	20.1	239	253	4	15.9	243
TP4	FILL2	5.1	0.99	5.99	1	19.9	25.8	83.8	0.14	14.5	130
TP5	0.5	5.14	0.6	2.05	0.037	31.1	19	17.9	0.066	22.6	51.9
TP5	1.5	4.95	0.54	2.15	0.049	28.4	15.7	18.4	0.07	19.3	50.9
TP5	2.4	3.41	0.36	2.33	0.025	18.8	8.5	14.1	0.089	11.2	41
TP5	4.4	10.2	0.8	21.8	0.3	31.7	233	403	0.26	25.4	369

Lab duplicate

Above human health

Above background

TPH

Sample ID		C7-C9	C10-C14	C15-C36	C7-C36 (Total)
Maintenance/excavation workers		**20,000**	**No limit**	**No limit**	**No limit**
Wellington Regional Background (max value) (Greywacke)		**190**			
Soil acceptance criteria for protection of groundwater	**Depth**	**No limit**			
TP1	0.5	<10	<15	39	<50
TP1	2.6	<10	<15	<25	<50
TP1	3	<10	<15	<25	<50
TP1	4.1	<10	<15	581	581
TP2	0.5	<10	<15	<25	<50
TP2	2.1	<10	<15	<25	<50
TP2	3.9	<10	<15	<25	<50
TP2	4.5	<10	<15	<25	<50
TP3	0.5	<10	<15	<25	<50
TP3	3.2	<10	<15	<25	<50
TP3	4	<10	<15	45	<50
TP3	4.3	<10	<15	33	<50
TP4	0.5	<10	<15	<25	<50
TP4	2.3	<10	<15	<25	<50
TP4	FILL1	<10	<15	176	176
TP4	FILL2	<10	<15	370	370
TP5	0.5	<10	<15	<25	<50
TP5	1.5	13	16	32	60
TP5	2.4	<10	<15	<25	<50
TP5	4.4	<10	<15	48	<50

Table 4.19 MfE Hydrocarbon guidlelines. Silty clay soil, surface

Table 4.20 MfE Hydrocarbon guidlelines. Silty Clay, contam > 4m, groundwater at 8m

Lab duplicate
Above human health
Above background

BTEX

Sample ID		Benzene	Ethylbenzene	Toluene	m,p-xylene	o-xylene
Maintenance/excavation workers		**700**	**No limit**			
Wellington Regional Background		**-**				
Soil acceptance criteria for protection of groundwater	**Depth**	**0.34**	**No limit**	**8800**	**50**	
TP1	0.5	<0.025	<0.025	<0.025	<0.025	<0.025
TP1	0.5	<0.025	<0.025	<0.025	<0.025	<0.025
TP1	2.6	<0.025	<0.025	<0.025	<0.025	<0.025
TP1	3	<0.025	<0.025	<0.025	<0.025	<0.025
TP1	4.1	<0.025	<0.025	<0.025	<0.025	<0.025
TP2	0.5	<0.025	<0.025	<0.025	<0.025	<0.025
TP2	2.1	<0.025	<0.025	<0.025	<0.025	<0.025
TP2	3.9	<0.025	<0.025	<0.025	<0.025	<0.025
TP2	4.5	<0.025	<0.025	<0.025	<0.025	<0.025
TP3	0.5	<0.025	<0.025	<0.025	<0.025	<0.025
TP3	3.2	<0.025	<0.025	<0.025	<0.025	<0.025
TP3	4	<0.025	<0.025	<0.025	<0.025	<0.025
TP3	4.3	<0.025	<0.025	<0.025	<0.025	<0.025
TP4	0.5	<0.025	<0.025	<0.025	<0.025	<0.025
TP4	2.3	<0.025	<0.025	<0.025	<0.025	<0.025
TP4	FILL1	<0.025	<0.025	<0.025	<0.025	<0.025
TP4	FILL2	<0.025	<0.025	<0.025	<0.025	<0.025
TP5	0.5	<0.025	<0.025	<0.025	<0.025	<0.025
TP5	1.5	<0.025	<0.025	<0.025	<0.025	<0.025
TP5	2.4	<0.025	<0.025	<0.025	<0.025	<0.025
TP5	4.4	<0.025	<0.025	<0.025	<0.025	<0.025

Table 4.19 MfE Hydrocarbon guidlelines. Silty clay soil, surface

Table 4.20 MfE Hydrocarbon guidlelines. Silty Clay, contam > 4m, groundwater at 8m

Lab duplicate

PAH

	Depth	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo[a]pyrene	Benzo[b]&[j]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo[a]pyrene TEQ	
Inhalation Pathway		-	-	-	-	-	-	No limit	-	-	-	-	-	-	-	-	1,100	-	No limit	No limit	Table 4.17 MfE Hydrocarbon guidlelines. Silty clay soil, contamation at 1-4m, indoor
Recreational (human health)		-	-	-	-	-	-	40	-	-	-	-	-	-	-	-	-	-	-	40	
Maintenance/excavation workers		-	-	-	-	-	-	25	-	-	-	-	-	-	-	-	No limit		No limit	25	Table 4.19 MfE Hydrocarbon guidlelines. Silty clay soil, surface
Wellington Regional Background (max value) (Greywacke)		-	-	-	-	0.05	-	0.27	-	-	-	-	-	0.55	-	-	0.01	0.26	0.57	0.27	
Soil acceptance criteria for protection of groundwater	Depth	-						No limit	-								No limit	-	No limit	No limit	Table 4.20 MfE Hydrocarbon guidlelines. Silty Clay, contam > 4m, groundwater at 8m
TP1	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00	
TP1	0.5		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00	
TP1	2.6	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00	
TP1	3	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00	
TP1	4.1	-	<0.1	0.1	1.2	2.1	8.4	6.7	8	8.1	3.2	9	2.7	17	1	10.2	<0.1	11.6	16.3	10.04	
TP2	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00	
TP2	2.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00	
TP2	3.9	-	<0.1	<0.1	0.2	<0.1	1.4	1.5	1.8	1.2	0.8	1.2	0.5	1.3	<0.1	2	<0.1	<0.1	2.3	2.16	
TP2	4.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.2	0.1	<0.1	0.3	<0.1	<0.1	<0.2	0.05	
TP3	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00	
TP3	3.2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00	

Lab duplicate

Above background

Above human health

Above criteria for protection of groundwater

Calculated

TP3	4	-	<0.1	<0.1	<0.1	<0.1	0.3	0.2	0.3	0.3	0.1	0.3	<0.2	0.4	<0.1	0.4	<0.1	0.2	0.3	0.31
TP3	4.3	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP4	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP4	2.3	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP4	FILL1	-	<0.1	<0.1	0.1	0.2	1.3	1.1	1.5	1.2	0.7	1.6	0.4	2.9	0.1	1.8	<0.1	1.3	2.5	1.69
TP4	FILL2	-	<0.1	<0.1	0.2	0.2	1.4	1.2	1.7	1.3	0.8	1.8	0.5	3.3	0.1	1.9	<0.1	1.3	2.7	1.85
TP5	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP5	1.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP5	2.4	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.00
TP5	4.4	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	<0.1	0.1	<0.2	0.2	<0.1	0.3	<0.1	<0.1	<0.2	0.03

ASBESTOS

		ASBESTOS PRESENT / ABSENT?
TP1	0.5	Asbestos ABSENT
TP1	2.6	Asbestos ABSENT
TP1	3	Asbestos ABSENT
TP1	4.1	Asbestos ABSENT
TP2	0.5	Asbestos ABSENT
TP2	2.1	Asbestos ABSENT
TP2	3.9	Asbestos ABSENT
TP2	4.5	Asbestos ABSENT
TP3	0.5	Asbestos ABSENT
TP3	3.2	Asbestos ABSENT
TP3	4	Asbestos ABSENT
TP3	4.3	Asbestos ABSENT
TP4	0.5	Asbestos ABSENT
TP4	2.3	Asbestos ABSENT
TP4	FILL1	Asbestos ABSENT
TP4	FILL2	Asbestos ABSENT
TP5	0.5	Asbestos ABSENT
TP5	1.5	Asbestos ABSENT
TP5	2.4	Asbestos ABSENT
TP5	4.4	Asbestos ABSENT

Appendix E
Site Photos

Photo 1 – TP1 location

Photo 2 – TP1

Photo 3 – TP1 (2)

Photo 4 – TP1 landfilled material

Photo 5 – TP1 landfilled material (2)

Photo 6 – TP3 location

Photo 7 – TP3

Photo 8 – TP3 (2)

Photo 9 – TP3 landfilled material

Photo 10 – TP5 location

Photo 11 – TP5

Photo 12 – TP5 (2)

Photo 13 – TP5 (3)

Photo 14 – TP5 landfilled material

Photo 15 – TP2 location

Photo 16 – TP2

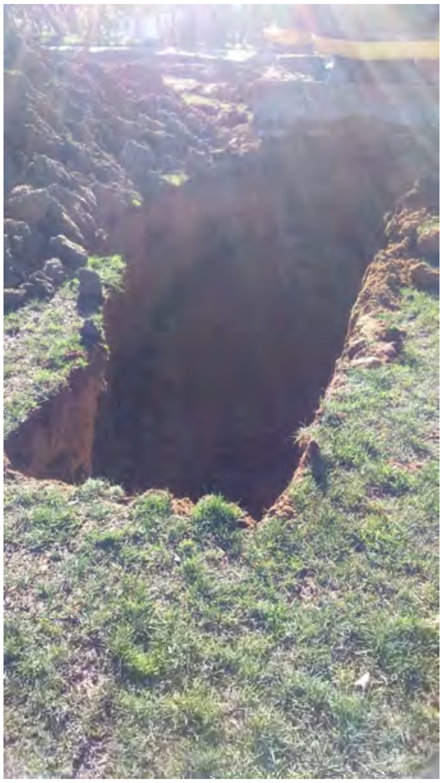


Photo 17 – TP2 (2, showing pit wall collapse)

Photo 18 – TP2 landfilled material

Photo 19 – TP4 location

Photo 20 – TP4

Photo 21 – TP4 (2, showing pit wall collapse)

Photo 22 – TP4 (3, showing further pit wall collapse)

Photo 23 – TP4 (4, showing further pit wall collapse)

Aurecon New Zealand Limited
Spark Central
Level 8, 42-52 Willis Street
Wellington 6011

PO Box 1591
Wellington 6140
New Zealand

T +64 4 472 9589
F +64 4 472 9922
E wellington@aurecongroup.com
W aurecongroup.com