Christchurch City Council
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Naval Point Detailed Site Investigation

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Naval Point Detailed Site Investigation

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1.0 Introduction

Christchurch City Council (CCC) has proposed a new development at Naval Point in Lyttelton (Statement of Work Number – 1075-0001 - 24th of September 2015). The development would include a new cruise ship facility, a promenade and commercial development near the harbour edge. The current land use in these areas comprises of a sailing club, the Coastguard building, a sports field, boat storage areas, boat ramps and large areas of unpaved surfaces.

AECOM New Zealand Limited (AECOM) has been engaged by (CCC) to undertake a Detailed Site Investigation (DSI) of Naval Point, Lyttelton. This report presents the findings of the DSI and is subject to the limitations in Section 10 of this report.

1.1 Purpose and Objectives

The purpose of the DSI is to satisfy the requirements of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health , 2011 (NES), in particular the requirement to carry out a detailed site investigation on a property with known HAIL activities when a change in landuse is being proposed. The detailed site assessment will be carried out in accordance with the MfE Contaminated Land Management Guidelines No.5: Site investigation and analysis of soils (revised 2011).

The objective of this DSI is to satisfy the following requirements:

- Interpret environmental quality data in regards to potential risks to human health and / or the environment during excavation works for the proposed development; and
- Assess on-going risk to human health for continued use of the area following development.

1.2 Scope of Work

The initial part of this investigation included reviewing previous investigations and historical aerial photographs of the site. This review allowed the sampling locations for the detailed site investigation (DSI) to be selected such as to target the areas with potential contaminants of concern onsite.

Based on an investigation area of 75,000 m^2 and previous/current landuses, 30 locations were proposed for test pits. The following activities were undertaken for the field investigation:

- Copies of service plans were obtained via the beforeudig website, and directly from Orion, Rockgas, Christchurch City Council (CCC), and Environment Canterbury (ECan).
- Service clearance was undertaken by Underground Service Locations Ltd (USL) using a cable avoidance tool (CAT) and ground penetrating radar (GPR).
- The number of test pits were reduced from the proposed 30 test pits to 26 due to limited access onsite. The twenty six test pits were advanced to depths of up to 3.5 metres below ground level (m bgl). Soil samples were taken from the surface and at 0.5 m intervals until groundwater was encountered with an excavator.
- At each location an AECOM field representative completed soil logging, measured PID levels, and collected soil samples for testing for asbestos, pesticides, TBT, PCP, hydrocarbons and metals.
- At the end of each day, soil samples were packed and submitted to the appropriate laboratory (Precise Consulting and Laboratory Ltd for Asbestos and Hill Laboratories Ltd in Hamilton for pesticides, TBT, PCP, metals and hydrocarbon testing) for analysis.
- Eight prepacked groundwater monitoring wells were installed within selected test pit excavations. The groundwater monitoring well locations were selected to obtain representative assessment of groundwater quality beneath the site. Groundwater monitoring wells were installed by using a 50 mm prepacked gravel filter pack wells prepared by McMillans Drilling Limited.
- The eight groundwater wells were developed via purging a week prior to the groundwater sampling.
- Groundwater samples were undertaken from the eight groundwater wells. Samples were analysed for petroleum hydrocarbons, heavy metals, organochlorine pesticides, organonitro and organo phosphorus pesticides, tributyltin and pentachlorophenols by Hill Laboratories Ltd.

The scope of work also included a hazardous materials survey of the following buildings: the pavilion, the scout hall, toilet block, coastguard building and yacht club. Results are presented in a standalone report this is not discussed further in the body of this report (**Appendix A**).

2.0 Site Description

2.1 Site History

2.1.1 Summary of Preliminary Site Investigation Report

The site history was taken from the Preliminary Site Investigation (PSI) – ENGEO report, commissioned by CCC in January 2015. The information reviewed in this report included the following: aerial photographs, CCC property files, Listed Landuse Register Information, interviews with long serving staff who have worked onsite and historic reports. Please see Table 1 below for a timeline summary of the site from the information reported in the PSI.

Table 1 Timeline for potentially contaminating activities

Period	Summary of Potentially Activities Onsite
1920s - 1940s	The site was created by dredging marine sediments within an armoured rock wall.
1949 - 1965	Lyttelton Sports Field was established onsite. The remainder of the site was used to treat and store timber poles. It was surmised that these were for telephone poles or timber piles.
1970s and 1980s	The site had further filling occurring onsite. Treatment and storage of timber poles were ceased as storage and maintenance of boats increased. A business was present in the northwestern corner of the site for sometime after 1965 and before 1984.
1990s to the present day	The site has been consistently used for recreational purposes (boating and sports field) with some boat maintenance work being undertaken on part of the site.

The report identified several sources of contamination across the site including: a single underground storage tank (UST), surface oil stains, a small campfire area, old and new treated timber poles, covered stockpiles of unknown material, possible asbestos containing materials, future demolition of buildings and the possible risk of unearthing asbestos pipes during the development of the site.

The other potential risk to the site arises from the surrounding landuses, namely, the long term, bulk storage of petroleum products. Releases to the environment from these above ground storage tanks have occurred in the past and have potential to have caused petroleum hydrocarbon contamination of subsurface soils and groundwater beneath the Naval Point site

The highest risk areas identified in the report were the boat maintenance area and the sports field on the basis that heavy metals or pesticides maybe present on the surface of these sites. Exposure could occur via direct contact and /or ingestion of soil, or inhalation of dust.

2.2 Site Walkover

On the 16th of October 2015, a site walkover was undertaken prior to the field investigation, by three AECOM staff members and two CCC staff members. During this site walkover the location of the former marine wharf was identified and incorporated into the area of interest. The former marine wharf is located between the boat storage area and the sports field.

2.3 Investigation Locations

The site comprises several distinct areas which include: a sports field, an area where the debris from the former marine wharf has been stored, the yacht haul out area and the boat ramps, two boat yards, the area beside the coastguard building and the sailing club. The Table 2 presents a summary of these areas and legal descriptions covered by this stage of the work. Please see Figure 1 for the map of the test pit locations.

Table 2 Site address and legal description

Parcel ID	Site Description	Legal Description		Test Pit Numbers
3407164	Playing field	Lot 3 DP 11243	The Lyttelton Borough Council	ETP10, ETP11, ETP12, ETP14, ETP15, ETP16 and ETP17
3500498	Former Wharf Debris Storage Area	Lot 1 DP 80599	Lyttelton Port Company Limited	ETP13
	Private Boat Yard			ETP26
3523069	Eastern CCC Boat Yard	Lot 1 DP 72644	The Banks Peninsula Council	ETP23, ETP24, ETP25
	Western CCC Boat Yard			ETP07, ETP08 and ETP09
	Coastguard Building Area			ETP04, ETP05 and ETP06
	The point			ETP01, ETP02 and ETP03
	Haul Out Area			ETP18, ETP19, ETP20 and ETP21
	Sailing Club			ETP22

3.0 Environmental Setting

Table 3 summarises the key environmental information

Table 3 Description of the Environment

Item	Details	
Zoning	BH - Boat Harbour and RV – Recreation Reserve	
Land Use	Current	Boat Harbour, Sailing Club and Recreation Reserve. Industrial ancillary associated activities with boat building, maintenance and storage.
	Proposed	The proposed development will comprise the construction of a cruise ship dock, promenade with commercial development and a sailing club.
Geology	According to the Geological Map of the Christchurch area[1], the site is located on an area of reclaimed land known as the Lyttelton Harbour Reclamation. The Lyttelton Harbour Reclamation lies at an elevation of approximately 5 m above sea level. It comprises hydraulic fill derived from the Lyttleton Harbour and overlies marine deposits comprising clayey silts.	
Groundwater	Groundwater was encountered in the test pits from depths of 2.5 metres below the ground surface.	
Groundwater Sensitivity	Sensitive	
	The aquifer is not artesian or confined	*Yes - The shallow groundwater unit underlying the site is not confined.*
	AND: The aquifer is expected to be less than 10 m below the potential suspected source of contamination;	*Yes - Shallow groundwater is expected to be present at depths of less than 10 m.*
	AND: The aquifer is of a quality appropriate for use and can yield water at a useful rate and is in an area where extraction and use of groundwater may be reasonably foreseen;	*No - Shallow groundwater is not currently abstracted for use within a 1km radius of the site. A confining layer is present between the shallow aquifer and the underlying usable aquifer.*
	OR: The source of contamination is less than 100 m from a sensitive water body.	*Yes –- The nearest marine surface water body is the harbour and the site is less than 100 m from it. The nearest fresh water surface water body is the Port of Lyttelton catchment (6,672,200 m^2), this includes all the small streams across the valley between the boundary of Cass Bay and Lyttelton township to the west and the edge of the Lyttelton township to the east.*

[1] Forsyth, P.J., Barrell, D.J.A., Jongens, R. (Compilers) 2008. Geology of the Christchurch Area. Map number QM16 1:250,000 scale

4.0 Potential Sources of Contamination

The Environment Canterbury Listed Landuse Register (LLUR) identifies the following Hazardous Activities and Industries List (HAIL) landuses:

Table 4 Summary of LLUR sites

LLUR Site	Description from LLUR	HAIL Activity[2]
26833	A timber yard was noted from ECAN aerial photographs (1965-1994) reviewed. A spill in 2014 released approximately 1244 million litres of jet fuel. The investigation consisted of the collection and analysis of 89 soil samples and 35 groundwater samples. Free product and a sheen was observed on the shallow gravel layer that overlies the reclamation fill. Reported petroleum hydrocarbon concentrations exceeded the excavation worker guideline values for TPH range C7 to C9 in two samples. A plume of dissolved phase petroleum was present in the shallow groundwater, primarily confined to preferential pathways and extended 70 metres downgradient of the main release area.	A18 – Wood treatment or preservation and bulk storage of treated timber.
28645	The sports turf was noted in the aerial photographs (1965-2011) reviewed.	A10 – Persistent pesticide bulk storage or use.
2939	Site was previously used for the storage of treated timber by the former Lyttelton Harbour Board. The timber was utilised for port maintenance. It is unknown if treated timber was held, but considering the end use of the timber it is considered likely (pre 1965 – pre 1994). Part of the site is leased to Stark Bros Limited and a 50,000 AGST, situated on a concrete pad and bunded in a steel bath bund, is present on the site. The tank contains used oil. The site also stores dry contaminated waste from the dry dock prior to its disposal. The waste is mixed with lime and is located on a concrete lined storage area. (1998 – present)	A17 – Storage tanks or drums for fuel, chemicals or liquid waste. A18 – Wood treatment or preservation and bulk storage of treated timber.

4.1 Contaminants of Concern

The Contaminants of Concern (COCs) of relevance to this site are based on the previous and current potentially hazardous activities on the site as identified in the above reports and conversations with CCC staff during a site walkover. The potential contaminants of concern associated with this site include biological hazards, total petroleum hydrocarbons (TPH), metals, polycyclic aromatic hydrocarbons (PAHs), semi volatile compounds, pentachlorophenol (PCP), tributyl tin (TBT), organonitro and organophosphorus pesticides (ONOP), organochlorine pesticides (OCP) and benzene, toluene, ethylbenzene and xylenes (BTEX). The COCs listed in Table 5 are based on the MfE HAIL classification system and should be used as a guide for any chemical investigations based on historical site activities.

Table 5 Contaminants of concern

HAIL Activity	HAIL Description	Contaminants of Concern	Analytes
A10	Persistent pesticide bulk storage or use.	Arsenic, lead, copper, mercury, wide range of organic compounds including acidic herbicides, organophosphates and organochlorines.	Heavy metals, ONOP and organochlorines.
A17	Storage tanks or drums	Hydrocarbons (including	TPH, BTEX, PAH, metals,

[2] Ministry for the Environment (2011), Hazardous Activities and Industries List (HAIL): October 2011.

HAIL Activity	HAIL Description	Contaminants of Concern	Analytes
	for fuel, chemicals or liquid waste.	BTEX, polycylic aromatic hydrocarbons (PAHs) and solvents), metals, possible Volatile Organic Compounds (VOCs) and biological contaminants.	VOCs, bacteria and viruses.
A18	Wood treatment or preservation and bulk storage of treated timber.	Pentrachlorophenol (PCP), copper, arsenic, chromium, boron, PAHs, phenolics (creosote), antisapstain, organochlorine pesticides, fungicides and tributyltin (TBT).	PCP, heavy metals and TBT.
E1	Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition.	Asbestos.	Asbestos.

5.0 Selection of Guidelines

The applicable guidelines used to assess the soil and groundwater results are shown in Table 6 below. The soil results have been assessed against the commercial/ industrial guidelines and recreational guidelines (where recreational guidelines are not available residential guidelines were utilised as a conservative estimation). The groundwater in this area is not used for potable supply therefore groundwater results have been assessed against the appropriate ecological guidelines.

ANZECC 90% marine water trigger level guidelines were utilised to assess the groundwater results. Lyttelton Harbour is considered to be a slightly to moderately disturbed ecosystem, the biological communities remain in a healthy condition and ecosystem integrity is largely retained. Environment Canterbury Class Coastal CR Water Lyttelton Harbour/Whakaraupo (West) guidelines were also used to assess the groundwater results. Class Coastal CR classification means that the water that is managed for contact recreation and for the maintenance of aquatic systems.

Table 6 Applicable Guidelines

Analytical Suite	Environmental Guideline Criteria Documents
Heavy metals	Resource Management – National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 (NES) - Recreational Soil Contaminant Standards (SCS)– proposed landuse - Commercial/Industrial Unpaved SCS– proposed land use Australian and New Zealand Guidelines for fresh and marine water quality (ANZECC), 2000 ecological level of protection, 90% trigger value for marine water Environment Canterbury – Coastal Plan - Class Coastal CR Water Lyttelton Harbour/Whakaraupo (West) guidelines, 2011
TPH, BTEX and PAH (naphthalene and pyrene)	Ministry for the Environment 1999, updated 2011, Guidelines for the Management and Assessment of Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE 1999 Guidelines) - Soil type – sand or sandy silt - Commercial / Industrial –proposed landuse - Residential –potential future land use (conservatively chosen in the absence of a recreational guideline) - Tier I – All Pathways - Tier 1 – Groundwater - All Pathways
Organochlorine, Organonitro and Organophosphorus pesticides	Resource Management – National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 (NES) - Recreational Soil Contaminant Standards (SCS)– proposed landuse - Commercial/Industrial Unpaved SCS– proposed land use USEPA Regional Screening Table, November 2015, , residential and commercial landuse Australian and New Zealand Guidelines for fresh and marine water quality (ANZECC), 2000 ecological level of protection, 90% trigger value for marine water Environment Canterbury – Coastal Plan - Class Coastal CR Water Lyttelton Harbour/Whakaraupo (West) guidelines, 2011
PAH – benzo(a)pyrene equivalent	Resource Management – National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 (NES) - Recreational Soil Contaminant Standards (SCS)– proposed landuse - Commercial/Industrial Unpaved SCS– proposed land use Tier 1 – Groundwater - All Pathways

Analytical Suite	Environmental Guideline Criteria Documents
Tributyl Tin	USEPA Regional Screening Table, November 2015, residential and commercial landuse Australian and New Zealand Guidelines for fresh and marine water quality (ANZECC), 2000 ecological level of protection, 90% trigger value for marine water Environment Canterbury – Coastal Plan - Class Coastal CR Water Lyttelton Harbour/Whakaraupo (West) guidelines, 2011
Asbestos	Western Australian Department of Health (WA DoH) (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia. - All site uses (friable asbestos in soils) - Parks, public open spaces – total % asbestos in soil
Background levels	Environment Canterbury Background Concentrations - Environment Canterbury 2006 Background Concentrations of selected trace elements in Canterbury Soils. - Soil type: Christchurch, Yellow Gley Earth.

6.0 Field Methodology

6.1 Test Pit Excavation

The field work was undertaken between the 19th and the 22nd of October 2015. The locations of subsurface utilities (power, gas, communications, water and drainage services) were identified prior to test pitting works through service plans and a service mark out, conducted by Underground Service Locators (USL) using ground penetrating radar (GPR) and a cable avoidance tool (CAT).

A total of 26 test pits were advanced to depths of up to 3.5 metres below ground level (m bgl) by Scope using a 3-tonne excavator. In eight of the 26 test pits groundwater wells were installed after the logging and soil sampling was completed. Further details of the groundwater installation, methodology and sampling are outlined in Section 6.4 and 6.5 below.

6.2 Soil Sampling

Soil samples were collected in accordance with the methodology set out within the MfE Contaminated Land Management Guideline No. 5 (CLMG No. 5).

Soil samples were collected from the excavator bucket into laboratory supplied sample containers. Following collection, the soil samples were submitted to Hill Laboratories for analysis under AECOM Chain of Custody (CoC) documentation. Soil samples were analysed for total petroleum hydrocarbons (TPH), tributyl tin (TBT), pentachlorophenol (PCP), Organochlorine pesticides (OCP), Organonitrogen and Phosphorus pesticides (ONOP), benzene toluene, ethylbenzene, and total xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH) and heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc). The need for BTEX and PAH testing was determined on receipt of the TPH results.

A figure showing test pit locations is attached in **Appendix B**. Test pit logs are presented in **Appendix C**. Photographs are attached in **Appendix D**.

6.2.1 Asbestos Sampling

Asbestos samples were collected from each test pit in accordance with the methodology outlined with in the Western Australian Guidelines[3].

To collect the asbestos sample, a 10 L container of soil was collected from the excavator bucket and weighed. The soil sample was screened through a 7 mm sieve to separate the soil fractions, and a composite soil subsample was collected from the < 7 mm soil fraction and weighed.

Any suspected asbestos containing material (ACM) identified in the > 7 mm fraction was collected as a separate sample.

Soil subsamples and ACM samples were submitted to Precise Consulting and Laboratory Ltd in Christchurch under AECOM CoC documentation. Soil subsamples were analysed quantitatively for asbestos in soil and ACM samples were analysed qualitatively for presence / absence of asbestos.

6.3 Groundwater Well Installation

The groundwater wells were installed in the test pits after the completion of the geological logging and soil sampling. Groundwater wells were installed in eight of the 26 test pits. The groundwater monitoring well locations were selected to allow for representative assessment of groundwater quality beneath the site. The wells were completed offsite by McMillans Drilling and composed of PVC 50 mm prepacked gravel filter pack wells that were prepared and then transported to the site. The wells were 4 metres in length and screened for 3 metres, which allowed for 1 metre of stick up of the well once completed. The wells were then installed using a Mighty Gripper to hold the piezometer approximately vertical when the excavator is reinstating the test pits and compacting around the wells.

A figure showing the monitoring well locations is attached in **Appendix B.**

[3] Western Australian Department of Health (WA DoH) (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.

6.4 Groundwater Methodology

All groundwater samples were collected on 10th and 11th of November 2015 from the monitoring wells using the following sampling method:

- The depth to groundwater was measured using a dip meter. Measurements were taken from the top of the well casing.
- The wells were purged by removal of approximately three well volumes using a low flow peristatic pump. The pH, temperature and electrical conductivity of the purged water was measured with a multi-parameter meter and recorded. The readings were considered to be stabilised when within 10% of subsequent readings. Samples were collected from the wells once the purging process was completed, and placed in laboratory supplied bottles and stored chilled.
- The pump was decontaminated between wells with DECON 90, and new tubing used in each well to ensure cross contamination during sampling did not occur.
- The depth to groundwater was measured again to confirm water level recovery.
- A fresh pair of nitrile gloves was used by the AECOM field staff for each monitoring well.

All samples were couriered to Hill Laboratories in accordance with standard AECOM procedures. Groundwater samples were for analysed for a selection of the following analyses: total petroleum hydrocarbons (TPH), tributyl tin (TBT), pentachlorophenol (PCP), Organochlorine pesticides (OCP), Organonitrogen and Phosphorus pesticides (ONOP), benzene toluene, ethylbenzene, and total xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH) and heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc).

7.0 Soil Results

7.1 Field Observations

During the test pit excavation works, fill materials were observed in the majority of test pits in the shallow soils between 0.3 metres below ground surface to 0.7 metres below the ground surface. In some test pits fill was observed down to 1.5 m bgl. Below this depth the natural geology of the site was interbedded marine silts and sands. Photographs are attached as **Appendix D**.

Table 6 summarises the observations of the test pits that contained fill on the site. Test pit logs are presented as **Appendix C**.

Table 7 Contamination/ Geological summaries

Location	Fill (m bgl)	Base of pit (m bgl)	Contamination / fill observed
ETP01	1.5	2.3	Moderate hydrocarbon odour, possible coal tar(1.5)
ETP03	0-0.7	3.3	Fragments of brick and tree roots.
ETP05	0-1.5	3	Fragments of debris and brick (0-0.7). Fragments of paint cans were found (0.7-1). Chunks of concrete were intermixed with dark grey silt (1-1.5).
ETP07	0.2-0.7	3	Some brick, concrete and wood (0.2). Plastic sheeting (0.7)
ETP08	0.7	2.9	Bricks (0.7)
ETP09	0-0.6	3.1	Brick (0-0.6)
ETP17	0-0.4, 2	3	Fragments of brick (0.2). Coal fragments. (2)
ETP19	0-1	3	Some ceramic, some brick and some concrete.
ETP20	1.2	3.2	Concrete fragments, some wood and steel piping.
ETP21	0-0.5	1.7	Brick fragments, steel, rope and glass (0-0.5). Large concrete fragments (0.5).
ETP22	0.5-1.1	2.8	Brick fragments, steel pieces, cement sheeting, glass and general waste material. (0.5-1.1)
ETP25	0.2	3	Brick and some metal wire (0.5)
ETP26	0.3	2	Some brick and wood (0.3)

7.2 Soil Analytical Results

Appendix E presents results tables for metals and tributyl tin (Table 7), Hydrocarbons (Table 8), Pentachlorophenol (PCP) and Organochlorine pesticides (Table 9), Organonitro and Organophosphorus pesticides (Table 10) and Asbestos (Table 11). Detections only have been tabulated. The laboratory results as received from the laboratory and the CoC information are presented in **Appendix F**.

7.2.1 Hydrocarbons

BTEX concentrations were not detected above the method detection limit (MDL) in any of the soil samples analysed from the site.

TPH concentrations were detected above MDL in 11 of the 37 soil samples analysed from site. The sample from ETP23_1.2 contained a concentration of C_{10}-C_{14} TPH of 1,040 mg/kg which exceeds the MfE guideline for residential landuse (Sandy Silt 1 m -4 m) (which has been used as a conservative guideline in the absence of a

recreational landuse value). If it is also conservatively assumed that all of the TPH in this C_{10}-C_{14} band is composed of naphthalene then the indoor air exposure soil acceptance criteria is exceeded. Note: this assumption cannot be verified as follow on PAH analysis was not completed for this sample.

Sample ETP23_1.2 also contained the highest concentration of hydrocarbon, namely 67,000 mg/kg of C_{15}-C_{36} TPH. TPH chromatograms for this sample are consistent with a diesel or potentially weathered bitumen signature. There is no guideline available for the C_{15}-C_{36} TPH band.

PAHs concentrations were detected above MDL in the one sample analysed from the site. The result for sample ETP17_0.2 complied with the NES guidelines for recreational and commercial landuse for benzo(a)pyrene equivalents.

7.2.2 Metals

The sample from test pit ETP22 0.6-0.7 had a lead concentration of 11,700 g/m^3 which exceeds the NES standard for recreational landuse and commercial landuse.

All 37 samples collected and analysed for heavy metals were above the published Environment Canterbury background levels.

Apart from the lead concentration detected in sample ETP22 0.6-0.7, all metal results complied with the relevant NES-SCS for commercial and recreational land use. Note: four shallow samples () have copper results which exceed the concentration likely to inhibit plant growth.

7.2.3 Pentachlorophenol (PCP)

Four samples collected and analysed for pentachlorophenol (PCP) had results which were below the limit of detection for the laboratory and therefore complied with the relevant NES-SCS for commercial and recreational land use.

7.2.4 Organochlorine, Organonitro and phosphorus pesticides

All seven samples analysed for Organochlorine, Organonitro and Organophosphorus pesticides had results which were below the limit of detection for the laboratory, with the exception of those noted below.

7.2.4.1 Diuron

Diuron was detected above the MDL in two of the seven samples analysed from the site. These included samples from the following test pits: ETP10 0.2-0.3 and ETP17 0.2, which are both on the recreational ground.All the Diuron results obtained from samples collected from the detailed site investigation complied with the relevant USEPA for commercial and residential land use.

7.2.4.2 DDT

DDT was detected above the MDL in four of the seven samples analysed from the site. These included samples from the following test pits: ETP10 0.2-0.3, ETP11 0.2-0.3, ETP16 0.2, ETP17 0.2 which are all on the recreational ground. All the DDT results obtained from samples collected from the detailed site investigation complied with the relevant NES-SCS for commercial and recreational land use.

7.2.5 Tributyl Tin

Tributyl Tin was detected in three of the five samples analysed from the site. These included samples from the following test pits: ETP07 0.1-0.2, ETP08 0.2-0.3 and ETP26 0.8-0.9 which are all in historical boat maintenance areas. All the Tributyl Tin results obtained from samples collected from the detailed site investigation complied with the relevant USEPA for commercial and residential land use.

7.2.6 Asbestos

Asbestos was detected at trace levels in five samples: ETP07_0.3-0.5_SV, ETP09_0.1-0.3_SV, ETP22_0.2-0.4_SV, ETP22_0.6-0.8_SV, and ETP23_0.2-0.4_SV. Asbestos concentrations in sample ETP 22_0.6-0.8 exceeded the Western Australian guidelines for asbestos contaminated soil.

8.0 Groundwater Monitoring

Groundwater monitoring was undertaken on the eight monitoring wells that were installed at Naval Point as part of this DSI.

8.1 Groundwater Results

Appendix G presents results tables for metals and tributyl tin (Table 12), hydrocarbons (Table 13) and Pentachlorophenol (PCP) and pesticides (Table 14). Detections only have been tabulated. The laboratory results as received from the laboratory and the CoC information are presented in **Appendix H**.

8.1.1 Hydrocarbons

Eight groundwater samples were analysed for TPH and one sample was analysed for BTEX. Concentrations of TPH and BTEX were not detected above MDL in any of the samples analysed.

Three groundwater samples were analysed for PAHs (TP5, TP10 and TP20). Naphthalene was detected above MDL in two samples (TP5 and TP20), however, both results complied with the guideline. No other PAHs were detected above MDL in these samples.

8.1.2 Metals

Eight groundwater samples were analysed for total recoverable metals. All metals were detected above MDL in water sampled from test pits TP15, TP20, and TP03. The highest total metal concentrations were reported in groundwater sampled from TP3.

Total Recoverable Arsenic concentrations were detected above MDL in all samples. One groundwater result (sample TP05) exceeded the ECAN Class Coastal CR Water guideline.

Total Recoverable Cadmium concentrations were detected above MDL in three of the eight samples. One groundwater result (sample TP03) exceeded the ECAN Class Coastal CR Water guideline.

Total Recoverable Chromium was detected above the MDL in five of the eight samples. Two of these groundwater samples (TP12 and TP15) had results which exceeded the ANZECC 90% trigger value for marine water.

Total Recoverable Copper concentrations were detected above MDL in all samples. The concentrations of copper detected in all eight groundwater samples exceeded the ANZECC 90% trigger value for marine water and the ECAN Class Coastal CR Water guideline.

Total Recoverable Lead was detected above the MDL in seven of the eight groundwater samples. Four groundwater samples (TP03, TP12, TP15, TP20) had results which exceeded the ANZECC 90% trigger value for marine water and the ECAN Class Coastal CR Water guideline.

Total Recoverable Nickel concentrations were detected above MDL in five of the eight samples. Three groundwater samples (TP03, TP12, TP15) had results which exceeded the ECAN Class Coastal CR Water guideline

Total Recoverable Zinc was detected above the MDL in six of the eight groundwater samples. Four samples (TP03, TP12, TP15 and TP20) had results which exceeded the ANZECC 90% trigger value for marine water and the ECAN Class Coastal CR Water guideline.

All other samples tested for heavy metals complied with the ANZECC 90% trigger value for marine water.

8.1.3 Pentachlorophenol (PCP)

Two groundwater samples were analysed for SVOCs including PCP. PCP concentrations were not detected above the MDL in either of these samples and complied with the ANZECC 90% trigger value for marine water. No other SVOCs were detected about the MDL.

8.1.4 Organochlorine, Organonitrogen and Organophosphorus Pesticides

Three groundwater samples were analysed for Organochlorine Pesticides, and OrganoNitrogen and Phosphorus pesticides. Only one sample (TP10) contained a detectable concentration of these compounds, namely Diuron.

There is no guideline for Diuron in the ANZECC guidelines, therefore the USEPA guideline for protection of groundwater was utilised. The Diuron result complied with the USEPA guideline.

8.1.5 Tributyl Tin

Two groundwater samples were analysed for Tributyl Tin. Only one of these, TP05, contained concentrations of Tributyl Tin above the MDL. The concentration of Tributyl Tin in this sample exceeded the ANZECC 90% trigger values for marine water.

9.0 Discussion

Fill materials were observed in the majority of test pits in the shallow soils between 0.3 metres below ground surface to 0.7 metres below the ground surface. Several test pits excavated as part of this DSI revealed fill and debris to a depth of 1.5 m bgl. Not-withstanding the potential contaminant and geotechnical limitations of the fill material, it also poses a risk of physical harm to future users of the site in situations where sharps etc may make their way to the surface. The physical hazards within the test pits may need to be isolated or removed if the end landuse is recreational.

The soil results from the detailed site investigation showed elevated concentrations of heavy metals, heavy end hydrocarbons with two exceedances of guidelines. The sample from test pit ETP22 0.6-0.7m had a lead concentration of 11,700 g/m^3 which exceeds the NES-SCS for recreational and commercial landuse. One sample (ETP23 1.2) has a concentration of 1,040 mg/kg which exceeded the C_{10}-C_{14} MfE guidelines for residential landuse (which has been used to conservatively estimate the recreational guideline) for 1m-4m of Sandy Silt. There is potential for this sample to also contain concentrations of volatiles (PAHs) which exceed the indoor air exposure soil acceptance criteria. The heavy metal and TPH results are reflective of the wide spread observations of fill, which site history information indicates is likely to have occurred in a largely uncontrolled manner.

Results for soil sampled from Test pit 22 exceeded the Western Australian guidelines for asbestos contaminated soil.

Some areas of the site contain contaminants which exceed recreational and commercial landuse soil acceptance criteria or the Western Australian guidelines for asbestos, and are therefore, depending on the landuse, likely to require removal (following delineation) and validation sampling. Removed soil and fill material will need to be disposed of as contaminated material to an appropriate licensed disposal facility. Further sampling of the material may be required by the disposal facility, for example, Kate Valley Landfill requires Toxicity Characteristic Leaching Procedures (TCLP) to be carried out.

It should be noted that owing to the distance between test pits, the presence of contaminants including asbestos above guidelines in other areas of the site cannot be excluded.

The contaminants detected in this DSI also pose a risk to human health of the workers during the development of the site and the future workers involved in excavation and maintenance activities. It is recommended that a contaminated materials management plan is prepared for any proposed development and future use of the site to ensure that appropriate health, safety and environmental protections are implemented.

Note: On the basis of the results of this DSI a NES Consent is likely to be required for earthworks on the site or changes of landuse.

Groundwater samples taken from several of the monitoring bores installed on-site, contained metal concentrations that exceeded the ANZECC 90% trigger value for marine water and/or the Class Coastal CR Water. Given the results of the soil sampling and the evidence of widespread fill on the site, the groundwater results are not unexpected. It is likely that a passive discharge permit from Environment Canterbury will be required on the basis that the exceedances of the groundwater in comparison with the ANZECC guidelines and the Class Coastal CR guidelines and the discharge of this groundwater to the marine environment. It should be noted that sealing the site will reduce rainfall percolating through the fill and contaminated soil beneath the site, however, shallow groundwater will still potentially be in contact with these materials and result in the discharge of contaminants to seawater.

10.0 Phase 2 Report Limitations

10.1 Conclusion and Recommendations

This conclusion and all information in this Report is provided strictly in accordance with and subject to the following limitations and recommendations:

a) This Report has been prepared for the sole benefit of Christchurch City Council.

b) Except as required by law, no third party may use or rely on, this Report unless otherwise agreed by AECOM in writing. Where such agreement is provided, AECOM will provide a letter of reliance to the agreed third party in the form required by AECOM.

c) This Report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by AECOM for use of any part of this Report in any other context.

d) This conclusion is based solely on the information and findings contained in this Report.

e) This conclusion is based solely on the scope of work agreed between AECOM and Christchurch City Council and described in Section 1 ("Scope of Works") of this Report.

f) This Report is dated 10/12/2015 and is based on the conditions encountered during the site investigations conducted, and information reviewed, from 5/11/2015 to 10/12/2015. AECOM accepts no responsibility for any events arising from any changes in site conditions or in the information reviewed that have occurred after the completion of the site investigations.

g) The investigations carried out for the purposes of the Report have been undertaken, and the Report has been prepared, in accordance with normal prudent practice and by reference to applicable environmental regulatory authority and industry standards, guidelines and assessment criteria in existence at the date of this Report.

h) Where this Report indicates that information has been provided to AECOM by third parties, AECOM has made no independent verification of this information except as expressly stated in the Report. AECOM assumes no liability for any inaccuracies in or omissions to that information.

i) AECOM has tested only for those chemicals specifically referred to in this Report. AECOM makes no statement or representation as to the existence (or otherwise) of any other chemicals.

j) Except as otherwise specifically stated in this Report, AECOM makes no warranty or representation as to the presence or otherwise of asbestos and/or asbestos containing materials (“ACM”) on the site. If fill has been imported on to the site at any time, or if any buildings constructed prior to 1970 have been demolished on the site or materials from such buildings disposed of on the site, the site may contain asbestos or ACM. Without limiting the generality of sub-clauses (h) and (m), even if asbestos was tested for and those test results did not reveal the presence of asbestos at specific points of sampling, asbestos may still be present at the site if fill has been imported at any time, or if any buildings constructed prior to 1970 have been demolished on the site or materials from such buildings disposed of on the site.

k) Investigations have been undertaken into off-site conditions, as specified in Section 6 and AECOM makes no statement as to whether:

    1) any adjoining sites may have been impacted by contamination or other conditions originating from this site or from any other source; and/or

    2) any contamination originating from adjoining sites has or may have an impact on the site itself.]

l) Investigations undertaken in respect of this Report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and contamination may have been identified in this Report.

m) Subsurface conditions can vary across a particular site and cannot be exhaustively defined by the investigations described in this Report. It is unlikely therefore that the results and estimations expressed in this Report will represent conditions at any location removed from the specific points of sampling.

n) A site which appears to be unaffected by contamination at the time the Report was prepared may later, due to natural phenomena or human intervention, become contaminated.

o) Except as specifically stated above, AECOM makes no warranty, statement or representation of any kind concerning the suitability of the site for any purpose or the permissibility of any use, development or re-development of the site.

p) Use, development or re-development of the site for any purpose may require planning and other approvals and, in some cases, environmental regulatory authority approval. AECOM offers no opinion as to whether the current use has any or all approvals required, is operating in accordance with any approvals, the likelihood of obtaining any approvals for development or redevelopment of the site, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environmental works.

q) AECOM makes no determination or recommendation regarding a decision to provide or not to provide financing with respect to the site.

r) The ongoing use of the site and/or the use of the site for any different purpose may require the owner/user to manage and/or remediate site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this Report.

s) To the extent permitted by law, AECOM expressly disclaims and excludes liability for any loss, damage, cost or expenses suffered by any third party relating to or resulting from the use of, or reliance on, any information contained in this Report. AECOM does not admit that any action, liability or claim may exist or be available to any third party.

t) Except as specifically stated in this section, AECOM does not authorise the use of this Report by any third party.

u) It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

Appendix A

Hazardous Materials Survey Report

Naval Point Asbestos Survey - November 2015

Naval Point Asbestos Survey - November 2015

Client: Christchurch City Council

Co No.: N/A

Prepared by

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11-Dec-2015

Job No.: 60444747

AECOM in Australia and New Zealand is certified to the latest version of ISO9001, ISO14001, AS/NZS4801 and OHSAS18001.

Quality Information

Document Naval Point Asbestos Survey - November 2015

Ref 60444747

Date 11-Dec-2015

Prepared by Alan Spooner

Reviewed by Jo Walters

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	11 Dec 2015	Final	Anna Lukey Principal Environmental Scientist	

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Executive Summary

AECOM New Zealand Ltd (AECOM) was commissioned by Christchurch City Council (CCC), to conduct an asbestos survey and develop an asbestos register for the following five buildings (collectively labelled "the Sites located at Naval Point, Lyttelton:

- Yacht Club;
- Coastguard Building
- Scout Hall
- Sports Pavilion; and
- Toilet Block.

In addition to these buildings, associated structures were also inspected. These included the boat storage and boat yard sheds associated with the yacht club, as well as two storage sheds associated with the scout hall.

The objective of the survey was to, as far as practicable, locate, identify and assess visually accessible asbestos-containing materials (ACM) present in the areas nominated for inspection and to present the information collected in a way that allows the duty holder to manage the risks arising from those materials in order to meet owner/employer obligations under the New Zealand *Health and Safety in Employment (Asbestos) Regulations 1998* and the New Zealand *Health and Safety in Employment Act* 1992. Additionally, the *Guidelines for the Management and Removal of Asbestos* produced by the New Zealand Occupational Safety and Health Service of the Department of Labour (DoL) (1995, revised 1999)and the *Interim guidance for work involving asbestos* (WorkSafe NZ, 2015) were used. These guidelines were considered in our assessment of the current risk level of asbestos exposure at the Sites.

No ACM were identified has having a high risk.

The Yacht Club contains asbestos fibre cement sheeting which was identified during the survey to be in a fair condition, as some areas were observed to be broken. It is recommended broken or damaged areas be encapsulated with an appropriate sealant to minimise risk of fibre release.

All ACM identified in this survey should be labelled as asbestos containing and maintained in a good condition with annual inspections to assess its condition.

The inaccessible areas identified in Section 3.3 and Appendix E should be treated as containing ACM until confirmed otherwise by a competent person.

Where ACM has been identified (through sampling or visually assumed), appropriate risk management should be implemented to ensure that the risks are adequately controlled. Risk management of asbestos materials identified may range from their complete removal to periodic inspection and review of the risks posed by materials left in situ.

If any of the inspected areas that contain ACM are to undergo renovations or demolition, the asbestos containing materials identified should be removed prior to the commencement of demolition activities on Site.

Inaccessible areas should be treated as containing asbestos containing materials until confirmed otherwise.

No ACM were identified as potentially high risk materials based on the visual observations made on the condition, type and location of ACM.

This report presents the findings of a survey completed between 29 and 30 October 2015 and includes a Photographic Log (Appendix A), Full Survey Results (Appendix B), Asbestos Containing Materials/Building Register (Appendix C), Site Plans (Appendix D), Inaccessible Areas (Appendix E) an asbestos risk assessment as described in Appendix F and Laboratory Results (Appendix G).

This ACM Register is not a definitive description of all asbestos containing materials present in the area(s) of investigation.

THIS REPORT SHOULD BE READ IN ITS ENTIRETY.

1.0 Introduction

AECOM New Zealand Ltd (AECOM) was commissioned by Christchurch City Council (CCC), to conduct an asbestos survey and develop an asbestos register for the following five buildings (collectively labelled "the Sites located at Naval Point, Lyttelton:

- Yacht Club;
- Coastguard Building
- Scout Hall
- Sports Pavilion; and
- Toilet Block.

In addition to these buildings, associated structures were also inspected. These included the boat storage and boat yard sheds associated with the yacht club, as well as two storage sheds associated with the scout hall.

The objective of the survey was to, as far as practicable, locate, identify and assess visually accessible asbestos-containing materials (ACM) present in the areas nominated for inspection and to present the information collected in a way that allows the duty holder to manage the risks arising from those materials in order to meet owner / employer obligations under the New Zealand *Health and Safety in Employment (Asbestos) Regulations 1998* and the New Zealand *Health and Safety in Employment Act* 1992. Additionally, the *Guidelines for the Management and Removal of Asbestos* produced by the New Zealand Occupational Safety and Health Service of the Department of Labour (DoL) (1995, revised 1999) and the *Interim guidance for work involving asbestos* (WorkSafe NZ, 2015) were used. These guidelines were considered in our assessment of the current risk level of asbestos exposure at the Sites.

This report presents the findings of a survey completed between 4th and 17th November 2015 and includes a Photographic Log (Appendix A), Full Survey Results (Appendix B), Asbestos Containing Materials/Building Register (Appendix C), Site Plans (Appendix D), Inaccessible Areas (Appendix E) an asbestos risk assessment as described in Appendix F and Laboratory Results (Appendix G).

2.0 Site Description

The description of the buildings and auxiliaries located at the Sites is outlined in Table 2 below.

Table 1 Property Details

Item		Details		
Site Name		Naval Point		
Site Address		Charlotte Jane Quay, Lyttelton.		
Date of Survey		4th – 17th November 2015		
Site	**Site Buildings**	**Description**	**Construction Date**	**Activities**
Yacht Club	Clubrooms	Two storey building consisting of concrete block, “hardiflex” exterior cladding, aluminium windows and a colour steel roof.	Approx. 1950’s with later additions	Used for training activities, functions, administration and sports meetings.
	Rescue boat shed	Single storey concrete block shed with a colour steel roof.	Unknown	Storage of rescue boats, windsurfers and small sailing dinghy’s.
	Boat yard shed	Tin Shed	Approx.1990’s	Storage of outboard motors, stored boat equipment.
Scout Hall	Scout hall building	Two storey building consisting of concrete block, “hardiflex” exterior cladding, aluminium windows and a colour steel roof.	Approx .1990’s	Training activities
	Storage shed	Foam core construction	Unknown	Storage
	Weatherboard storage shed	Weatherboard construction with tin roof.	Unknown	Storage
Toilet block		Single level concrete block structure	Unknown	Public toilet block
Coastguard building		Two storey building consisting of weatherboards and a colour steel roof.	Approx.1980’s	Training activities
Pavilion		Pipe network and vessels which feed into the load out bay	Approx.1980’s	Used for sporting events

An Asbestos Register has been created where asbestos was found for each of the areas identified above (Appendix C).

3.0 Nature and Extent of Survey

3.1 General

The purpose of the survey was to locate, identify and document visually accessible asbestos containing materials (ACM). Including the following:

a) A visual inspection was undertaken of the internal and external construction materials and components within the area(s) of investigation, to identify and locate visible above ground, accessible ACM.

b) Areas which were not subject to or inaccessible during the survey are documented in Section 3.3 or in Appendix C

c) Materials identified visually were referenced in the register as asbestos (visual);

d) Accessible materials suspected of containing asbestos and that were visually assumed to be asbestos were sampled. Samples of suspected ACM were forwarded to a laboratory accredited by International Accreditation New Zealand (IANZ) for asbestos bulk sample analysis (Hill Laboratories);

e) Samples were collected from discrete locations without damaging the integrity of the material. Samples were not taken from live electrical areas as the Site had not been electrically isolated. Comments regarding inaccessible materials are provided in Section 3.3 or in Appendix C.

f) AECOM did not access high level areas (above the reach of a step ladder) unless provision was made by the client for safe access. High level areas may be presumed to contain asbestos containing materials based on the surveyor's visual assessment and experience.

g) Suspected ACM was photographed where possible; and

h) This report was prepared, detailing the location, condition and type of ACM detected. The areas not accessible due to access restrictions are detailed in Section 3.3 or in Appendix C.

3.2 Asbestos-Containing Materials

Where samples of materials suspected of containing asbestos were identified, these were collected and sent for analysis to an IANZ accredited laboratory (Hill Laboratories). The samples were examined using a stereo microscope and selected fibres were further examined using polarised light microscopy supplemented with dispersion staining.

Sampling is not always possible due to a number of factors, which might include a lack of accessibility, closed pipe network or the risk of causing asbestos contamination.

Where sampling was not possible, a determination was reasonably made as to the presence or absence of asbestos. This determination was based on factors such as the age, physical appearance or fixing method (nail and screw heads, cover strips or cover battens). Additionally, a determination might be made by inference from the sample analysis results of similar materials sampled during the survey.

3.3 Inaccessible Areas

No access was available to the following areas at the time of inspection:

- The site was electrically active during this survey. Consequently no access was made to electrical cabinets, equipment and or other areas where there was a potential electrical hazard.
- Confined spaces
- Locked cupboards and rooms.
- Underground services and confined spaces

For the purposes of risk management it is recommended that areas where access was not possible should also be assumed to contain asbestos unless accessed and inspected by a competent person. Materials suspected of containing asbestos should be assumed to contain asbestos unless analysed and proven otherwise.

4.0 Results

4.1 Naval Point Yacht Club

The asbestos containing materials listed in Appendix C (Yacht Club) were identified as low risk. The ACM identified during the survey are summarised in Table 2 below. A site plan is attached in Appendix D (Yacht Club) that identifies areas sampled with areas identified as containing asbestos.

Table 2 Summary of ACM – Yacht club

Yacht Club					
Room / Area	**Item**	**Register ID**	**Risk Rating**	**Photo.**	**Recommendations**
Upstairs function room	Electrical backing board	**NAVALYC-6**	Low	27	Label as containing asbestos and maintain in a good condition. Re-inspect every 12 months.
Upstairs hallway	Wall lining	**NAVALYC-4 NAVALYC-5**	Low	22-23	Label as containing asbestos and maintain in a good condition. Re-inspect every 12 months.
Downstairs hallway by entrance	Electrical backing board	**NAVALYC-3**	Low	21	Label as containing asbestos and maintain in a good condition. Re-inspect every 12 months.
	Wall lining	**NAVALYC-2**	Low	20	Label as containing asbestos and maintain in a good condition. Re-inspect every 12 months.
External SW corner of building	Electrical backing board	**NAVALYC-7**	Low	36	Label as containing asbestos and maintain in a good condition. Re-inspect every 12 months.

4.2 Sports Pavilion

The asbestos containing materials listed in Appendix C (Pavilion) were identified as low risk. Materials identified during the survey are summarised in Table 3 below. A site plan is attached in Appendix D (Pavilion) that identifies areas sampled with areas identified containing asbestos.

Table 3 Summary of ACM - Pavilion

Pavilion					
Room / Area	**Item**	**Register ID**	**Risk Rating**	**Photo.**	**Recommendations**
Entrance	Electrical backing board	**NAVALPV-1**	Low	42	Label as containing asbestos and maintain in a good condition. Re-inspect every 12 months.
Eastern side changing room	Electrical backing board	**NAVALPV-2**	Low	43	Label as containing asbestos and maintain in a good condition. Re-inspect every 12 months.

4.3 Scout Hall

The asbestos containing materials listed in Appendix C (Scout Hall) were identified as low risk. Materials identified during the survey are summarised in Table 4 below. A site plan is attached in Appendix D (Scout Hall) that identifies areas sampled with areas identified containing asbestos.

Table 4 Summary of ACM - Scout Hall

Scout Hall					
Room / Area	**Item**	**Register ID**	**Risk Rating**	**Photo**	**Recommendations**
Weatherboard storage shed Inside behind door	Electrical backing board	**NAVALSC1**	Low	45	Label and maintain in a good condition. Re-inspect every 12 months.

4.4 Coastguard

The asbestos containing materials listed in Appendix C (Coastguard) were identified as low risk. Materials identified during the survey are summarised in Table 5 below. A site plan is attached in Appendix D (Coastguard) that identifies areas sampled with areas identified containing asbestos.

Table 5 Summary of ACM - Coastguard

Coastguard					
Room / Area	**Item**	**Register ID**	**Risk Rating**	**Photo**	**Recommendations**
Garage west wall	Electrical backing board	**NAVALCG-1**	Low	50	Unable to access to sample, assume asbestos containing unless proven otherwise.

A Photographic log is presented in Appendix A, The survey results are presented in Appendix B.
The asbestos register identifying all asbestos containing materials identified (sampled and assumed) during the survey is detailed in Appendix C.

During the survey no asbestos materials were identified as having a high risk for fibre release.

The methodology used in deriving risk ratings for the asbestos risk assessment is provided in Appendix F of this report.

The client is advised that the Asbestos Register is not a definitive description of all asbestos materials present in the area(s) of investigation.

5.0 Recommendations

The Yacht Club contains asbestos fibre cement sheeting which was identified during the survey to be in a fair condition as some areas were visually observed as broken. It is recommended that broken or damaged areas be encapsulated with an appropriate sealant to minimise risk of fibre release. All other asbestos containing materials on site outlined in Appendix C present a low risk, and should be labelled as containing asbestos and re-inspected on an annual basis. This is to ensure the condition of the material is still good, and risk of exposure is kept low.

The inaccessible areas identified in Section 3.3 and Appendix E should be treated as containing ACM unless confirmed otherwise by a competent person.

Where ACM has been identified (through sampling or visually assumed), appropriate risk management should be implemented to ensure that the risks are adequately controlled. Risk management of asbestos materials identified may range from their complete removal to periodic inspection and review of the risks posed by materials left in situ.

If any of the inspected areas that contain ACM are to undergo renovations or demolition, the asbestos containing materials identified should be removed prior to the commencement of demolition activities on Site.

Section 6.0 below provides general guidance only on appropriate risk management measures and is not intended to provide definitive advice or recommendations as to any obligations that arise, or measures that should be taken, as a result of any identified asbestos materials.

6.0 Hazard Control

The *New Zealand Guidelines for the Management and Removal of Asbestos* include the following methods of hazard control:

1 ***Removal**: Removing asbestos containing material;*

2 ***Enclosure**: Placing a barrier between the asbestos containing material and the surrounding environment; and*

3 ***Encapsulation or Sealing**: coating the asbestos containing material with a product that usually penetrates to the substrate and the coating just provides a protective barrier impermeable to asbestos.*

The chosen method of control should be based upon assessment of the condition of the asbestos, the possibility of further damage or deterioration, and the potential for exposure of personnel to airborne asbestos (NZDAA, 2011).

6.1 Asbestos Removal

Asbestos removal aims to remove the hazard completely, although it should be noted that in some situations, the removal of asbestos materials may generate a higher level of risk than leaving in situ. Section 5.4.1 of the *New Zealand Guidelines for the Management and Removal of Asbestos* recommend the removal of asbestos where:

- It is breaking away from the substrate base;
- Prior to any demolition works occurring; or
- When it is likely to be abraded or otherwise damaged.

Removal is also considered generally appropriate when:

- The surface is friable or asbestos is poorly bonded;
- Asbestos is severely water damaged or liable to damage or deterioration;
- Where there is lichen growth or damage; or
- Where asbestos is located in air conditioning ducts.

Removal may not be appropriate where asbestos materials are located on complex and inaccessible surfaces or where removal is extremely difficult and other techniques offer a satisfactory alternative.

6.2 Asbestos Enclosure

Enclosure is the placing of a barrier between the asbestos containing materials and the surrounding environment. The asbestos hazard will remain, however it is isolated from the surrounding environment.

Section 5.4 (Table 1) of the *New Zealand Guidelines for the Management and Removal of Asbestos*, states that enclosure is considered appropriate when;

- Removal is extremely difficult;
- Fibres can be completely contained within enclosure;
- Most of surface is already inaccessible; or
- Disturbance to, or entry into enclosure is not likely.

Enclosure is not considered appropriate when;

- Enclosure itself is liable to damage; or
- Water damage is likely.

Enclosure acts to isolate people from exposure to asbestos containing materials; however the nature of the enclosure may limit accessibility to these materials for inspection of the condition of the materials.

6.3 Asbestos Encapsulation or Sealing

Encapsulation involves coating the asbestos contaminated materials with a product that usually penetrates to the substrate and hardens the material. Sealing is where there is no substantial penetration of the substrate and the coating provides a protective barrier impermeable to the asbestos. Under the *Health and Safety in Employment (Asbestos) Regulations 1998*, encapsulation / sealing friable asbestos is considered restricted work and persons carrying out this work must hold a restricted licence.

Encapsulation / sealing is considered appropriate where:

- Asbestos containing material is in good condition;
- Removal is difficult;
- Damage of the asbestos containing material is unlikely;
- Short life of structure; and
- Asbestos containing material is readily accessible for regular assessment.

Encapsulation / sealing is not considered appropriate when:

- Asbestos is deteriorated;
- Application of sealant may cause damage to the material;
- Further water damage is likely; or
- Where there are large areas of damaged asbestos.

6.4 Friable and Bonded Asbestos-Containing Material Removal Guidelines

Friable asbestos means asbestos that under ordinary conditions can be easily crumbles. An employer should restrict access to friable asbestos materials and construction work processes involving friable asbestos material.

All friable asbestos 'work' must be undertaken by a person who holds a *restricted work* license. The *Guidelines for the Management and Removal of Asbestos* (the Guidelines) produced by the New Zealand Occupational Safety and Health Service of the DoL (1995, Revised 1999) provide the following general information with regard to restricted work: (It is noted that the source material for definition of *'restricted work'* is the *Asbestos Regulations (1998), Regulation 2)*

Restricted work means work in one or more of the following categories:

a) Work involving asbestos, if the asbestos concerned is friable and is or has been used in connection with thermal or acoustic insulation, or fire protection, in buildings, ships, structures, or vehicles;

b) Work involving asbestos, if the asbestos concerned is friable and is or has been used in connection with lagging around boilers ducts, furnaces, or pipes;

c) The demolition or maintenance of anything, including a building or part of a building, containing friable asbestos;

d) The encapsulation of materials containing friable asbestos;

e) The use, on asbestos cement or other bonded product containing asbestos, of:

- A power tool with any kind of cutting blade or abrasive device, except when it is used with dust control equipment; or
- Any other equipment whose use may result in the release of asbestos dust, except when it is used with dust control equipment.

f) Dry sanding of floor coverings containing asbestos.

With regard to non-friable asbestos, the Guidelines provide the following handling procedures and general precautions:

Part II: Handling of Bonded Asbestos

2.18 General

2.18.1 Non-friable asbestos products have been compounded from asbestos mixed with cement or other hard bonding materials. This part recommends precautions to be observed when working with non-friable asbestos products.

2.18.2 These products include, but are not limited to:

- Flat or corrugated, compressed asbestos-cement sheeting;
- Asbestos-cement pipes for water, drainage and flue gases;
- Roofing shingles;
- Floor or wall coverings;
- Asbestos gaskets;
- Pump and valve packing's, or
- Asbestos bonded into bituminous products.

2.18.3 So long as these products are maintained in good order and are not worked on with abrasive cutting or grinding tools they are **not** likely to present a health risk.

2.18.4 New fibro-cement products manufactured in New Zealand no longer contain asbestos.

2.18.5 The employer shall ensure that precautions are observed during structural alteration or demolition involving asbestos-cement materials and removal of floor and wall coverings containing asbestos.

2.19 General precautions to be observed for non-friable asbestos products.

2.19.1 Work procedures must be designed to minimise the generation of dust.

Action should be taken to avoid the spread of asbestos fibre. In particular, the following principles should be adopted:

a) Abrasive cutting or sanding power tools should not be used on asbestos-containing products. These may generate large amounts of dust containing asbestos.

b) Non-powered hand tools such as hand saws should be used.

c) Wetting down the material further reduces the release of asbestos fibre when cutting.

d) High pressure water jets/guns shall not be used because of the potential to spread asbestos waste over the surrounding environment.

e) Work with asbestos-containing products in well ventilated areas and, where possible, in the open air.

f) Good work hygiene principles shall be observed. This may entail the use of plastic drop sheets to collect offcuts and coarse dust or the use of appropriate vacuum cleaning equipment when necessary.

g) Suitable respiratory protection should be used when airborne asbestos fibre is likely to be present.

h) All off-cuts and collected dust should be disposed of as asbestos waste.

Interim guidance for work involving asbestos (WorkSafe NZ, March 2015) provides further and more current guidance on the management and removal of ACM and should be used until the new WorkSafe NZ regulations come into effect. These new regulations are likely to come into effect in early 2016.

AECOM further recommends that as demolition work is likely to disturb the ACM then the ACM should be removed prior to works commencing. A destructive asbestos and hazardous materials inspection may also be necessary prior to work commencing in those areas not able to be accessed as detailed in this report.

Removal of ACM is to be undertaken in accordance with the requirements outlined in the Guidelines.

Airborne asbestos monitoring should be carried out during the removal of friable ACM and all samples should be analysed by a laboratory accredited by International Accreditation New Zealand (IANZ) or the reciprocal Australian body, the National Association of Testing Authorities (NATA) for the estimation of airborne asbestos fibre. In some cases, airborne asbestos monitoring will be required for the removal of non-friable ACM. For example, airborne asbestos monitoring is recommended during non-friable asbestos removal works at sensitive sites such as schools and hospitals or at a premise alongside schools and hospitals.

At the completion of asbestos removal work, a clearance inspection should be conducted by a competent person to assess the adequacy of the removal works undertaken.

In order to avoid any potential conflict of interest, it is recommended that airborne asbestos monitoring and clearance inspections be performed by person/s independent of the asbestos removal contractor.

All asbestos waste must be disposed at a suitably approved waste collection facility. All tipping receipts must be retained and asbestos registers updated to reflect the abatement action.

7.0 References

Hill Laboratories, Analysis Report 1501590, Report Dated 16-Nov-15

Hill Laboratories, Analysis Report 1502443, Report Dated 19-Nov-15

Department of Labour (DOL), revised 1999. *Guidelines for the management and removal of Asbestos*, New Zealand Occupational Safety and Health Service, DoL, 1995, Revised 1999.

Ministry of Business, Innovation and Employment (MBIE), 1998. New Zealand *Health and Safety in Employment (Asbestos) Regulations 1998.*

Ministry of Business, Innovation and Employment (MBIE), 1992. New Zealand *Health and Safety in Employment Act* 1992.

WorkSafe NZ, March 2015. *Interim guidance for work involving asbestos* (WorkSafe NZ, 2015).

8.0 Limitations

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A. The survey was undertaken by visual inspection and minor destructive means only. Only those areas of investigation at the site that were accessible to AECOM at the time of our inspection are covered in this report. Therefore, AECOM does not guarantee that this visual inspection has confirmed, warranted or certified the location, identification and/or the removal of all asbestos material either identified by AECOM or others in any report previously provided and/or which is or may be present on the Site inspected.

B. AECOM has relied on information provided by the Client and by third parties to produce this Report and arrive at its conclusions. AECOM has not verified the accuracy or completeness of such information and therefore assumes no responsibility for its accuracy and makes no representations with respect to its accuracy or completeness.

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This Report does not, and does not purport to, give legal advice as to the Client's actual or potential asbestos or hazardous material liabilities, or draw conclusions as to whether any particular circumstances constitute a breach of relevant legislation. Such advice can only be given by qualified legal practitioner

Appendix A

Photographic Log

Photo No.	Date
1	04/11/2015

Room / Area

Naval Point boat yard shed

Location

Boat yard shed – Roofing building paper

Survey Reference

Not sampled, not suspect ACM

Asbestos Type

No ACM Suspected

Condition

Caption

Not suspected ACM

Photo No.	Date
2	04/11/2015

Room / Area

Naval Point Rescue boat shed

Location

Southern wall

Survey Reference

Nprbs1

Asbestos Type

No Asbestos Detected

Condition

Broken, Layered

Caption

FCS

Photo No.	Date
3	04/11/2015

Room / Area

Naval Point Rescue boat shed

Location

Southern wall

Survey Reference

Nprbs1

Asbestos Type

No ACM detected

Condition

Caption

FCS panels on southern wall

Photo No.	Date
4	04/11/2015

Room / Area

Naval Point Rescue boat shed

Location

Northern wall

Survey Reference

Nprbs2

Asbestos Type

No ACM Detected

Condition

Newer looking FCS to FCS on Southern wall

Caption

FCS panels on northern wall.

Photo No.	Date
5	04/11/2015

Room / Area

Naval Point yacht club

Location

Exterior wall north.

Survey Reference

Npyc1

Asbestos Type

No Asbestos Detected

Condition/Comments

Some minor damage to wall.

Caption

Later layered fibre cement sheeting on northern wall.

Photo No.	Date
6	04/11/2015

Room / Area

Naval Point yacht club

Location

Exterior wall north.

Survey Reference

Npyc1

Asbestos Type

No Asbestos Detected

Condition/Comments

Some minor damage to wall.

Caption

Later layered fibre cement sheeting on northern wall.

Photo No.	Date
7	04/11/2015

Room / Area

Naval Point yacht club

Location

Exterior wall north.

Survey Reference

Npyc1

Asbestos Type

No Asbestos Detected

Condition/Comments

Some minor damage to wall.

Caption

Later layered fibre cement sheeting on northern wall.

Photo No.	Date
8	04/11/2015

Room / Area

Naval Point yacht club exterior walls.

Location

Exterior walls north and east.

Survey Reference

Npyc2

Asbestos Type

Chrysotile and Amosite

Condition/Comments

Some minor damage to parts of wall.

Caption

Original cladding on wall. Not layered like Npyc1 samples.

Photo No.	Date
9	04/11/2015

Room / Area

Naval Point yacht club exterior walls.

Location

Exterior wall north and east.

Survey Reference

As per Npyc2

Asbestos Type

Inaccessible

Condition/Comments

Suspected ACM cladding, Inaccessible at the time of inspection.

Caption

NE gable 2nd floor. Suspected asbestos containing fibre cement

Photo No.	Date
10	04/11/2015

Room / Area

Naval Point yacht club exterior walls.

Location

Exterior wall north and eastern soffit

Survey Reference

Npyc2

Asbestos Type

Chrysotile and Amosite

Condition/Comments

Broken in places.

Caption

Battens also as original cladding on wall. Not layered like Npyc1 samples.

Photo No.	Date
11	04/11/2015

Room / Area

Naval Point yacht club exterior walls.

Location

Exterior wall north and east.

Survey Reference

Npyc2

Asbestos Type

Chrysotile and Amosite

Condition/Comments

Broken in places.

Caption

Original cladding on wall. Not layered like Npyc1 samples.

Photo No.	Date
12	04/11/2015

Room / Area

Naval Point yacht club exterior walls.

Location

Exterior wall north and eastern soffit.

Survey Reference

Same as Npyc2

Asbestos Type

Chrysotile and Amosite

Condition/Comments

Soffits in good condition, it is assumed that the soffits are the same throughout the building.

Caption

Soffit as per original cladding on wall.

Photo No.	Date
13	04/11/2015

Room / Area

Naval Point yacht club exterior walls.

Location

Exterior wall north and east.

Survey Reference

Npyc2a

Asbestos Type

Chrysotile and Amosite

Condition/Comments

Unsealed in places.

Caption

Original cladding is asbestos containing.

Photo No.	Date
14	04/11/2015

Room / Area

Naval Point yacht club exterior walls.

Location

Exterior wall north and east.

Survey Reference

Npyc2

Asbestos Type

Chrysotile and Amosite

Condition/Comments

Fibre cement sheeting is in good condition, wooden battens over wall cladding.

Caption

2nd floor wall as per original asbestos containing cement sheeting.

Photo No.	Date
15	04/11/2015

Room / Area

Naval Point yacht club exterior walls.

Location

Exterior wall north and eastern soffit.

Survey Reference

Npyc2

Asbestos Type

Chrysotile and Amosite

Condition/Comments

Good.

Caption

Soffit on eastern entrance.

Photo No.	Date
16	04/11/2015

Room / Area

Naval Point yacht club exterior walls.

Location

Exterior wall north and east.

Survey Reference

Npyc2

Asbestos Type

Chrysotile and Amosite

Condition/Comments

Fair Condition/Comments.

Caption

Some battens have been replaced with wood; most are original asbestos containing fibrous cement material.

Photo No.	Date
17	04/11/2015

Room / Area

Naval Point yacht club

Location

Exterior wall north; bituminous building paper.

Survey Reference

Npyc3

Asbestos Type

No asbestos detected

Condition/Comments

Exposed where cladding is broken.

Caption

Building paper sampled from where cladding is broken.

Photo No.	Date
18	04/11/2015

Room / Area

Naval Point yacht club

Location

North wall glazing compound

Survey Reference

Npyc4

Asbestos Type

No asbestos detected

Condition/Comments

Fair.

Caption

Window Putty.

Photo No.	Date
19	04/11/2015

Room / Area
Naval Point yacht club

Location
North wall glazing compound

Survey Reference
Npyc4

Asbestos Type
No asbestos detected

Condition/Comments
Fair

Caption
Glazing compound.

Photo No.	Date
20	04/11/2015

Room / Area
Naval Point yacht club

Location
Hallway wall to office

Survey Reference
Refer sample npyc2

Asbestos Type
Chrysotile and Amosite

Condition/Comments
Good.

Caption
Original exterior wall. Wooden battens in this area.

Photo No.	Date
21	04/11/2015

Room / Area

Naval Point yacht club

Location

Eastern stairwell near entrance

Survey Reference

Not sampled, live. Presumed ACM.

Asbestos Type

Asbestos – Visual

Condition/Comments

Good.

Caption

Meter board

Photo No.	Date
22	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs hallway

Survey Reference

Not sampled. Strongly presumed as per Npyc2

Asbestos Type

Chrysotile and Amosite

Condition/Comments

Good.

Caption

Annotated photo shows where asbestos containing materials are present on hallway walls.

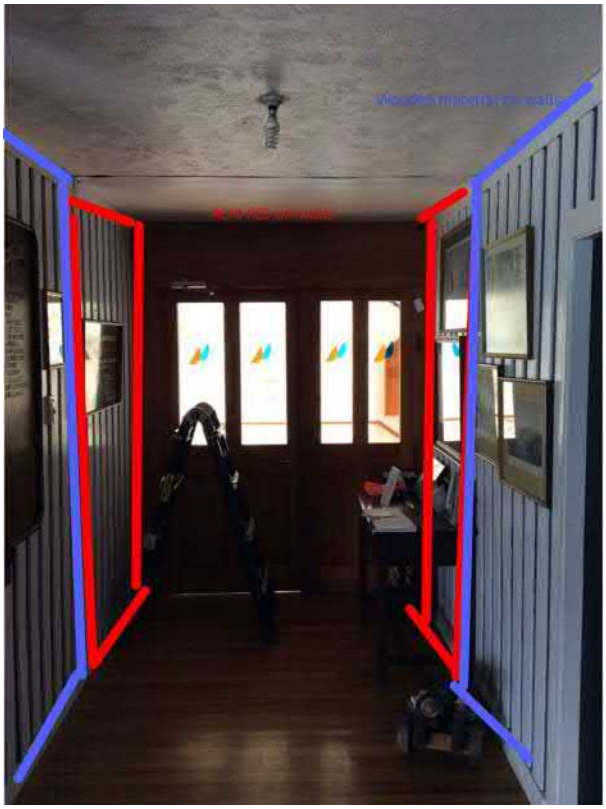


Photo No.	Date
23	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs hallway

Survey Reference

Not sampled. Suspected ACM

Asbestos Type

Suspected ACM

Condition/Comments

Good.

Caption

Flat non textured ceiling suspected asbestos containing.

Photo No.	Date
24	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs hallway ceiling

Survey Reference

Npyc5

Asbestos Type

No asbestos detected

Condition/Comments

Good in places, poor in others.

Caption

No asbestos detected.

Photo No.	Date
25	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs hallway wall

Survey Reference

As per Npyc5

Asbestos Type

No asbestos detected

Condition/Comments

Good.

Caption

Wall is similar material to ceiling and not suspected ACM.

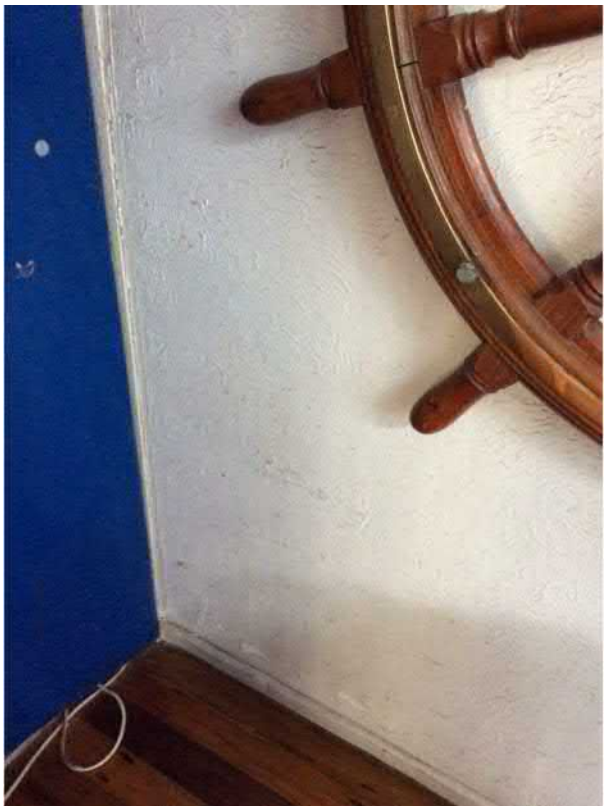


Photo No.	Date
26	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs hallway ceiling

Survey Reference

As per Npyc5

Asbestos Type

No asbestos detected

Condition/Comments

Poor.

Caption

Textured Ceiling

Photo No.	Date
27	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs function room

Survey Reference

Live electrical board.

Asbestos Type

Asbestos - Visual

Condition/Comments

Fair

Caption

Asbestos containing electrical backing board.

Photo No.	Date
28	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs function room

Survey Reference

Not sampled suspected asbestos containing sealer.

Asbestos Type

Inaccessible

Condition/Comments

Suspected CAF gasket.

Caption

Gasket and sealer suspected to contain asbestos.

Photo No.	Date
29	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs function room

Survey Reference

Not sampled

Asbestos Type

Not suspected ACM

Condition/Comments

Good

Caption

Fireplace door seal – Not suspected ACM – appears modern.

Photo No.	Date
30	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs function room

Survey Reference

Not sampled suspected asbestos containing.

Asbestos Type

Suspected Asbestos

Condition/Comments

Fair

Caption

Thermal bricks suspect ACM.

Photo No.	Date
31	04/11/2015

Room / Area

Naval Point yacht club

Location

Upstairs function room

Survey Reference

Not sampled, components suspected to contain asbestos.

Asbestos Type

Inaccessible

Condition/Comments

Fair

Caption

Fireplace with suspected ACM components internally.

Photo No.	Date
32	04/11/2015

Room / Area

Naval Point yacht club

Location

Building wall

Survey Reference

Npyc6

Asbestos Type

No suspected Asbestos

Condition/Comments

Fair in places.

Caption

Layered cement similar to sample Npyc1 on northern walls.

Photo No.	Date
33	04/11/2015

Room / Area

Naval Point yacht club

Location

Building wall

Survey Reference

As per Npyc6

Asbestos Type

No asbestos detected

Condition/Comments

Good.

Caption

Cement sheet cladding.

Photo No.	Date
34	04/11/2015

Room / Area

Naval Point yacht club

Location

Library

Survey Reference

Npyc8

Asbestos Type

No asbestos detected

Condition/Comments

Good.

Caption

Gib board joint compound

Photo No.	Date
35	04/11/2015

Room / Area

Naval Point yacht club

Location

Library

Survey Reference

Npyc8

Asbestos Type

No asbestos detected

Condition/Comments

Good.

Caption

Gib board joint compound

Photo No.	Date
36	04/11/2015

Room / Area

Naval Point yacht club

Location

External SW corner

Survey Reference

Not sampled, live.

Asbestos Type

Asbestos- Visual

Condition/Comments

Inaccessible at time of inspection, due live power

Caption

Live electrical backing board. Suspected ACM.

Photo No.	Date
37	04/11/2015

Room / Area

Naval Point yacht club

Location

Internal under stairs by bathrooms

Survey Reference

Not sampled

Asbestos Type

Inaccessible

Condition/Comments

Suspected millboard at top of cylinder.

Caption

Hot water cylinder suspected to contain ACM

Photo No.	Date
39	11/11/2015

Room / Area
Naval point pavilion

Location
South wall soffit patch

Survey Reference
NPP-1a

Asbestos Type
No Asbestos detected

Condition/Comments
Good

Caption
FCM patch on soffit

Photo No.	Date
40	11/11/2015

Room / Area
Naval point pavilion

Location
Soffit around whole building

Survey Reference
NPP-1

Asbestos Type
No Asbestos detected

Condition/Comments
Good

Caption
Original soffit around building

Photo No.	Date
41	11/11/2015

Room / Area
Naval point pavilion

Location
Window corkage on steel joinery

Survey Reference
NPP-2

Asbestos Type
No Asbestos detected

Condition/Comments
Good

Caption
Window Putty

Photo No.	Date
42	11/11/2015

Room / Area
Naval point pavilion

Location
Entrance Eastern wall

Survey Reference
NPP-3

Asbestos Type
Asbestos – Visual

Condition/Comments
Good

Caption
Live electrical backing boarding

Photo No.	Date
43	11/11/2015

Room / Area
Naval point pavilion

Location
Eastern side changing rooms

Survey Reference
NPP-4

Asbestos Type
Asbestos- Visual

Condition/Comments
Good

Caption
Live backing board not sampled

Photo No.	Date
44	11/11/2015

Room / Area
Naval point pavilion

Location
Kitchen

Survey Reference
NPP-5

Asbestos Type
Inaccessible

Condition/Comments
Suspected millboard within Cylinder.

Caption
Hot Water Cylinder

Photo No.	Date
45	11/11/2015

Room / Area

Naval point scout club storage shed.

Location

Behind door

Survey Reference

NPSC-1

Asbestos Type

Asbestos Visual

Condition/Comments

Good, drilled holes observed.

Caption

Electrical backing board

Photo No.	Date
46	11/11/2015

Room / Area

Naval point scout club storage shed

Location

Window putty

Survey Reference

NPSC-2

Asbestos Type

Inaccessible

Condition/Comments

Suspected ACM

Caption

Window Putty,

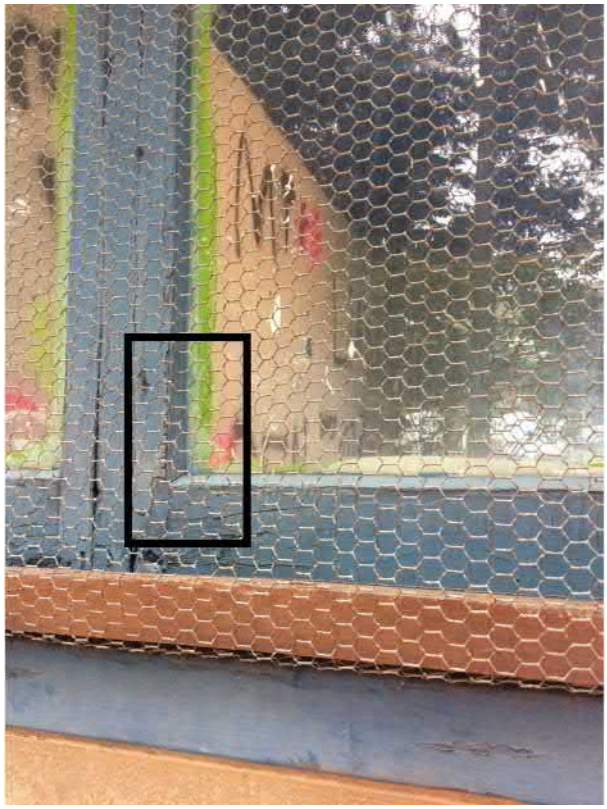


Photo No.	Date
47	17/11/2015

Room / Area
Naval point coastguard

Location
Kitchen

Survey Reference
Npc-1

Asbestos Type
No Asbestos Detected

Condition/Comments
Brown coloured Vinyl

Caption
Kitchen

Photo No.	Date
48	17/11/2015

Room / Area
Naval point coastguard

Location
Kitchen

Survey Reference
Npc-1

Asbestos Type
No Asbestos Detected

Condition/Comments
Poor in patches

Caption
vinyl

Photo No.	Date
49	17/11/2015

Room / Area

Naval point coastguard

Location

Radio room cornice

Survey Reference

Npc2

Asbestos Type

No Asbestos Detected

Condition/Comments

Good

Caption

Cornice between wall and ceiling

Photo No.	Date
50	17/11/2015

Room / Area

Naval point coastguard

Location

Garage west wall

Survey Reference

Npc-3

Asbestos Type

Asbestos –Visual

Condition/Comments

Good

Caption

Power live – Electrical distribution Board

Photo No.	Date
51	17/11/2015

Room / Area

Naval point coastguard

Location

Radio room textured ceiling

Survey Reference

Npc-4

Asbestos Type

No Asbestos Detected

Condition/Comments

Due to the sampling being destructive only one discrete sample was taken, this sample had no asbestos detected.

Caption

Textured ceiling

Photo No.	Date
52	17/11/2015

Room / Area

Naval point coastguard

Location

Under steps SW corner

Survey Reference

Npc-5

Asbestos Type

No Asbestos Detected

Condition/Comments

Good Condition/Comments. Only present in one section of building.

Caption

Fibre Cement sheeting under Steps

Photo No.	Date
53	17/11/2015

Room / Area

Naval point coastguard

Location

Under steps Ne side

Survey Reference

Npc6

Asbestos Type

No Asbestos Detected

Condition/Comments/Comment

Good Condition/Comments painted bituminous adhesive sealant.

Caption

Lower Section bituminous sealant.

Appendix B

Survey Results

Hazardous Materials Survey Results Sheet

Client: CCC
Site Address: Naval Point Yacht Club / Boat Yard shed / Boat shed
Job Number: 60444747
Survey Date/s: 4/11/2015

Building	Room/ Area	Location	Material Description		Survey Reference	Result		Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
Naval Point yacht club - External	Boat Yard Shed	Boat yard shed roof membrane	Miscellaneous Products	Bituminous Adhesive / Sealant	Npbys1	Not suspected ACM								1	R1 - No action is required.	
Naval Point yacht club - External	Rescue boat shed	Southern wall	Cement Products	Wall Lining	Nprbs1	No Asbestos Detected								2	R1 - No action is required.	
Naval Point yacht club - External	Rescue boat shed	Southern wall	Cement Products	Wall Lining	Nprbs1	No Asbestos Detected								3	R1 - No action is required.	
Naval Point yacht club - External	Rescue boat shed	Northern wall	Cement Products	Wall Lining	Nprbs2	No Asbestos Detected								4	R1 - No action is required.	
Naval Point yacht club - External	External	Exterior wall north	Cement Products	Wall Lining	Npyc1	No Asbestos Detected								5	R1 - No action is required.	
Naval Point yacht club - External	External	Exterior wall north	Cement Products	Wall Lining	Npyc1	No Asbestos Detected								6	R1 - No action is required.	
Naval Point yacht club - External	External	Exterior wall north	Cement Products	Wall Lining	Npyc1	No Asbestos Detected								7	R1 - No action is required.	
Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	Npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	8	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	Npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	9	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	Npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	10	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	Npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	11	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	Npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	12	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	Npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	13	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	Npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	14	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	Npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	15	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	Npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	16	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	External	Exterior wall North side bituminous wall membrane	Miscellaneous Products	Bitumen	Npyc3	No Asbestos Detected								17	R1 - No action is required.	
Naval Point yacht club - External	External	North wall glazing compound	Miscellaneous Products	Caulking Compounds	Npyc4	No Asbestos Detected								18	R1 - No action is required.	
Naval Point yacht club - External	External	North wall glazing compound	Miscellaneous Products	Caulking Compounds	Npyc4	No Asbestos Detected								19	R1 - No action is required.	
Naval Point yacht club - External	Stairwell 1 by eastern entrance	Hallway wall to office	Cement Products	Wall Lining	Refer sample npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Good	Moderate	Low	Moderate	**Low**	20	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	Stairwell 1 by eastern entrance	Eastern stairwell	Insulation Board Products	Electrical Backing Board	Live. Not sampled	**Asbestos (visual)**		Bonded / Non Friable	Good	Moderate	Low	Low	**Low**	21	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	Stairwell 1 by eastern entrance	Upstairs hallway	Cement Products	Wall Lining	Refer sample npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Good	High	Low	Moderate	**Low**	22	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - External	Stairwell 1 by eastern entrance	Upstairs hallway	Cement Products	Wall Lining	Refer sample npyc2	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Good	High	Low	Moderate	**Low**	23	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	

Hazardous Materials Survey Results Sheet

Client: CCC
Site Address: Naval Point Yacht Club / Boat Yard shed / Boat shed
Job Number: 60444747
Survey Date/s: 4/11/2015

Building	Room/ Area	Location	Material Description		Survey Reference	Result	Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
Naval Point yacht club - Internal	Stairwell 1 by eastern entrance	Upstairs hallway ceiling	Painted Surface	Internal	Npyc5	No Asbestos Detected							24	R1 - No action is required.	
Naval Point yacht club - Internal	Stairwell 1 by eastern entrance	Upstairs hallway ceiling	Painted Surface	Internal	Npyc5	No Asbestos Detected							25	R1 - No action is required.	
Naval Point yacht club - Internal	Stairwell 1 by eastern entrance	Upstairs hallway ceiling	Painted Surface	Internal	Npyc5	No Asbestos Detected							26	R1 - No action is required.	
Naval Point yacht club - Internal	External	Upstairs function room	Insulation Board Products	Electrical Backing Board	Not sampled	**Asbestos (visual)**	Bonded / Non Friable	Good	Low	Low	Low	**Low**	27	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - Internal	External	Upstairs function room	Rope Cloth Gasket Products	Gasket - Vinyl Sheet	Not sampled suspected acm	Inaccessible							28	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos should be presumed to be present until proved otherwise.	
Naval Point yacht club - Internal	External	Upstairs function room	Rope Cloth Gasket Products	Gasket - Rope	Not sampled	Not suspected ACM							29	R1 - No action is required.	
Naval Point yacht club - Internal	External	Upstairs function room	Cement Products	Fire Break	Not sampled suspected acm	Inaccessible							30	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos should be presumed to be present until proved otherwise.	
Naval Point yacht club - External	External	Upstairs function room	Rope Cloth Gasket Products	Gasket - Vinyl Sheet	Not sampled suspected acm	Inaccessible							31	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos should be presumed to be present until proved otherwise.	
Naval Point yacht club - External	2nd floor west balcony	Building wall	Cement Products	Wall Lining	Npyc6	Not suspected ACM							32	R1 - No action is required.	
Naval Point yacht club - External	2nd floor west balcony	Building wall	Cement Products	Wall Lining	Npyc6	Not suspected ACM							33	R1 - No action is required.	
Naval Point yacht club - External	Stairwell 1 by eastern entrance	Library ceiling	Miscellaneous Products	Caulking Compounds	Npyc8	No Asbestos Detected							34	R1 - No action is required.	
Naval Point yacht club - External	Stairwell 1 by eastern entrance	Library ceiling	Miscellaneous Products	Caulking Compounds	Npyc8	No Asbestos Detected							35	R1 - No action is required.	
Naval Point yacht club - External	External	Exterior SW corner	Insulation Board Products	Electrical Backing Board	Live. Not sampled	**Asbestos (visual)**	Bonded / Non-Friable	Good	Low	Low	Low	**Low**	36	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point yacht club - Internal	Under stairs	Under stairs by bathrooms	Miscellaneous Products	"Millboard"	Not sampled suspected acm	**Inaccessible**							37	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos should be presumed to be present until proved otherwise.	

Hazardous Materials Survey Results Sheet

Client: Christchurch City Council
Site Address: Naval Point Pavilion
Job Number: 60444747
Survey Date/s: 11/11/15

Room/ Area	Location	Material Description		Survey Reference	Result	Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
Outside	South wall soffit patch	Cement Products	Soffit	NPP-1a	No Asbestos Detected							39	R1 - No action is required.	
Outside	Soffit around whole building	Null	null	NPP-1	No Asbestos Detected							40	R1 - No action is required.	
Outside	Window corkage on steel joinery	Other	null	NPP-2	No Asbestos Detected							41	R1 - No action is required.	
Inside entrance, eastern changing room and kitchen	Entrance Eastern wall	Insulation Board Products	Electrical Backing Board	NPP-3	Asbestos (visual)	Bonded / Non Friable	Good	Low	Low	Low	**Low**	42	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Inside entrance, eastern changing room and kitchen	Eastern side changing rooms	Insulation Board Products	Electrical Backing Board	NPP-4	Asbestos (visual)	Bonded / Non Friable	Good	Low	Low	Low	**Low**	43	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Inside entrance, eastern changing room and kitchen	Kitchen	Miscellaneous Products	"Millboard"	NPP-5	Inaccessible							44	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos should be presumed to be present until proved otherwise.	

ANZ

Hazardous Materials Survey Results Sheet

Q4AN(EV)-335-FM70

Client: Christchruch City Council

Site Address: Naval Point scout club

Job Number: 60444747

Survey Date/s: 11/11/15

Building	Room/ Area	Location	Material Description		Survey Reference	Result	Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
Naval Point scout club - Weatherboard storage shed	Weather board shed	Behind door	Insulation Board Products	Electrical Backing Board	NPSC-1	Asbestos (visual)	Bonded / Non Friable	Good	Moderate	Low	Low	**Low**	45	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Naval Point scout club - Weatherboard storage shed	Weather board shed	Window putty	Miscellaneous Products	Cork Board	NPSC-2	**Inaccessible**							46	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos should be presumed to be present until proved otherwise.	

Hazardous Materials Survey Results Sheet

Client: Christchruch City Council

Site Address: Naval Point Coastguard Building

Job Number: 60444747

Survey Date/s: 17-11-15

Room/ Area	Location	Material Description		Survey Reference	Result	Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
Classroom kitchen and radio room	Kitchen	Vinyl Products	Floor Covering	Npc-1	No Asbestos Detected							47	R1 - No action is required.	
Classroom kitchen and radio room	Kitchen	Vinyl Products	Floor Covering	Npc-1	No Asbestos Detected							48	R1 - No action is required.	
Classroom kitchen and radio room	Radio room cornice	Painted Surface	Internal	Npc2	No Asbestos Detected							49	R1 - No action is required.	
Garage and bathrooms	Garage west wall	Insulation Board Products	Electrical Backing Board	Npc-3	**Asbestos (visual)**	Bonded / Non Friable	Good	Low	Low	Moderate	**Low**	50	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
Classroom kitchen and radio room	Radio room textured ceiling	Painted Surface	Textured Surface	Npc-4	No Asbestos Detected							51	R1 - No action is required.	
Walls	Under steps sw corner	Cement Products	Wall Lining	Npc-5	No Asbestos Detected							52	R1 - No action is required.	
Walls	Under steps Ne side	Miscellaneous Products	Bituminous Adhesive Sealant	Npc6	No Asbestos Detected							53	R1 - No action is required.	

Appendix C

Asbestos Register

Client: CCC
Site Address: Naval Point Yacht Club / Boat Yard shed / Boat shed
Job Number: 60444747
Survey Date/s: 4/11/2015

Register ID	Building	Room/ Area	Location	Material Description		Result		Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
NAVALYC-1	Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	8	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-1	Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	9	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-1	Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	10	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-1	Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	11	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-1	Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	12	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-1	Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	13	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-1	Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	14	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-1	Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	15	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-1	Naval Point yacht club - External	External	Exterior wall north and eastern entrance soffits	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Fair	Low	Low	Moderate	**Low**	16	R4 - Encapsulate material and fit with asbestos warning labels. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-2	Naval Point yacht club - External	Stairwell 1 by eastern entrance	Hallway wall to office	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Good	Moderate	Low	Moderate	**Low**	20	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-3	Naval Point yacht club - External	Stairwell 1 by eastern entrance	Eastern stairwell	Insulation Board Products	Electrical Backing Board	**Asbestos (visual)**		Bonded / Non Friable	Good	Moderate	Low	Low	**Low**	21	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-4	Naval Point yacht club - External	Stairwell 1 by eastern entrance	Upstairs hallway	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Good	High	Low	Moderate	**Low**	22	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-5	Naval Point yacht club - External	Stairwell 1 by eastern entrance	Upstairs hallway	Cement Products	Wall Lining	**Asbestos**	**Chrysotile and Amosite**	Bonded / Non Friable	Good	High	Low	Moderate	**Low**	23	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-6	Naval Point yacht club - Internal	External	Upstairs function room	Insulation Board Products	Electrical Backing Board	**Asbestos (visual)**		Bonded / Non Friable	Good	Low	Low	Low	**Low**	27	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALYC-7	Naval Point yacht club - External	External	Exterior SW corner	Insulation Board Products	Electrical Backing Board	**Asbestos (visual)**		Bonded / Non-Friable	Good	Low	Low	Low	**Low**	36	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	

Hazardous Materials Survey Results Sheet

Client: Christchurch City Council
Site Address: Naval Point Pavilion
Job Number: 60444747
Survey Date/s: 11/11/15

Register ID	Room/ Area	Location	Material Description		Result	Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
NAVALPV-1	Inside entrance, eastern changing room and kitchen	Entrance Eastern wall	Insulation Board Products	Electrical Backing Board	**Asbestos (visual)**	Bonded / Non Friable	Good	Low	Low	Low	**Low**	42	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	
NAVALPV-2	Inside entrance, eastern changing room and kitchen	Eastern side changing rooms	Insulation Board Products	Electrical Backing Board	**Asbestos (visual)**	Bonded / Non Friable	Good	Low	Low	Low	**Low**	43	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	

Hazardous Materials Survey Results Sheet

Client: Christchruch City Council
Site Address: Naval Point scout club
Job Number: 60444747
Survey Date/s: 11/11/15

Register ID	Building	Room/ Area	Location	Material Description		Result	Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
NAVALSC1	Naval Point scout club - Weatherboard storage shed	Weather board shed	Behind door	Insulation Board Products	Electrical Backing Board	Asbestos (visual)	Bonded / Non Friable	Good	Moderate	Low	Low	**Low**	45	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	

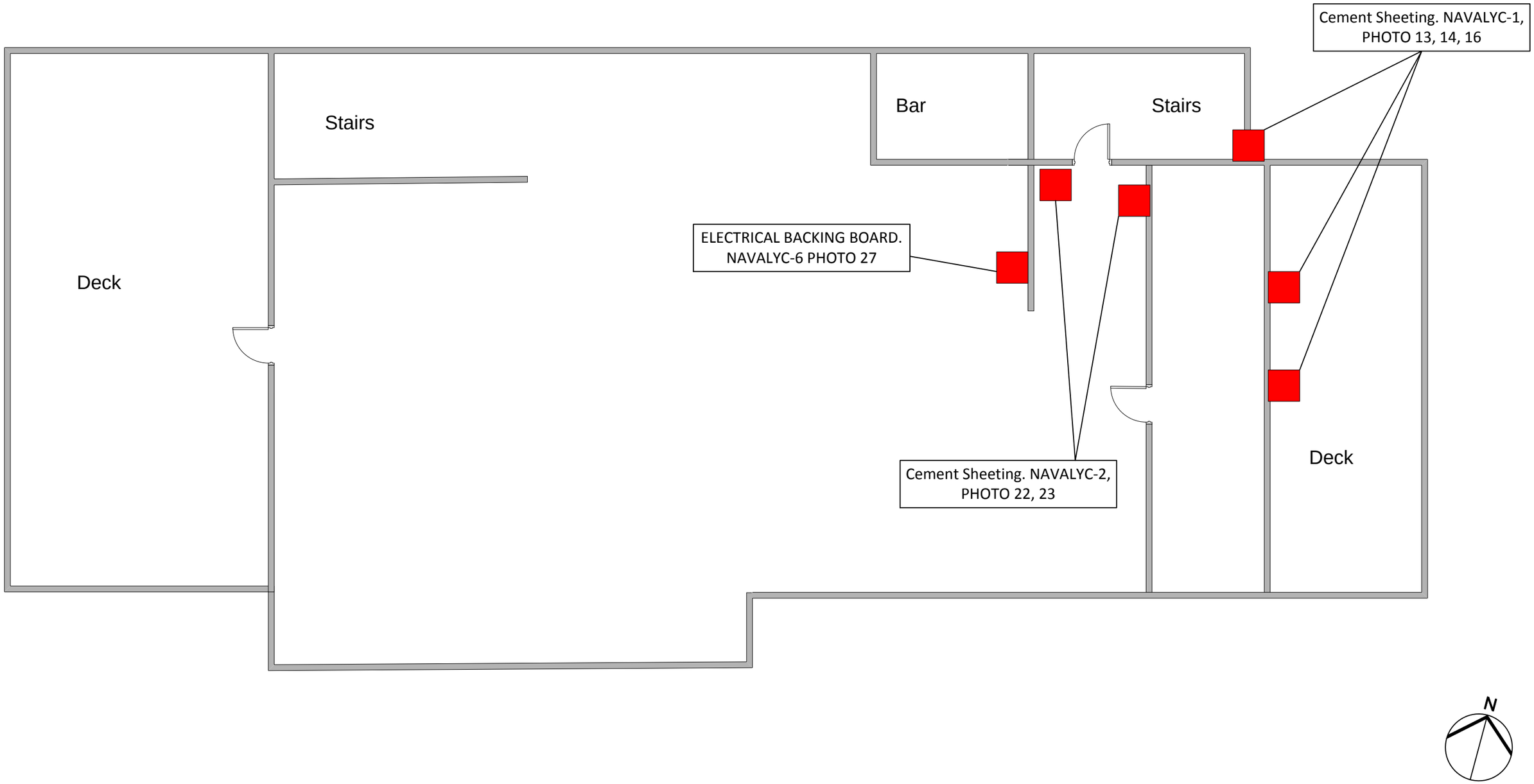
Hazardous Materials Survey Results Sheet

Client: Christchruch City Council
Site Address: Naval Point Coastguard Building
Job Number: 60444747
Survey Date/s: 17-11-15

Register ID	Room/ Area	Location	Material Description		Result		Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
NAVALCG-1	Garage and bathrooms	Garage west wall	Insulation Board Products	Electrical Backing Board	Asbestos (visual)		Bonded / Non Friable	Good	Low	Low	Moderate	Low	50	R3 - Label material as containing asbestos. Re-inspect every 12 months. Removal should be undertaken prior to any demolition or refurbishment which may affect the material.	

Appendix D

Site Plans



PROJECT ID: 60444747
LAST DATE MODIFIED: 10/12/15

AECOM

Naval Point Yacht Club – 1st floor

Not to scale

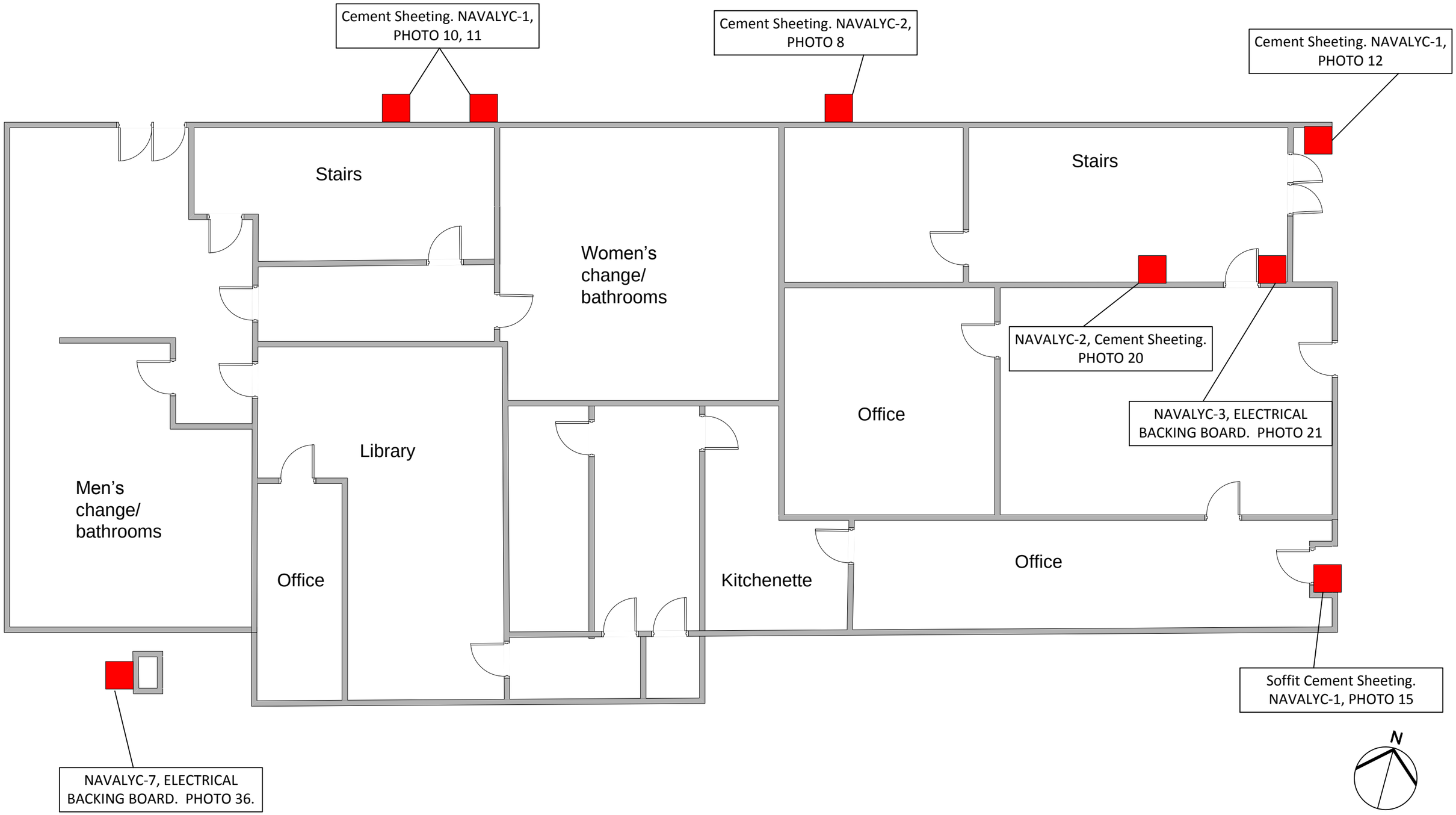
LOCATION OF POSITIVE ASBESTOS SAMPLES

NAVALYC-2 ACM REGISTER ID

PHOTO 22 PHOTOGRAPHIC LOG ID

Naval Point

Appendix D



PROJECT ID: 60444747
LAST DATE MODIFIED: 10/12/15

AECOM

Naval Point Yacht Club – Ground floor

Not to scale

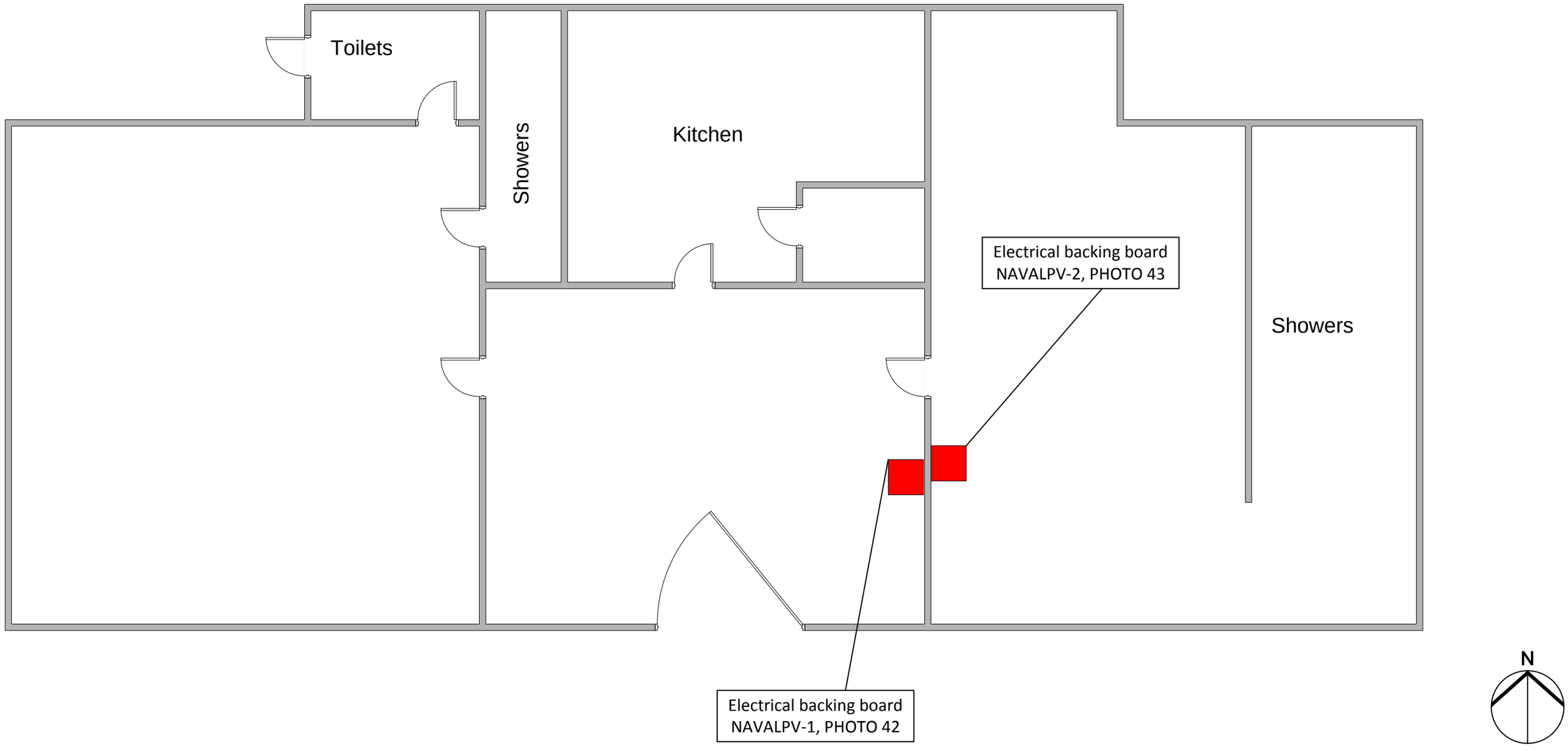
LOCATION OF POSITIVE ASBESTOS SAMPLES

NAVALYC-1 ACM REGISTER ID

PHOTO 8 PHOTOGRAPHIC LOG ID

Naval Point

Appendix D



PROJECT ID: 60444747
LAST DATE MODIFIED: 10/12/15

AECOM

Not to scale

POSITIVE ASBESTOS SAMPLE LOCATIONS

NAVALPV-1 ACM REGISTER ID

PHOTO 43 PHOTOGRAPHIC LOG ID

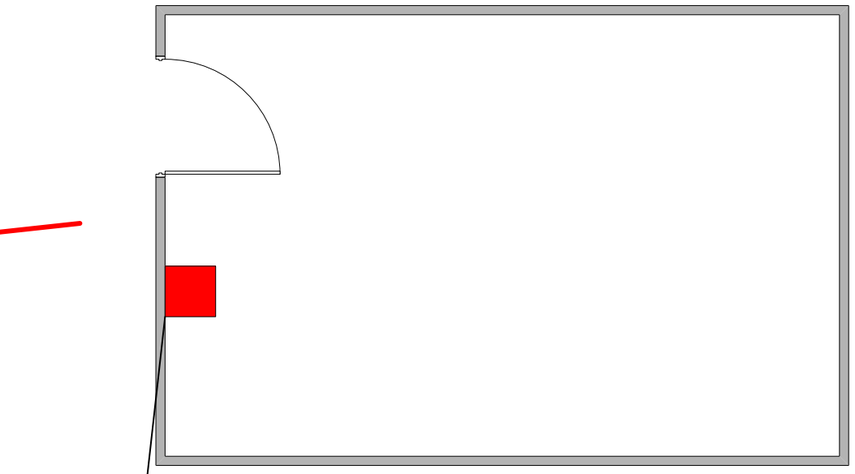
Naval Point Sports Pavilion

Naval Point

Appendix D

Scout Hall

Storage Sheds



ELECTRICAL BACKING BOARD.
NAVALSC1, PHOTO 45.

N

PROJECT ID: 60444747
LAST DATE MODIFIED: 10/12/15

AECOM

Not to scale

POSITIVE ASBESTOS SAMPLE LOCATIONS

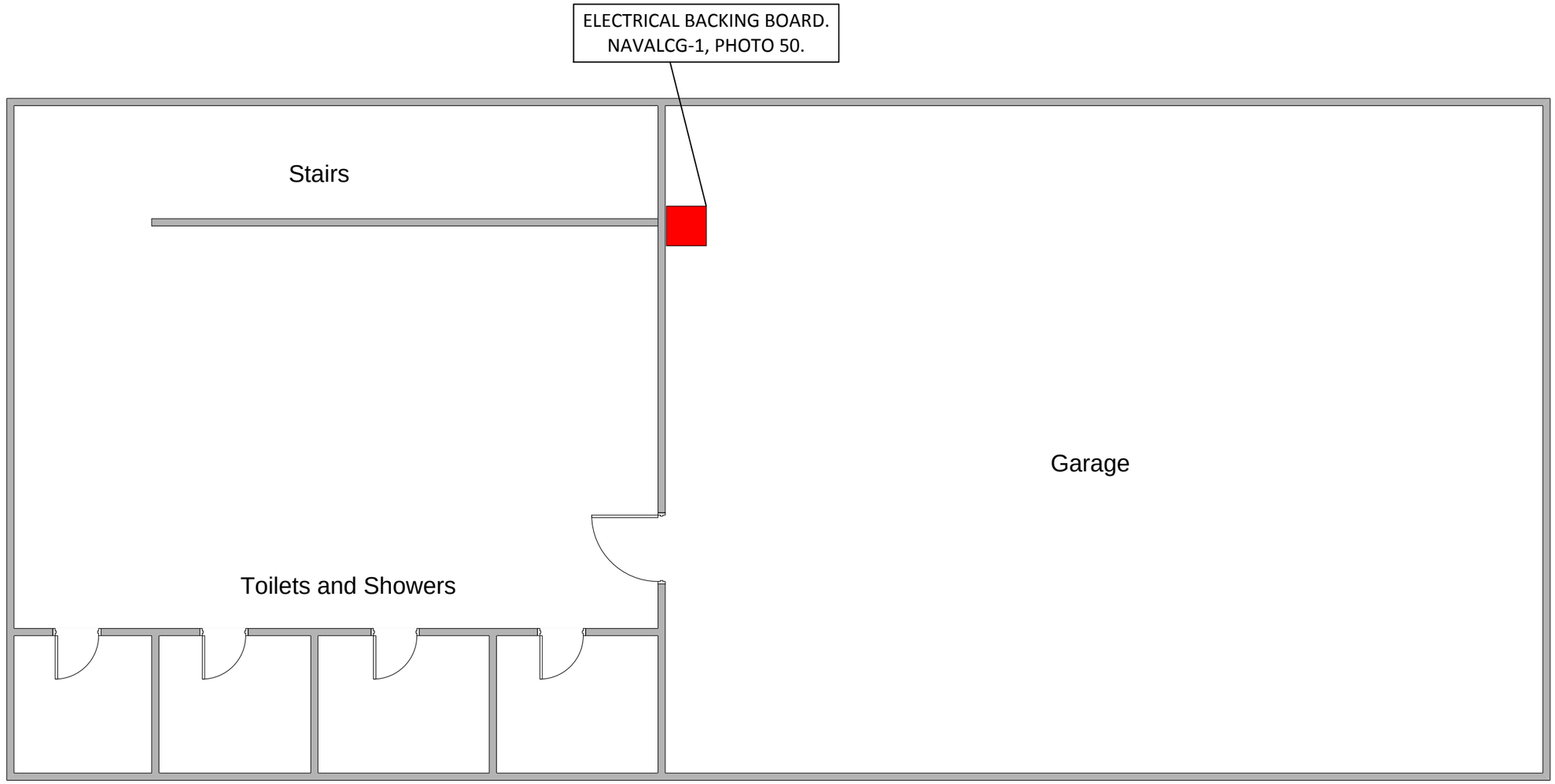
NAVALSC1 ACM REGISTER ID

PHOTO 45 PHOTOGRAPHIC LOG ID

Naval Point Scout Buildings

Naval Point

Appendix D



N

PROJECT ID: 60444747
LAST DATE MODIFIED: 10/12/15

AECOM

Not to scale

LOCATION OF POSITIVE ASBESTOS SAMPLES

NAVALCG-1 ACM REGISTER ID

PHOTO 50 PHOTOGRAPHIC LOG ID

Coastguard - Basement

Naval Point

Appendix D

Appendix E

Inaccessible Areas

Appendix E - Inaccessable areas
Client: CCC
Site Address: Naval Point boat club / scout hall / pavilion / coastguard
Job Number: 60444747
Survey Date/s: 4-17/11/2015

Building	Room/ Area	Location	Material Description		Survey Reference	Result	Asbestos Classification	Condition	Activities	Risk of Fibre Release	Location	Risk Rating	Photo No.	Comments & Recommendations	Action Taken
Naval Point yacht club - Internal	External	Upstairs function room	Rope Cloth Gasket Products	Gasket - Vinyl Sheet	Not sampled suspected acm	**Inaccessible**							28	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos	
Naval Point yacht club - Internal	External	Upstairs function room	Cement Products	Fire Break	Not sampled suspected acm	**Inaccessible**							30	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos	
Naval Point yacht club - External	External	Upstairs function room	Rope Cloth Gasket Products	Gasket - Vinyl Sheet	Not sampled suspected acm	**Inaccessible**							31	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos	
Naval Point yacht club - Internal	Under stairs	Under stairs by bathrooms	Miscellaneous Products	"Millboard"	Not sampled suspected acm	**Inaccessible**							37	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos	
Naval Point Pavilion	Inside entrance, eastern changing room and kitchen	Kitchen	Miscellaneous Products	"Millboard"	NPP-5	**Inaccessible**							44	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos should be presumed to be present until proved otherwise.	
Naval Point scout club - Weatherboard storage shed	Weather board shed	Window putty	Miscellaneous Products	Cork Board	NPSC-2	**Inaccessible**							46	R10 - Presumed asbestos containing material to an inaccessible area. Asbestos should be presumed to be present until proved otherwise.	

Appendix F

Asbestos Risk Assessment Methodology

Appendix F

Asbestos Risk Assessment Methodology

The potential risks posed by asbestos-containing materials (ACM) in premises are due to a number of risk factors including the:

- ACM classification/friability of the material;
- Condition of the material;
- Activities which may affect the material;
- Risk of fibre release from the material; and
- Location of the material.

The risk assessment methodology used by AECOM is based on the Australian Standard AS4360-2004 Risk Management. The hazard levels for this assessment have been determined according to Table 6

Table 6 Hazard Levels

Risk Factor/Description			Hazard Level
ACM Classification	Bonded or Non-Friable	Materials that contain asbestos in a bonded matrix (may consist of Portland cement or various resin/binders and cannot be crushed by hand when dry).	2
	Friable	ACM which, when dry, is or may become crumbled, pulverised or reduced to powder by hand pressure.	5
Condition	Good	*In situ* materials that exhibit little or no sign of damage or deterioration.	1
	Fair	Materials that exhibit mild to moderate damage and/or deterioration.	2
	Poor	Materials that exhibit moderate to severe damage or deterioration.	3
Activities	Low	The location of the material and use of the area indicate that the material will not likely be disturbed during normal operations.	1
	Moderate	The location of the material and use of the area indicate that the material might be disturbed during normal operations.	2
	High	The location of the material and use of the area indicate that the material is likely to be disturbed during normal operations. Evidence of prior disturbance may be present.	4
Risk of Fibre Release	Low	Material is not prone to release asbestos fibres (e.g. resins, floor tiles).	1
	Moderate	Material that may release fibres upon disturbance (e.g. cement products).	2
	High	Material likely to release significant fibre concentrations upon disturbance (e.g. spray coating).	3
Location	Low	ACM is present in an open environment (e.g. outdoors).	1
	Moderate	ACM is present within a semi-enclosed environment.	2
	High	ACM is located within an enclosed environment and exposed to forced ventilation.	4

The multiplication of the asbestos type and each risk factor can be then used to determine the Hazard Level as follows:

ACM Classification x Condition x Activities x Risk of Fibre Release x Location = Hazard Level

The recommended health risk/action priority rating for each Hazard Level is provided in Table 8

Table 7 Risk Ratings

Risk Rating	Overall Hazard Level
Low	0 – 19
Moderate	20 – 49
High	> 50

Control measure guidelines for each Risk Rating is provided in Table 8**.**

Table 8 Definitions of Risk Rating and Control Measure Guidelines

Risk Rating		Definition
Health Risk	Low	Products or materials that pose negligible risk to employees and the general public. They consist of materials that currently are in a good condition, located in areas which are not subject to activities that may impact upon them and are of a type which do not readily release asbestos fibres upon contact. These materials should be identified and warning signs erected. The material does not present a significant risk unless disturbed by intrusive work such as drilling, cutting, breaking or sanding.
Hazard Level	0 – 19	
Action Priority	AP3	
Health Risk	Moderate	Products or materials that pose a risk to employees and the public in their current state. They consist of materials whose condition has degraded, in an area where they may be impacted upon by surrounding activities and of a type that can release asbestos fibres upon contact. Removal or encapsulation and regular reviews or assessments are recommended for these materials.
Hazard Level	20 – 49	
Action Priority	AP2	
Health Risk	High	Products or materials that pose an immediate or elevated risk to employees or the public in their current state. They consist of materials that are in poor condition, may be located within return air plenums or are in an area where activities are very likely to impact upon the material. Immediate actions should be taken for these materials to be removed by a licensed asbestos removal contractor. Alternative management strategies must be considered where removal of ACM is not practicable.
Hazard Level	> 50	
Action Priority	AP1	

The Asbestos Register should form part of the Site Health and Safety Management System and will need to be reviewed at least annually or sooner where there is any significant change in circumstances.

It should be noted that any risk assessment presented in this document was made on the basis of the nature of activities observed at the time the survey was undertaken. Changes in circumstances which affect the current Risk Assessment should be notified to your AECOM Consultant.

Appendix G

Laboratory Analysis Results

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	AECOM New Zealand Limited	**Lab No:**	1502443	A2Pv1
Contact:	Alan Spooner	**Date Registered:**	18-Nov-2015	
	C/- AECOM New Zealand Limited	**Date Reported:**	19-Nov-2015	
	PO Box 710	**Quote No:**	60851	
	CHRISTCHURCH 8140	**Order No:**	60444747-1.2	
		Client Reference:		
		Submitted By:	Alan Spooner	

Sample Type: Building Material

Sample Name	Lab Number	Sample Category	Sample size (weight or dimensions)	Asbestos Presence / Absence
NPC-1 - Kitchen Vinyl Floor	1502443.1	Linoleum / Vinyl floor tile	1.59	Asbestos NOT detected.
NPC-2 - Radio Room Cornice	1502443.2	Fibre Board	0.27	Asbestos NOT detected.
NPC-4 - Radio Room Ceiling	1502443.3	Textured Coating	0.38	Asbestos NOT detected.
NPC-5 - FCS By Steps	1502443.4	Fibre Board	5.61	Asbestos NOT detected.
NPC-6	1502443.5	Linoleum / Vinyl floor tile	0.35	Asbestos NOT detected.

Analyst's Comments

Appendix No.1 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Building Material

Test	Method Description	Default Detection Limit	Sample No
Asbestos in Bulk Material			
Sample Category	Assessment of sample type.	-	1-5
Sample size (weight or dimensions)	Sample size. Weight or size as appropriate.	-	1-5
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	-	1-5

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Rhodri Williams BSc (Hons)
Asbestos Section Manager

Hill Laboratories
BETTER TESTING BETTER RESULTS

ANALYSIS REQUEST

Job No: 150 2443 Date Recv: 18-Nov-15 07:08

R J Hill Laboratories Limite
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zeala

Received by: Natalia Leatua

3115024434

Client

Name AECOM New Zealand Ltd

Address 2-2 Hazeldean Road, Addington, Christchurch

Phone 03 966 6000 *Fax*

Client Reference 60444747_1.2

Quote No 60851 *Order Number*

Primary Contact Alan Spooner

Submitted By

Charge To AECOM New Zealand Ltd 53080

Results To
- ☐ Fax Results
- ☑ Email Results alan.spooner@aecom.com
- ☑ Mail Client
- ☐ Mail Submitter

Office use only Jo

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories
Date & Time: 17/11/15
Name: Alan Spooner
☑ *Please tick if you require COC to be faxed back*
Signature:

Received at Hill Laboratories
Date & Time:
Name: kat
Signature: KD

Condition ☐ *Room Temp* ☐ *Chilled* ☐ *Frozen* *Temp:* RT

☐ Sample Analysis details checked
Signature:

ADDITIONAL INFORMATION

Priority
- ☐ **Low**
- ☑ **Normal**
- ☑ **High**
- ☐ **Urgent** (ASAP, extra charge applies, please contact the lab first)

Requested Reporting Date:

Sample Types

Waters	**E**	Effluent	**G**	Geothermal	**Pot1**	Potable Water (LAS/EU)	**Pot2**	Potable Water (NZDWS)
	GW	Ground Water	**L**	Leachate	☐	Audit Monitoring	**Pot3**	Potable Water (other)
	SW	Surface Water	**S**	Saline	☐	Check Monitoring	**Pool**	Swimming/Spa Pool
	TW	Trade Waste						
Solids	**ES**	Soil	**SE**	Sediment	**SL**	Sludge	**PL**	Plant
Other	**O**	O Oil	**M**	Miscellaneous	**FS**	FS Fish/shellfish/biota	**BM**	BM Biological Material

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
1	NPC-1	17/11/15	M	Bulk ID for asbestos
2	NPC-2	"	"	
3	NPC-4	"	"	
4	NPC-5	"	"	
5	NPC-6	"	"	
6				
7				
8				
9				
10				

Continued on next page

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	AECOM New Zealand Limited	**Lab No:**	1501590	A2Pv1
Contact:	Alan Spooner	**Date Registered:**	16-Nov-2015	
	C/- AECOM New Zealand Limited	**Date Reported:**	18-Nov-2015	
	PO Box 710	**Quote No:**	60851	
	CHRISTCHURCH 8140	**Order No:**	NPASP1	
		Client Reference:	60444747_1.2	
		Submitted By:	Alan Spooner	

Sample Type: Building Material

Sample Name	Lab Number	Sample Category	Sample size (weight or dimensions)	Asbestos Presence / Absence
NPYC 1 Ext Wall Wall Lining Layered Composite Board	1501590.1	Fibre Board	4.29	Asbestos NOT detected.
NPYC 2 Exterior Wall Lining (North) 2nd Level Fibre Cement Board	1501590.2	Fibre Cement	44.84	Amosite (Brown Asbestos) and Chrysotile (White Asbestos) detected.
NPYC 3 North Exit Wall Bitumen Membrane	1501590.3	Bituminous Product	1.6	Asbestos NOT detected.
NPYC 4 Exterior Window Caulking	1501590.4	Other #1	4.28	Asbestos NOT detected.
NPYC 5 Ceiling Gible Textured Coat Upper Ceiling	1501590.5	Other #2	6.33	Asbestos NOT detected.
NPYC 8 Library Gypsum Board Joint Compund Ceiling	1501590.6	Textured Coating	0.41	Asbestos NOT detected.
NPRBS 1 Rescue Boat Shed Exterior Column Flat Fibre Cement Sheet (Layered)	1501590.7	Fibre Cement	30.43	Asbestos NOT detected.
NPRBS 2 Rescue Boat Shed Exterior Column Cladding Flat Fibre Cement Sheet	1501590.8	Fibre Cement	6.54	Asbestos NOT detected.
NPP-1 60444 767	1501590.9	Fibre Board	3.24	Asbestos NOT detected.
NPP-1a 60444 767	1501590.10	Fibre Board	4.66	Asbestos NOT detected.
NPP-2 60444 767	1501590.11	Other #3	2.67	Asbestos NOT detected.
NPYC 4 Exterior Wall Upper Level	1501590.12	Fibre Cement	20.35	Amosite (Brown Asbestos) and Chrysotile (White Asbestos) detected.

Analyst's Comments

#1 Putty

#2 Plaster

#3 Render

Appendix No.1 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Building Material			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Asbestos in Bulk Material			
Sample Category	Assessment of sample type.	-	1-12
Sample size (weight or dimensions)	Sample size. Weight or size as appropriate.	-	1-12
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	-	1-12

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Rhodri Williams BSc (Hons)
Asbestos Section Manager

Job No: 150 1590 | Date Recv: 16-Nov-15 14:49

Hill Laboratories
BETTER TESTING BETTER RESULTS

ANALYS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Received by: Tamara Calder

3115015905

Client

Name: AECOM New Zealand Ltd
Address: 2-2 Hazeldean Road, Addington, Christchurch
Phone: 03 966 6000 Fax:
Client Reference: 60446767
Quote No: 60851 Order Number: NPASP1

Primary Contact Alan Spooner
Submitted By
Charge To AECOM New Zealand Ltd 53080

Results To ☐ Mail Client ☑ Mail Submitter
☐ Fax Results
☑ Email Results alan.spooner@aecom.com

Office use only Job No:

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories
Date & Time: 11/11/15
Name: Alan Spooner
☑ Please tick if you require COC to be faxed back
Signature:

Received at Hill Laboratories
Date & Time:
Name:
Signature:

Condition ☐ Room Temp ☐ Chilled ☐ Frozen Temp: RT
☐ Sample Analysis details checked
Signature:

ADDITIONAL INFORMATION

Priority
☐ Low ☑ Normal ☐ High
☐ Urgent (ASAP, extra charge applies, please contact the lab first)

Requested Reporting Date:

Sample Types

Waters	E	Effluent	G	Geothermal	Pot1	Potable Water (LAS/EU) ☐ Audit Monitoring ☐ Check Monitoring	Pot2 Potable Water (NZDWS)
	GW	Ground Water	L	Leachate			Pot3 Potable Water (other)
	SW	Surface Water	S	Saline			Pool Swimming/Spa Pool
	TW	Trade Waste					
Solids	ES	Soil	SE	Sediment	SL	Sludge	PL Plant
Other	O	O Oil	M	Miscellaneous	FS	FS Fish/shellfish/biota	BM BM Biological Material

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
1	NPYC1	4/11/15		Bulk material asbestos for all
2	NPYC2	"		
3	NPYC3	"		
4	NPYC4	"		
5	NPYC5	"		
6	NPYC8	"		
7	NPRBS1	"		
8	NPRBS2	"		
9	NPP-1	11/11/15		
10	NPP-1a	11/11/15		

Continued on next page

Job No. 150 1590 Date Recv: 16-Nov-15 14:45

Received by: Tamara Calder

3115015905

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
11	NPP-2	11/11/15		
12	NPYC2.0	4/11/15		
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
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36				
37				
38				
39				
40				

Appendix B

Test Pit Location Map

PROJECT ID: 60444747
LAST DATE MODIFIED: 07/12/15

AECOM

N

0 100 200

APPROXIMATE SCALE (m)

LEGEND

TEST PIT LOCATIONS

MONITORING WELL LOCATIONS

SITE BOUNDARY

SITE LAYOUT PLAN
NAVAL POINT - LYTTLETON

CHRISTCHURCH CITY COUNCIL

FIGURE

1

Appendix C

Test Pit Logs

BORE LOG

HOLE IDENTIFICATION **ETP01**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP01 0.2-0.3		0.0			SILT with minor sand; light brown. Dry; non-plastic.	FILL			
						Gravelly SILT; brown. Moist; gravel is sub-rounded Greywacke, volcanic rock, fine to coarse; some plastic fragments.				
	ETP01 0.6-0.7		0.2			Some cobbles, some rubbish.				
				1						
	ETP01 1.2-1.3		0.2							
	ETP01 1.5-1.6		70.5			Dark brown to black.		Moderate hydrocarbon odour. Possible coal tar.		
				2					▽	
	ETP01 2.1-2.2		0.3							
						ETP01 terminated at 2.3m Target Depth				

GROUNDWATER OBSERVATIONS

Number	Depth (m)	Date
–	2.2m	19/10/2015

Date logged 19/10/2015
Logged SM
Checked AS

Remarks

Driller
Drill Rig Machine Excavator
Started 19/10/2015
Finished 19/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP02**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP02 0.2-0.3		0.2			Sandy fine to medium GRAVEL with minor silt; light brown. Dry; gravel is sub-rounded to sub-angular Greywacke.	FILL			
						Sandy SILT; brown - grey. Moist, low plasticity.	NATURAL			
	ETP02 1.0-1.1		0.2	1		Some orange mottling.				
						SILT with minor clay; grey. Moist, moderate plasticity.				
	ETP02 1.7-1.8		0.3			Some clay, high plasticity.				
	ETP02 2.8-2.9		0.3	2						
				3		*ETP02 terminated at 3m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 19/10/2015
Logged SM
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 19/10/2015
Finished 19/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP03**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP03 0.2-0.3					Sandy GRAVEL with ragments of brick and tree roots; brown.				
	ETP03 0.8-0.9			1		Silty SAND with gravel and large cobbles; light brown.				
	ETP03 1.5-1.6			2			FILL			
	ETP03 2.6-2.7			3		SILT; light brown. Some plasticity.				
						ETP03 terminated at 3.3m Target Depth				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 20/10/2015
Logged HW
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 20/10/2015
Finished 20/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP04**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP04 0.1-0.2		0.2			Sandy fine to coarse GRAVEL; light brown. Dry; gravel is sub-rounded to sub-angular Greywacke with some volcanic rock.				
						Gravelly medium to coarse SAND; dark grey. Moist; gravel is fine to coarse volcanic rock.				
	ETP04 0.4-0.6 SV									
	ETP04 0.7-0.8		0.8			SILT, grey. Moist, non plastic.		Faint hydrocarbon odour.		
				1		Clayey SILT, grey. Moist, moderate plasticity.				
						Some dark grey staining.	FILL			
	ETP04 1.6-1.7		6.4							
				2						
				3		*ETP04 terminated at 3m Target Depth*				

GROUNDWATER OBSERVATIONS

Number Depth (m) Date

–

Date logged 19/10/2015
Logged SM
Checked AS

Remarks
12.5 kg soil sample sieved and 500 g soil subsample collected for asbestos analysis. Very slow water seepage from ~2.5 m bgl.

No ground water encountered

Driller
Drill Rig Machine Excavator
Started 19/10/2015
Finished 19/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP05**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP05 0.2-0.3					Sandy GRAVEL with fragments of brick; brown.	FILL			
	ETP05 1.5-1.6									
	ETP05 0.7-0.8					Fine SAND; dark grey, with rubbish and brick fragments				
				1		SILT; dark grey with large fragments of building materials (e.g. concrete), slight plasticity.				
						SAND; dark grey.	NATURAL			
				2						
				3		*ETP05 terminated at 3m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 20/10/2015
Logged HW
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 20/10/2015
Finished 20/10/2015

Date Printed: 11/12/2015

AECOM

BORE LOG

HOLE IDENTIFICATION **ETP06**

Client Christchurch City Council

Project Naval Point DSI

Project number 60444747

Location Lyttleton

Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP06 0.2-0.3		0.1			Sandy fine to coarse GRAVEL with some silt; brown. Dry; gravel is sub-rounded to angular Greywacke and volcanic rock.	FILL			
						Silty medium to coarse SAND; brown. Moist.				
						SILT; brown to grey. Moist, non-plastic.				
	ETP06 0.9-1.0		0.2	1						
						Clayey SILT; grey with orange staining. Moist, moderate plasticity.				
						Silty CLAY; grey. Moist, high plasticity.				
	ETP06 2.1-2.2		0.2	2						
						Wet				
				3		*ETP06 terminated at 2.9m Target Depth*				

GROUNDWATER OBSERVATIONS

Number Depth (m) Date

–

Date logged 19/10/2015

Logged SM

Checked AS

Remarks

Water seeping from approximately 2.5 m bgl.

No ground water encountered

Driller

Drill Rig Machine Excavator

Started 19/10/2015

Finished 19/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP07**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP07 0.1-0.2		0.1			Sandy fine to coarse GRAVEL; light brown. Dry; gravel is sub-rounded to angular Greywacke and volcanic rock. Brown with some dark grey staining. some silt. Building materials (e.g. brick, concrete, wood).	FILL			
	ETP07 0.3-0.4 ETP07 0.3-0.4 SV					Sand is light yellow to brown and orange.				
	ETP07 0.5-0.6		0.2			Plastic sheeting.				
						Coarse SAND; black. Moist.				
				1		Clayey SILT; grey. Moist, low plasticity.				
	ETP07 1.2-1.3		0.2							
				2		SAND, dark grey. Wet.				
				3		*ETP07 terminated at 3m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 19/10/2015
Logged SM
Checked AS

Remarks
16.0 kg soil sample sieved and 500 g soil subsample collected for asbestos analysis. Water seeping from approximately 1.8 m bgl.

No ground water encountered

Driller
Drill Rig Machine Excavator
Started 19/10/2015
Finished 19/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP08**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP08 0.2-0.3		2.6			Sandy fine to coarse GRAVEL with minor cobbles; brown. Moist; gravel is sub-rounded to angular Greywacke and volcanic rock.				
						Building materials (e.g. brick)				
	ETP08 0.8-0.9		2.5	1		Sandy SILT; grey with orange staining. Moist, non-plastic.	FILL			
	ETP08 1.8-1.9		1.6	2		Clayey SILT; dark grey. Moist; moderate plasticity.	NATURAL	Estuarine odour		
						Silty fine SAND; dark grey. Moist.				
	ETP08 2.7-2.8		1.5	3		*ETP08 terminated at 2.9m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 22/10/2015
Logged SM
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 22/10/2015
Finished 22/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP09**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP09 0.1-0.2 ETP09 0.1-0.3 SV		0.4			Sandy fine GRAVEL with some silt; light brown. Dry; gravel is sub-rounded to sub-angular Greywacke and volcanic rock.				
						SILT with minor sand; light grey. Moist, Low plasticity.				
	ETP09 1.1-1.2		0.3	1			FILL		▽	
						Silty CLAY; grey. Moist, moderate plasticity.				
	ETP09 2.1-2.2		0.5	2						
						CLAY; dark grey. Wet.		Estuarine odour		
				3		*ETP09 terminated at 3.1m Target Depth*				

GROUNDWATER OBSERVATIONS

Number	Depth (m)	Date	–
	1.8m	-	

Date logged 21/10/2015
Logged SM
Checked AS

Remarks
12.0 kg soil sample sieved and 500 g soil subsample collected for asbestos analysis. Water seeping from approximately 1.8 m bgl.

Driller
Drill Rig Machine Excavator
Started 21/10/2015
Finished 21/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP10**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP10 0.2-0.3		0.0			Sandy SILT; light brown. Dry; sand is fine.				
						SILT with minor clay; brownish grey with faint orange staining. Moist, low plasticity.				
	ETP10 0.8-0.9		0.0	1						
						Clayey SILT; grey. Moist, moderate plasticity.	FILL			
	ETP10 1.8-1.9		0.2			Silty CLAY; dark grey. Moist, high plasticity.				
				2						
	ETP10 2.8-2.9		0.2			Fine SAND; dark grey. Wet.				
				3		*ETP10 terminated at 3m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 20/10/2015
Logged SM
Checked AS

Remarks
Water seeping from approximately 1.0 m bgl.

No ground water encountered

Driller
Drill Rig Machine Excavator
Started 20/10/2015
Finished 20/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP11**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP11 0.2-0.3		0.0			Sandy SILT; light brown. Dry, non-plastic, sand is fine.	FILL			
						Clayey SILT; brown to grey with orange staining. Moist, low plasticity.				
	ETP11 0.9-1.0		0.1	1						
	ETP11 2.0-2.1		0.1	2		Silty CLAY; dark grey. Moist, moderate plasticity.				
						Silty fine SAND with minor clay, dark grey. Moist.				
				3		*ETP11 terminated at 2.9m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 20/10/2015
Logged SM
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 20/10/2015
Finished 20/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP12**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP12 0.1-0.2		0.0			Sandy SILT; light brown. Dry; sand is fine to medium.				
						SILT with some clay; brown to grey. Moist, low plasticity.				
	ETP12 1.0-1.1		0.0	1						
						Silty CLAY; grey. Moist, moderate plasticity.	FILL			
	ETP12 1.8-1.9		0.1							
				2		Dark grey, high plasticity.				
	ETP12 2.7-2.8		0.2							
				3		*ETP12 terminated at 3m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 20/10/2015
Logged SM
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 20/10/2015
Finished 20/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP13**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP13 0.1-0.2		1.8			Sandy SILT with gravel; light brown, Dry, sand is fine, gravels are sub-rounded to angular and up to 200mm.				
	ETP13 0.2-0.3 SV									
	ETP13 0.8-0.9		1.4	1		SILT; grey. Moist, non-plastic.		Mottled black colour in places. Estuarine smell.		
						Minor clay	FILL			
	ETP13 1.7-1.8		1.1	2						
						Silty CLAY; dark grey. Moist, moderate plasticity.				
	ETP13 2.9-3.0		1.1	3						
						ETP13 terminated at 3.1m Target Depth				

GROUNDWATER OBSERVATIONS

Number Depth (m) Date

–

Date logged 21/10/2015
Logged SM
Checked AS

Remarks
12.5 kg soil sample sieved and 500 g soil subsample collected for asbestos analysis.

No ground water encountered

Driller
Drill Rig Machine Excavator
Started 21/10/2015
Finished 21/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP14**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP14 0.3-0.4		0.3	1		Sandy SILT with minor clay; light brown. Dry.	FILL			
						SAND with minor clay; orange staining.				
	ETP14 1.2-1.3			2		Clayey SILT; dark grey with orange mottles. Moist, plastic.				
	ETP14 2.3-2.4					SAND; dark grey. Moist.				
	ETP14 2.9-3.0			3		SILT; light grey. Plastic.				
						ETP14 terminated at 3m Target Depth				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 20/10/2015
Logged HW
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 20/10/2015
Finished 20/10/2015

Date Printed: 11/12/2015

AECOM

BORE LOG

HOLE IDENTIFICATION **ETP15**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP15 0.2					Sandy SILT; light brown. Dry; sand is fine.				
	ETP16 0.7-0.8			1		Minor clay, some orange staining.				
	ETP15 1.5-1.6			2		Clayey SILT; dark grey. Moist; moderate plasticity.	FILL			
	ETP15 2.8-2.9			3		*ETP15 terminated at 3.1m Target Depth*				

GROUNDWATER OBSERVATIONS

Number Depth (m) Date

–

Date logged 20/10/2015
Logged SM
Checked AS

Remarks
Water seeping from approximately 1.6 m bgl.

No ground water encountered

Driller
Drill Rig Machine Excavator
Started 20/10/2015
Finished 20/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP16**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP16 0.2-0.3					Sandy SILT; light brown. Dry; sand is fine.	FILL			
						SILT; orange mottled. Moist				
	ETP16 1.1-1.2			1		Clayey SILT; grey. Moist, low plasticity.				
	ETP16 1.9-2.0			2		Silty CLAY; dark grey. Moist, moderate plasticity.				
						Fine SAND; dark grey. Moist.				
	ETP16 3.2-3.3			3		*ETP16 terminated at 3.3m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 20/10/2015
Logged SM
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 20/10/2015
Finished 20/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP17**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP17 0.2					Silty SAND; brown.	FILL	fragments of building materials (e.g. brick)		
						SILT; grey with orange mottles.				
	ETP17 1-1.1			1						
				2		SILT; dark grey.Moist, moderate plasticity, with coal fragments.				
	ETP17 2.2									
	ETP17 2.8			3		*ETP17 terminated at 3m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 20/10/2015
Logged HW
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 20/10/2015
Finished 20/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP18**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP18 0.1-0.3 SV					Sandy fine to coarse GRAVEL; light brown.Dry; gravel is sub-rounded to sub-angular Greywacke.				
	ETP18 0.2-0.3		0.3			SILT; dark grey to brown. Moist.				
						Orange brown.				
	ETP18 0.8-0.9		0.4	1		Sandy SILT; grey with orange staining. Moist, non-plastic.				
						Silty CLAY; grey. Moist, moderate plasticity.	FILL			
	ETP18 1.9-2.0		0.4	2						
				3		*ETP18 terminated at 3.3m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 21/10/2015
Logged SM
Checked AS

Remarks
12.5 kg soil sample sieved and 500 g soil subsample collected for asbestos analysis. Water seeping from approximately 1.6 m bgl.

Driller
Drill Rig Machine Excavator
Started 21/10/2015
Finished 21/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP19**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP19 0.2-0.3 SV ETP19 0.2-0.3		0.1			Sandy fine GRAVEL with minor silt; light brown. Dry; gravel is sub-rounded to sub-angular greywacke and volcanic rock.	FILL	Building materials (e.g. brick, ceramic and concrete)		
	ETP19 0.9-1.0		1.0	1		SILT; grey. Moist, non-plastic				
	ETP19 1.8-1.9		1.7	2		Minor clay				
	ETP19 2.8-2.9		1.8	3		Clayey SILT; grey. Moist, moderate plasticity.				
						ETP19 terminated at 3m Target Depth				

GROUNDWATER OBSERVATIONS

Number Depth (m) Date

–

Date logged 21/10/2015
Logged SM
Checked AS

Remarks
12.5 kg soil sample sieved and 500 g soil subsample collected for asbestos analysis. Water seeping from approximately 1.9 m bgl.

Driller
Drill Rig Machine Excavator
Started 21/10/2015
Finished 21/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP20**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP20 0.1-0.2		0.5			Sandy fine to medium GRAVEL; light brown. Dry; gravel is sub-rounded to sub-angular Greywacke				
						Sandy SILT; yellow-brown. Moist; sand is fine, non-plastic.				
	ETP20 0.7-0.8		0.4	1						
						dark brown patches, large cobbles of volcanic rock.	FILL	Fill materials (e.g. concrete, wood and steel piping)		
	ETP20 1.4-1.5		0.3							
				2		SILT; grey. Moist, Non-plastic.				
	ETP20 2.2-2.3		0.3							
				3		*ETP20 terminated at 3.2m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 21/10/2015
Logged SM
Checked AS

Remarks
Water seeping from approximately 1.9 m bgl.

No ground water encountered

Driller
Drill Rig Machine Excavator
Started 21/10/2015
Finished 21/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION: **ETP21**

Client: Christchurch City Council
Project: Naval Point DSI
Project number: 60444747

Location: Lyttleton
Co-ordinates:

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP21 0.1-0.2		0.1			Sandy SILT with some gravel; light brown. Dry, sub-rounded to sub-angular.	FILL	Building materials (e.g. brick, steel and glass)		
						Large concrete fragments				
	ETP21 0.7-0.8		0.3	1						
	ETP21 1.4-1.5		0.4			*ETP21 terminated at 1.7m Unable to advance due to hole collaspe*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 21/10/2015
Logged SM
Checked AS

Remarks
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 21/10/2015
Finished 21/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP22**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP22 0.2-0.4 SV ETP22 0.2-0.3		1.0			Sandy fine to coarse GRAVEL; light brown. Dry; gravel is sub-rounded to sub-angular Greywacke and volcanic rock. Brown.	FILL	Fill material (e.g. large volcanic rock fragment, brick, steel, cement sheeting, glass and general waste material.		
	ETP22 0.5 BLK ETP22 0.6-0.8 SV ETP22 0.6-0.7		0.5	1		SILT; grey. Moist, non-plastic.				
	ETP22 1.6-1.7		0.7	2		Silty CLAY; dark grey. Moist, moderate plasticity.				
	ETP22 2.6-2.7					*ETP22 terminated at 2.8m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 21/10/2015
Logged SM
Checked AS

Remarks
One 14.5 kg and one 12.5 kg soil sample sieved and 500 g soil subsamples collected for asbestos analysis. Water seeping from approximately 2.2 m bgl.

No ground water encountered

Driller
Drill Rig Machine Excavator
Started 21/10/2015
Finished 21/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP23**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP0.2-0.4 SV ETP23 0.2-0.3		1.3			Sandy fine to coarse GRAVEL with some silt; brown. Moist; gravel is sub-rounded to sub-angular greywacke and volcanic rock.				
						Yellow brown				
	ETP23 0.8-0.9		1.3	1		Brown				
	ETP23 1.2-1.3		1.3			Sandy medium GRAVEL; black. Moist; sand is coarse.				
						Sandy SILT with minor clay; grey. Moist, low plasticity.	FILL			
						Some clay, moderate plasticity.				
	ETP23 2.2-2.3		0.9	2						
				3		*ETP23 terminated at 3.1m Target Depth*				

GROUNDWATER OBSERVATIONS
Number Depth (m) Date
–

Date logged 22/10/2015
Logged SM
Checked AS

Remarks
Water seeping from approximately 1.4 m bgl.
No ground water encountered

Driller
Drill Rig Machine Excavator
Started 22/10/2015
Finished 22/10/2015

Date Printed: 11/12/2015

AECOM

BORE LOG

HOLE IDENTIFICATION **ETP24**

Client Christchurch City Council

Project Naval Point DSI

Project number 60444747

Location Lyttleton

Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP24 0.2-0.3		1.8			Sandy fine to coarse GRAVEL with some silt and trace cobbles; brown. Moist; gravel is sub-rounded to angular Greywacke and volcanic rock.	FILL	Faint hydrocarbon odour		
	ETP24 0.7-0.8		1.6	1		Silty fine to coarse GRAVEL with minor sand; grey. Moist; gravel is sub-rounded Greywacke; some wood present.				
						SILT with some fine sand; grey. Moist.				
						Minor clay, low plasticity.				
						Some clay. moderate plasticity.				
	ETP24 2.0-2.1		0.8	2						
						Fine SAND with minor silt; grey. Moist.				
				3		*ETP24 terminated at 3m Target Depth*				

GROUNDWATER OBSERVATIONS

Number Depth (m) Date

–

Date logged 22/10/2015

Logged SM

Checked AS

Remarks

Water seeping from approximately 1.7 m bgl.

No ground water encountered

Driller

Drill Rig Machine Excavator

Started 22/10/2015

Finished 22/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION: **ETP25**

Client: Christchurch City Council
Project: Naval Point DSI
Project number: 60444747

Location: Lyttleton
Co-ordinates:

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP25 0.1-0.2		1.1			Sandy fine to coarse GRAVEL; brown. Moist; gravel is sub-rounded to sub-angular Greywacke and volcanic rock.				
						Brownish-grey; some brick and metal wire.				
	ETP25 0.6		0.9							
						SILT with minor fine sand; grey. Moist.				
	ETP25 0.9-1.0		0.7	1						
						Clayey SILT; grey with dark grey to black patches. Moist, low plasticity.	FILL	Moderate hydrocarbon odour.		
	ETP25 1.8-1.9		39.2	2						
						Some fine sand				
						Clayey SILT.				
	ETP25 2.8-2.9		0.6	3						
						ETP25 terminated at 3m Target Depth				

GROUNDWATER OBSERVATIONS

Number Depth (m) Date

–

Date logged 22/10/2015
Logged SM
Checked AS

Remarks
Water seeping from approximately 1.5 m bgl.

Driller
Drill Rig Machine Excavator
Started 22/10/2015
Finished 22/10/2015

Date Printed: 11/12/2015

BORE LOG

HOLE IDENTIFICATION **ETP26**

Client Christchurch City Council
Project Naval Point DSI
Project number 60444747

Location Lyttleton
Co-ordinates

Drilling Method / Casing remarks	SAMPLING & TESTING: Sample ID	Analysis	PID (ppm)	Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	WELL DIAGRAM
	ETP26 0.2-0.3		0.6			Sandy fine to coarse GRAVEL; light brown. Dry; gravel is sub-rounded to angular Greywacke and volcanic rock.				
						Brown, some silt, some brick, some wood. Moist				
						Wet			▽	
	ETP26 0.8-0.9		0.8	1			FILL			
						SILT with minor clay and fine sand; grey. Wet, low plasticity.				
				2		*ETP26 terminated at 2m Target Depth*				

GROUNDWATER OBSERVATIONS

Number	Depth (m)	Date
	0.6m	22/10/2015

Date logged 22/10/2015
Logged SM
Checked AS

Remarks

Driller
Drill Rig Machine Excavator
Started 22/10/2015
Finished 22/10/2015

Date Printed: 11/12/2015

Appendix D

Photographs

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747
Photo. No.: 01	Date: 19/10/15	
Test Pit ETP03		

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
02	19/10/15

Test Pit ETP03 with groundwater well.

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
03	19/10/15

Test Pit ETP04

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
04	19/10/15

Test Pit ETP05 with groundwater well.

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
05	19/10/15

Test Pit ETP07

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
06	22/10/15

Test Pit ETP08

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
07	20/10/2015

Test Pit ETP10 with groundwater well.

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
08	20/10/2015

Test Pit ETP12 with groundwater well.

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747
Photo. No.: 09	Date: 21/10/2015	
Test Pit ETP13		

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
10	20/10/2015

Test Pit ETP15 with groundwater well.

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
11	21/10/2015

Test Pit ETP18 with groundwater well.

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
12	21/10/2015

Test Pit ETP20

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
13	21/10/2015

Test Pit ETP20 with groundwater well.

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
14	21/09/2015

Test Pit ETP21

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
15	21/10/15

Test Pit ETP22

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
16	21/10/2015

Test Pit ETP22

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

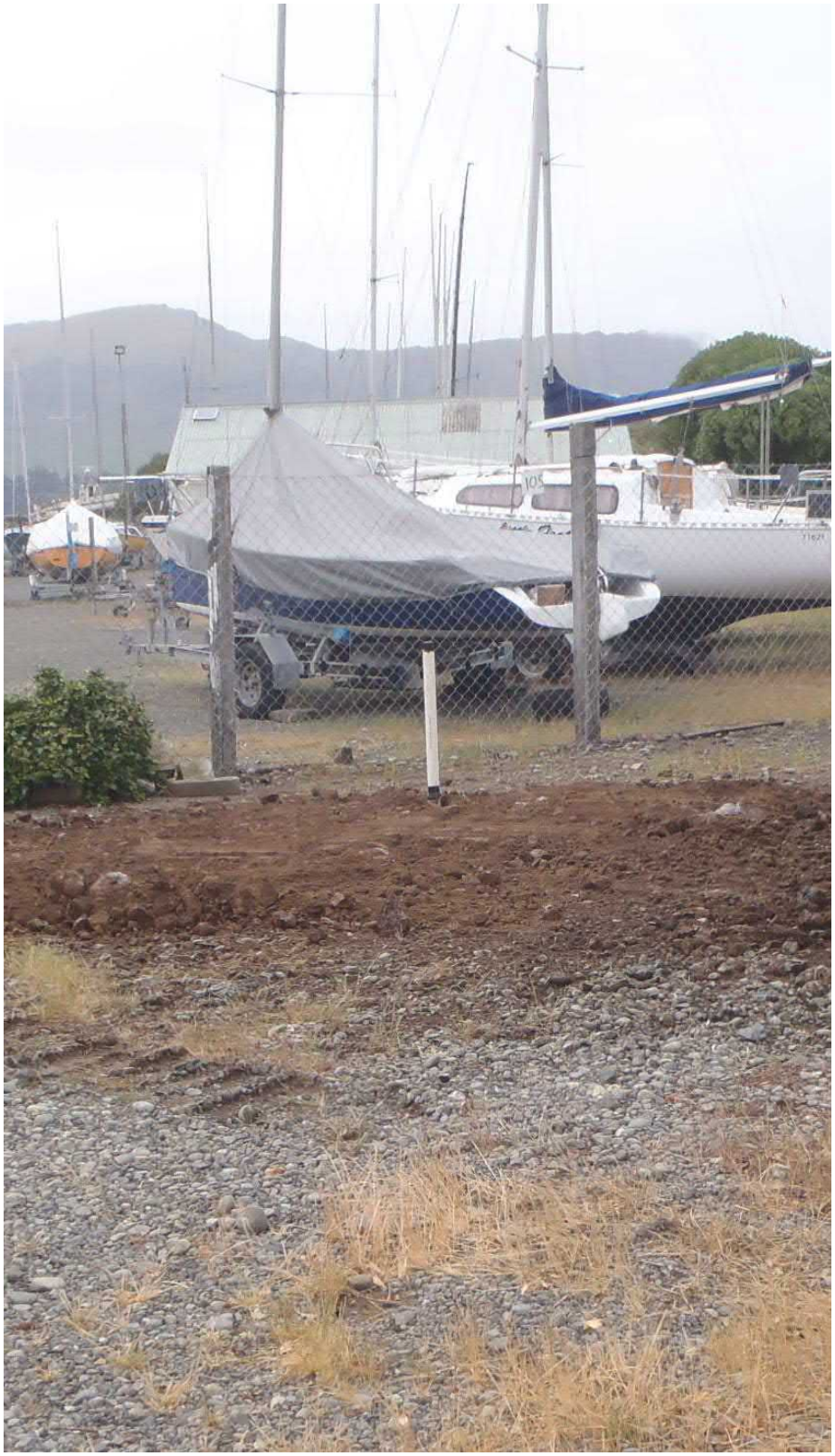
Photo. No.:	Date:
17	22/10/15

Test Pit ETP23

Photographic Log		
Client: Christchurch City Council	Site Location: Naval Point – Lyttleton	Project No.: 60444747

Photo. No.:	Date:
18	22/10/15

Test Pit ETP23



Appendix E

Soil Analytical Result Tables

Table 7 Total Metals Soil Analytical Results compared to NES and USEPA Guidelines

AECOM Location ID	ETP01	ETP02	ETP03		ETP04		ETP05		ETP06	ETP07		ETP08		ETP09	ETP10	ETP11	ETP12	ETP13	National Environmental Standard for Contaminated Land (2012) [1]	National Environmental Standard for Contaminated Land (2012) [1]	Environment Canterbury Background Concentrations	Environment Canterbury Background Concentrations	USEPA[3]	USEPA[3]
AECOM Field ID	ETP01 1.5-1.6	ETP02 0.2-0.3	ETP03 0.2-0.3	ETP03 1.5-1.9	ETP04 0.7-0.8	ETP04 1.6-1.7	ETP05 0.7-0.8	ETP05 1.5-1.6	ETP06 0.9-1.0	ETP07 0.1-0.2	ETP07 1.2-1.3	ETP08 0.2-0.3	ETP08 1.8-1.9	ETP09 1.1-1.2	ETP10 0.8-0.9	ETP11 0.2-0.3	ETP12 1.0-1.1	ETP13 0.8-0.9						
Laboratory Sample Reference	1490864.4	1490864.6	1491304.1	1491304.3	1490864.11	1490864.12	1491304.18	1491304.19	1490864.14	1490864.16	1490864.18	1492225.14	1492225.16	1492225.26	1491304.25	1491304.21	1491304.14	1491304.29						
Date Sampled	19/10/2015	19/10/2015	20/10/2015	20/10/2015	19/10/2015	19/10/2015	20/10/2015	20/10/2015	19/10/2015	19/10/2015	19/10/2015	22/10/2015	22/10/2015	21/10/2015	20/10/2015	20/10/2015	20/10/2015	21/10/2015						
Depth (m bgl)	1.5	0.2	0.2	1.5	0.7	1.6	0.7	1.5	0.9	0.1	1.2	0.2	1.8	1.1	0.8	0.2	1	0.8						
PID Headspace Reading (ppm)	70.5	0.2	0.0	0	0.8	6.4	0.8	1.5	0.2	0.1	0.2	2.6	1.6	0.3	0.0	0.0	0.0	1.4			Yellow Gley Earth	Yellow Gley Earth		
Guideline Soil Type [3]	SILT	SILT	SAND	Silty SAND	SILT	SILT	SAND	SILT	SILT	GRAVEL	SILT	GRAVEL	SILT	SILT	SILT	Sandy SILT	SILT	SILT					Residential Soil (mg/kg)	Industrial Soil (mg/kg)
Observations	Black colouring, moderate hydrocaarbon odour				Faint hydrocarbon odour	Faint hydrocarbon odour													Recreational Landuse[2]	Commercial Landuse[2]	Trace Elements Level 1	Trace Elements Level 2		
Metals Trace																								
Total Recoverable Arsenic (mg/kg dry wt)	11	8	24	3	8	9	14	8	10	< 2	9	< 2	6	7	6	8	8	8	80	70	4.6	4.9		
Total Recoverable Cadmium (mg/kg dry wt)	0.82	< 0.10	0.34	< 0.10	< 0.10	< 0.10	0.13	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	400	1300	0.11 (0.18)	0.13(0.195)		
Total Recoverable Chromium (mg/kg dry wt)	22	24	23	15	24	27	17	25	24	9	25	10	20	22	23	25	23	26	>10,000	>10,000	15.6	16.9		
Total Recoverable Copper (mg/kg dry wt)	57	13	198	15	11	11	100	11	11	46	10	108 #1	6	9	9	14	9	11	>10,000	>10,000	11.5	12.4		
Total Recoverable Lead (mg/kg dry wt)	590	29	450	18.2	26	27	156	27	25	16.3	25	16.6 #1	18.6	23	22	30	22	27	880	3300	18.8	21.3		
Total Recoverable Mercury (mg/kg dry wt)	0.56	0.34	16.9	< 0.10	0.21	< 0.10	0.19	0.12	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.26	0.12	0.22	1800	4200	0.1	0.11		
Total Recoverable Nickel (mg/kg dry wt)	18	19	15	19	19	21	16	18	18	29	19	27	13	16	17	18	17	19	-	-	11.6	13.1		
Total Recoverable Zinc (mg/kg dry wt)	320	87	380	57	84	91	179	84	81	69	85	83	61	80	79	88	79	88	-	-	62.4	69.6		
Tributyl Tin Trace in Soil samples by GCMS																								
Dibutyltin (as Sn) (mg/kg dry wt)										0.016		0.011		< 0.005									19	250
Monobutyltin (as Sn) (mg/kg dry wt)										0.056		0.008		< 0.007										
Tributyltin (as Sn) (mg/kg dry wt)										0.013		0.018		< 0.004									23	350
Triphenyltin (as Sn) (mg/kg dry wt)										< 0.003		< 0.003		< 0.003										

AECOM Location ID	ETP14	ETP15	ETP16	ETP17	ETP18	ETP19	ETP20	ETP21	ETP22	ETP22	ETP23		ETP24		ETP25		ETP26		National Environmental Standard for Contaminated Land (2012) [1]	National Environmental Standard for Contaminated Land (2012) [1]	Environment Canterbury Background Concentrations	Environment Canterbury Background Concentrations	USEPA[3]	USEPA[3]
AECOM Field ID	ETP14 0.2-0.3	ETP15 1.5-1.6	ETP16 0.2	ETP17 2.2	ETP18 0.8-0.9	ETP19 1.8-1.9	ETP20 0.7-0.8	ETP21 0.1-0.2	ETP22 0.6-0.7	ETP22 2.6-2.7	ETP23 0.8-0.9	ETP23 1.2-2.2	ETP24 0.7-0.8	ETP24 2.0-2.1	ETP25 0.1-0.2	ETP25 1.8-1.9	ETP26 0.2-0.3	ETP26 0.8-0.9						
Laboratory Sample Reference	1491304.5	1491304.11	1491304.38	1491304.44	1492225.23	1491304.34	1492225.19	1492225.28	1491304.37	1492225.32	1492225.11	1492225.12	1492225.8	1492225.9	1492225.3	1492225.5	1492225.1	1492225.2						
Date Sampled	20/10/2015	20/10/2015	20/10/2015	20/10/2015	21/10/2015	21/10/2015	21/10/2015	21/10/2015	21/10/2015	21/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015						
Depth (m bgl)	0.2	1.5	0.2	2.2	0.8	1.8	0.7	0.1	0.6	2.6	0.8	1.2	0.7	2	0.1	1.8	0.2	0.8						
PID Headspace Reading (ppm)	0.0	0.0	0.0	0.0	0.4	1.7	0.4	0.1	0.5	0.0	0.0	1.3	1.6	0.8	1.1	39.2	0.6	0.8			Yellow Gley Earth	Yellow Gley Earth		
Guideline Soil Type [3]	Sandy SILT	Clayey SILT	Sandy SILT	SILT	SILT	SILT	SILT	SILT	Sandy GRAVEL	CLAY	GRAVEL	GRAVEL	GRAVEL	SILT	GRAVEL	SILT	GRAVEL	GRAVEL					Residential Soil (mg/kg)	Industrial Soil (mg/kg)
Observations																			Recreational Landuse[2]	Commercial Landuse[2]	Trace Elements Level 1	Trace Elements Level 2		
Metals Trace																								
Total Recoverable Arsenic (mg/kg dry wt)	8	7	6	8	7	6	3	18	23	7	3	17	6	7	5	5	7	5	80	70	4.6	4.9		
Total Recoverable Cadmium (mg/kg dry wt)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.8	1.99	< 0.10	0.22	< 0.10	0.2	< 0.10	0.2	< 0.10	0.18	0.23	400	1300	0.11 (0.18)	0.13(0.195)		
Total Recoverable Chromium (mg/kg dry wt)	23	23	19	23	24	25	13	22	42	23	8	8	15	22	15	24	19	10	>10,000	>10,000	15.6	16.9		
Total Recoverable Copper (mg/kg dry wt)	12	9	10	12	11	11	6	230	470	10	43	27	32	8	29	8	590	91	>10,000	>10,000	11.5	12.4		
Total Recoverable Lead (mg/kg dry wt)	41	24	28	27	27	26	12.9	650	**11,700**	26	11.1	34	58	21	87	23	29	35	880	3300	18.8	21.3		
Total Recoverable Mercury (mg/kg dry wt)	< 0.10	0.12	0.15	< 0.10	0.42	0.19	< 0.10	4.3	4	0.15	< 0.10	0.11	0.14	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1800	4200	0.1	0.11		
Total Recoverable Nickel (mg/kg dry wt)	18	17	14	18	17	18	8	27	47	17	27	12	16	15	19	18	20	22	-	-	11.6	13.1		
Total Recoverable Zinc (mg/kg dry wt)	89	77	72	80	83	85	45	2,500	3,200	82	81	50	106	71	122	79	250	112	-	-	62.4	69.6		
Tributyl Tin Trace in Soil samples by GCMS																								
Dibutyltin (as Sn) (mg/kg dry wt)									< 0.005									0.26					19	250
Monobutyltin (as Sn) (mg/kg dry wt)									< 0.007									0.081						
Tributyltin (as Sn) (mg/kg dry wt)									< 0.004									1.03					23	350
Triphenyltin (as Sn) (mg/kg dry wt)									< 0.003									< 0.003						

All concentrations in mg/kg dry weight.

[1] National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011.

[2] Values taken from Table B2 in Appendix B 'Soil contaminant standards for health for inorganic substances (Recreational and Commerical).'

[3]USEPA Summary Regional Screening Tables

Bold - exceeds the National Environmental Standard for Contaminated Land (2011) Recreational Guideline

Table 8 Total Petroleum Hydrocarbons Soil Analytical Results compared to Applicable Tier I Guidelines and NES

AECOM

AECOM Location ID	ETP01	ETP02	ETP03	ETP03	ETP04	ETP04	ETP05	ETP05	ETP06	ETP07	ETP07	ETP08	ETP08	ETP09	ETP10	ETP11	ETP12	ETP13	MfE 1999 Guidelines (Revised 2011): Tier 1 Soil Acceptance Criteria[1]						MfE 1999 Guidelines (Revised 2011): Tier 1 Soil Acceptance Criteria[1]					
AECOM Field ID	ETP01 1.5-1.6	ETP02_0.2-0.3	ETP03_0.2-0.3	ETP03 1.5-1.9	ETP04_0.7-0.8	ETP04 1.6-1.7	ETP05 0.7-0.8	ETP05 1.5-1.6	ETP06 0.9-1.0	ETP07 0.1-0.2	ETP07 1.2-1.3	ETP08 0.2-0.3	ETP08 1.8-1.9	ETP09 1.1-1.2	ETP10 0.8-0.9	ETP11 0.2-0.3	ETP12 1.0-1.1	ETP13 0.8-0.9												
Laboratory Sample Reference	1490864.4	1490864.6	1491304.1	1491304.3	1490864.11	1490864.12	1491304.18	1491304.19	1490864.14	1490864.16	1490864.18	1492225.14	1492225.16	1492225.26	1491304.25	1491304.21	1491304.14	1491304.29												
Date Sampled	19/10/2015	19/10/2015	20/10/2015	20/10/2015	19/10/2015	19/10/2015	20/10/2015	20/10/2015	19/10/2015	19/10/2015	19/10/2015	22/10/2015	22/10/2015	21/10/2015	20/10/2015	20/10/2015	20/10/2015	21/10/2015												
Depth (m bgl)	1.5	0.2	0.3	1.5	0.7	1.6	0.7	1.5	0.9	0.1	1.2	0.2	1.8	1.1	0.8	0.2	1	0.8												
PID Headspace Reading (ppm)	70.5	0.0	0.0	0.0	0.8	6.4	0.0	1.5	0.2	0.1	0.2	2.6	1.6	0.3	0.0	0.0	0.0	1.4												
Guideline Soil Type [3]	SILT	Sandy GRAVEL	Sandy GRAVEL	SILT	SILT	SILT	Sandy SILT	SILT	SILT	Sandy GRAVEL	SILT	GRAVEL	SILT	SILT	SILT	Sandy SILT	SILT	SILT	All Pathways Soil Acceptance Criteria for TPH - Residential Use						All Pathways Soil Acceptance Criteria for TPH - Commercial					
Observations	Black colouring, moderate hydrocaarbon odour					Faint hydrocarbon odour													Contamination Depth: Surface (<1m)			Contamination Depth: 1m-4m			Contamination Depth: Surface (<1m)			Contamination Depth: 1m-4m		
																			Sandy silt	Sand	Clay	Sandy silt	Sand	Clay	Sandy silt	Sand	Clay	Sandy silt	Sand	Clay
Total Petroleum Hydrocarbons (TPH)																														
C_7-C_9(mg/kg dry wt)	< 8	<9	<8	<8	<9	< 10	<8	< 9	< 9	< 8	< 9	< 8	< 9	< 9	< 9	< 9	< 9	< 9	(500)[7,m]	120[m]	(15,000)[7,x]	(500)[7,m]	120[m]	NA[2]	(500)[7,m]	120[m]	NA[2]	(500)[7,m]	120[m]	NA[2]
C_{10}-C_{14}(mg/kg dry wt)	87	<20	<20	<20	<20	< 20	<20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	(510)[7,x]	(470)[7,x]	(570)[7,x]	(670)[7,x]	(560)[7,x]	(2900)[7,x]	(1700)[7,x]	(1500)[7,x]	(1900)[7,x]	(2200)[7,x]	(1900)[7,x]	(9700)[7,x]
C_{15}-C_{36}(mg/kg dry wt)	360	<40	210	<40	<40	< 40	107	< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Total hydrocarbons (C_7 - C_{36})(mg/kg dry wt)	450	<70	210	<70	<70	< 70	107	< 70	< 70	< 70	< 70	< 70	< 70	< 70	< 70	< 70	< 70	< 70												
BTEX in soil headspace GC-MS																														
Benzene(mg/kg dry wt)									< 0.06						< 0.06		< 0.06		1.1[v]	1.9[v]	2.7[v]	1.9[v]	1.9[7,v]	8.8[4,v]	3[m]	3.6[v]	11[v]	3[m]	7.2[v]	(41)[4,v]
Toluene(mg/kg dry wt)									< 0.06						< 0.06		< 0.06		(82)[4,v]	(68)[4,v]	(320)[4,v]	(170)[4,v]	(94)[4,m]	(2,400)[4,v]	(94)[4,m]	(270)[4,v]	(1000)[4,v]	(94)[4,m]	(480)[4,m]	(7,900)[4,v]
Ethylbenzene(mg/kg dry wt)									< 0.06						< 0.06		< 0.06		(59)[4,v]	(53)[4,v]	(160)[4,v]	(92)[4,7,v]	(300)[4,v]	NA [2]	(180)[4,v]	(200)[4,v]	(540)[4,v]	(300)[4,v]	(300)[4,v]	NA [2]
m&p-Xylene(mg/kg dry wt)									< 0.12						< 0.12		< 0.12		(59)[4,v]	(48)[4,v]	(250)[4,v]	(130)[4,v]	(420)[4,v]	(1,800)[4,v]	(150)[4,m]	(200)[4,m]	810[4,v]	(150)[4,m]	(420)[4,v]	(6000)[4,v]
o-Xylene(mg/kg dry wt)									< 0.06						< 0.06		< 0.06													

AECOM Location ID	ETP14	ETP15	ETP16	ETP17	ETP18	ETP19	ETP20	ETP21	ETP22		ETP23	ETP23	ETP24		ETP25		ETP26		MfE 1999 Guidelines (Revised 2011): Tier 1 Soil Acceptance Criteria[1]						MfE 1999 Guidelines (Revised 2011): Tier 1 Soil Acceptance Criteria[1]					
AECOM Field ID	ETP14 0.2-0.3	ETP15 1.5-1.6	ETP16 0.2	ETP17 2.2	ETP18_0.8-0.9	ETP19 1.8-1.9	ETP20_0.7-0.8	ETP21 0.1-0.2	ETP22 0.6-0.7	ETP22 2.6-2.7	ETP23 0.8-0.9	ETP23 1.2	ETP24 0.7-0.8	ETP24 2.0-2.1	ETP25 0.1-0.2	ETP25 1.8-1.9	ETP26 0.2-0.3	ETP26 0.8-0.9												
Laboratory Sample Reference	1491304.5	1491304.11	1491304.38	1491304.44	1492225.23	1491304.34	1492225.19	1492225.28	1491304.37	1492225.32	1492225.11	1492225.12	1492225.8	1492225.9	1492225.3	1492225.5	1492225.1	1492225.2												
Date Sampled	20/10/2015	20/10/2015	20/10/2015	20/10/2015	21/10/2015	21/10/2015	21/10/2015	21/10/2015	21/10/2015	21/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015	22/10/2015												
Depth (m bgl)	0.2	1.5	0.2	2.2	0.8	1.8	0.7	0.1	0.6	2.6	0.8	1.2	0.7	2	0.1	1.8	0.2	0.8												
PID Headspace Reading (ppm)	0.0	0.0	0.0	0.0	0.4	1.7	0.4	0.1	0.5	0.0	1.3	1.3	1.6	0.8	1.1	39.2	0.6	0.8												
Guideline Soil Type [3]	Sandy SILT	SILT	Sandy SILT	SILT	Sandy SILT	SILT	Sandy SILT	SILT	Sandy GRAVEL	CLAY	GRAVEL	GRAVEL	GRAVEL	SILT	GRAVEL	SILT	GRAVEL	GRAVEL	All Pathways Soil Acceptance Criteria for TPH - Residential Use						All Pathways Soil Acceptance Criteria for TPH - Commercial					
Observations																			Contamination Depth: Surface (<1m)			Contamination Depth: 1m-4m			Contamination Depth: Surface (<1m)			Contamination Depth: 1m-4m		
																			Sandy silt	Sand	Clay	Sandy silt	Sand	Clay	Sandy silt	Sand	Clay	Sandy silt	Sand	Clay
Total Petroleum Hydrocarbons (TPH)																														
C_7-C_9(mg/kg dry wt)	< 8	<10	<8	<10	< 9	< 9	<8	< 8	< 9	< 10	< 8	20	< 8	< 10	< 8	< 10	< 8	< 8	(500)[7,m]	120[m]	(15,000)[7,x]	(500)[7,m]	120[m]	NA[2]	(500)[7,m]	120[m]	NA[2]	(500)[7,m]	120[m]	NA[2]
C_{10}-C_{14}(mg/kg dry wt)	< 20	<20	<20	<20	< 20	< 20	<20	< 20	< 20	< 20	< 20	**1,040**	< 20	< 20	< 20	156	< 20	< 20	(510)[7,x]	(470)[7,x]	(570)[7,x]	(670)[7,x]	(560)[7,x]	(2900)[7,x]	(1700)[7,x]	(1500)[7,x]	(1900)[7,x]	(2200)[7,x]	(1900)[7,x]	(9700)[7,x]
C_{15}-C_{36}(mg/kg dry wt)	< 40	<40	42	<40	< 40	< 40	<40	970	410	< 40	< 40	67,000	210	< 40	< 40	310	570	240	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
Total hydrocarbons (C_7 - C_{36})(mg/kg dry wt)	< 70	<70	<70	<70	< 70	< 70	<70	970	410	< 70	< 70	68,000	210	< 70	< 70	470	570	240												
BTEX in soil headspace GC-MS																														
Benzene(mg/kg dry wt)		<0.06																	1.1[v]	1.9[v]	2.7[v]	1.9[v]	1.9[7,v]	8.8[4,v]	3[m]	3.6[v]	11[v]	3[m]	7.2[v]	(41)[4,v]
Toluene(mg/kg dry wt)		<0.06																	(82)[4,v]	(68)[4,v]	(320)[4,v]	(170)[4,v]	(94)[4,m]	(2,400)[4,v]	(94)[4,m]	(270)[4,v]	(1000)[4,v]	(94)[4,m]	(480)[4,m]	(7,900)[4,v]
Ethylbenzene(mg/kg dry wt)		<0.06																	(59)[4,v]	(53)[4,v]	(160)[4,v]	(92)[4,7,v]	(300)[4,v]	NA [2]	(180)[4,v]	(200)[4,v]	(540)[4,v]	(300)[4,v]	(300)[4,v]	NA [2]
m&p-Xylene(mg/kg dry wt)		<0.12																	(59)[4,v]	(48)[4,v]	(250)[4,v]	(130)[4,v]	(420)[4,v]	(1,800)[4,v]	(150)[4,m]	(200)[4,m]	810[4,v]	(150)[4,m]	(420)[4,v]	(6000)[4,v]
o-Xylene(mg/kg dry wt)		<0.06																												

URS Location ID	ETP17	MfE 1999 Guidelines (Revised 2011): Tier 1 Soil Acceptance Criteria[1]	MfE 1999 Guidelines (Revised 2011): Tier 1 Soil Acceptance Criteria[1]	**National Environmental Standard for Contaminated Land (2012)** [1]	**National Environmental Standard for Contaminated Land (2012)** [1]
URS Field ID	ETP17 0.2				
Laboratory Sample Reference	1491304.42				
Date Sampled	20/10/2015				
Depth (m bgl)	0.2				
PID Headspace Reading (ppm)	-				
Guideline Soil Type [3]	SAND	All Pathways Soil Acceptance Criteria for TPH - Residential Use	All Pathways Soil Acceptance Criteria for TPH - Commercial Use		
Observations		Contamination Depth: Surface (<1m)	Contamination Depth: Surface (<1m)	Recreational Landuse	Commercial Landuse
		Sand	Sand		
Polycyclic Aromatic Hydrocarbons Screening in Soil					
Acenaphthene(mg/kg dry wt)	< 0.03				
Acenaphthylene(mg/kg dry wt)	0.24				
Anthracene(mg/kg dry wt)	0.34				
Benzo[a]anthracene(mg/kg dry wt)	3.9				
Benzo[a]pyreene (BAP)(mg/kg dry wt)	6				
BAP(mg/kg dry wt)	8.86			40	35
Benzo[b]fluoranthene + Benzo[j]fluoranthene(mg/kg dry wt)	7.2				
Benzo[g,h,i]perylene(mg/kg dry wt)	4.5				
Benzo[k]fluoranthene(mg/kg dry wt)	2.7				
Chrysene(mg/kg dry wt)	3.9				
Dibenzo[a,h]anthracene(mg/kg dry wt)	0.9				
Fluoranthene(mg/kg dry wt)	7.2				
Fluorene(mg/kg dry wt)	0.05				
Indeno(1,2,3-c,d)pyrene(mg/kg dry wt)	4.7				
Naphthalene(mg/kg dry wt)	0.14	58[v]	190[4,v]		
Phenanthrene(mg/kg dry wt)	1.91				
Pyrene(mg/kg dry wt)	6.7	1600[4,m]	NA[2]		

All concentrations in mg/kg dry weight.

[1] Ministry for the Environment, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Revised 2011) (MfE 1999 Guidelines).

[2] NA indicates estimated criterion exceeds 20, 000 mg/kg. At 20, 000 mg/kg residual separate phase is expected to have formed in soil matrix. Some aesthetic impact may be noted.

[3] Values taken from Table 4.10, 4.11, 4.13, 4.14 of the MfE 1999 Guidelines (Revised 2011). The residential guidelines were used in lieu of recreational numbers.

[3]Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons.

m - Maintenance/Excavation.

x - PAH surrogate.

Bold - exceeds the Ministry for the Environment, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Revised 2011) (MfE 1999 Guidelines).

Table 9 Total PCP and OCP Soil Analytical Results compared to Applicable Guidelines

AECOM Location ID	ETP04	ETP10	ETP11	ETP12	ETP13	ETP14	ETP15	ETP16	ETP17	ETP18	ETP24	National Environmental Standard for Contaminated Land (2012) [1]	National Environmental Standard for Contaminated Land (2012) [1]
AECOM Field ID	ETP04 0.7-0.8	ETP10 0.2-0.3	ETP11 0.2-0.3	ETP12 0.1-0.2	ETP13 0.8-0.9	ETP14 0.2-0.3	ETP15 0.7-0.8	ETP16 0.2	ETP17 0.2	ETP18 0.8-0.9	ETP24 2.0-2.1		
Laboratory Sample Reference	1490864.11	1491304.24	1491304.21	1491304.13	1491304.29	1491304.5	1491304.1	1491304.38	1491304.42	1492225.23	1492225.9		
Date Sampled	19/10/2015	20/10/2015	20/10/2015	20/10/2015	21/10/2015	20/10/2015	20/10/2015	20/10/2015	20/10/2015	21/10/2015	22/10/2015		
Depth (m bgl)	0.7	0.2	0.2	0.1	0.8	0.2	0.7	0.2	0.2	0.8	2		
PID Headspace Reading (ppm)	0.8	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.4	0.8		
Guideline Soil Type [3]	SILT	Sandy SILT	Sandy SILT	Sandy SILT	SILT	Sandy SILT	Sandy SILT	Sandy SILT	Silty SAND	SILT	SILT		
Observations	Faint hydrocarbon odour											Recreational Landuse[2]	Commercial Landuse[2]
Pentachlorophenol Screening in Soil by LCMSMS													
Pentachlorophenol (PCP) (mg/kg dry wt)	< 0.05				< 0.05					< 0.05	< 0.05	**150**	**360**
2,3,4,6-Tetrachlorophenol (TCP) (mg/kg dry wt)	< 0.05				< 0.05					< 0.05	< 0.05		
Organochlorine Pesticides Trace in Soil													
Aldrin(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
alpha-BHC(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
beta-BHC(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
delta-BHC(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
gamma-BHC (Lindane)(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
cis-Chlordane(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
trans-Chlordane(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
2,4'-DDD(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	0.005				
4,4'-DDD(mg/kg dry wt)		0.0011	< 0.0010	< 0.0010		< 0.0010	< 0.0010	0.0024	0.011				
2,4'-DDE(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	0.011				
4,4'-DDE(mg/kg dry wt)		0.0035	0.0096	< 0.0010		< 0.0010	< 0.0010	0.131	1.52				
2,4'-DDT(mg/kg dry wt)		< 0.0010	0.0012	< 0.0010		< 0.0010	< 0.0010	0.0089	0.159				
4,4'-DDT(mg/kg dry wt)		0.0071	0.0063	0.0021		< 0.0010	< 0.0010	0.093	0.59				
Total DDT Isomers(mg/kg dry wt)		0.012	0.017	< 0.006		< 0.006	< 0.006	0.24	2.3			**400**	**1000**
Dieldrin(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.002			**70**	**160**
Endosulfan I(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Endosulfan II(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Endosulfan sulphate(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Endrin(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Endrin aldehyde(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Endrin ketone(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Heptachlor(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Heptachlor epoxide(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Hexachlorobenzene(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Methoxychlor(mg/kg dry wt)		< 0.0010	< 0.0010	< 0.0010		< 0.0010	< 0.0010	< 0.0010	< 0.0010				
Total Chlordane [(cis+trans)*100/42](mg/kg dry wt)		< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002	< 0.002				

All concentrations in mg/kg dry weight.

[1] National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011.

[2] Values taken from Table B2 in Appendix B 'Soil contaminant standards for health for inorganic substances (Recreational and Commerical).'

Bold - exceeds the National Environmental Standard for Contaminated Land (2011) Recreational Guideline

AECOM

Table 10 Total ONOP Soil Analytical Results compared to Applicable Guidelines

AECOM Location ID	ETP10	ETP11	ETP12	ETP14	ETP15	ETP16	ETP17	USEPA	USEPA
AECOM Field ID	ETP10 0.2-0.3	ETP11 0.2-0.3	ETP12 0.1-0.2	ETP14 0.2-0.3	ETP15 0.7-0.8	ETP16 0.2	ETP17 0.2		
Laboratory Sample Reference	1491304.24	1491304.21	1491304.13	1491304.5	1491304.1	1491304.38	1491304.42		
Date Sampled	20/10/2015	20/10/2015	20/10/2015	20/10/2015	20/10/2015	20/10/2015	20/10/2015		
Depth (m bgl)	0.2	0.2	0.1	0.2	0.7	0.2	0.2		
PID Headspace Reading (ppm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Guideline Soil Type [3]	Sandy SILT	Sandy SILT	Sandy SILT	Sandy SILT	Sandy SILT	Sandy SILT	Silty SAND	Residential Soil (mg/kg)	Industrial Soil (mg/kg)
Observations									
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS									
Acetochlor(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Alachlor(mg/kg dry wt)	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006		
Atrazine(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Atrazine-desethyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Atrazine-desisopropyl(mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Azaconazole(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Azinphos-methyl(mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Benalaxyl(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Bitertanol(mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Bromacil(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Bromopropylate(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Butachlor(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Captan(mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Carbaryl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Carbofuran(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Chlorfluazuron(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Chlorothalonil(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Chlorpyrifos(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Chlorpyrifos-methyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Chlortoluron(mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Cyanazine(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Cyfluthrin(mg/kg dry wt)	< 0.009	< 0.010	< 0.009	< 0.009	< 0.010	< 0.009	< 0.009		
Cyhalothrin(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Cypermethrin(mg/kg dry wt)	< 0.018	< 0.019	< 0.017	< 0.018	< 0.019	< 0.017	< 0.017		
Deltamethrin (including Tralomethrin)(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Diazinon(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Dichlofluanid(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Dichloran(mg/kg dry wt)	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
Dichlorvos(mg/kg dry wt)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		
Difenoconazole(mg/kg dry wt)	< 0.010	< 0.011	< 0.010	< 0.011	< 0.011	< 0.010	< 0.010		
Dimethoate(mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Diphenylamine(mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Diuron(mg/kg dry wt)	0.021	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	0.01	130	1600
Fenpropimorph(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Fluazifop-butyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Fluometuron(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Flusilazole(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Fluvalinate(mg/kg dry wt)	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006		
Furalaxyl(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Haloxyfop-methyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Hexaconazole(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Hexazinone(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)(mg/kg dry wt)	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04		
Kresoxim-methyl(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Linuron(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Malathion(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Metalaxyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Methamidophos(mg/kg dry wt)	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04		
Metolachlor(mg/kg dry wt)	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006		
Metribuzin(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Molinate(mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Myclobutanil(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Naled(mg/kg dry wt)	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04		
Norflurazon(mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Oxadiazon(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Oxyfluorfen(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Paclobutrazol(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Parathion-ethyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Parathion-methyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Pendimethalin(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Permethrin(mg/kg dry wt)	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003		
Pirimicarb(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Pirimiphos-methyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Prochloraz(mg/kg dry wt)	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04		
Procymidone(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Prometryn(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Propachlor(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Propanil(mg/kg dry wt)	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
Propazine(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Propiconazole(mg/kg dry wt)	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006		
Pyriproxyfen(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Quizalofop-ethyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Simazine(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Simetryn(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Sulfentrazone(mg/kg dry wt)	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04		
TCMTB [2-(thiocyanomethylthio)benzothiazole,Busan](mg/kg dry wt)	< 0.015	< 0.015	< 0.014	< 0.015	< 0.016	< 0.014	< 0.014		
Tebuconazole(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Terbacil(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Terbufos(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Terbumeton(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Terbuthylazine(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Terbuthylazine-desethyl(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Terbutryn(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Thiabendazole(mg/kg dry wt)	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04		
Thiobencarb(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Tolylfluanid(mg/kg dry wt)	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004		
Triazophos(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Trifluralin(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		
Vinclozolin(mg/kg dry wt)	< 0.008	< 0.008	< 0.007	< 0.008	< 0.008	< 0.007	< 0.007		

[1]USEPA Summary Regional Screening Tables

Naval Point Detailed Site Investigation

TABLE 11: Analytical Results - Asbestos in Soil Results

	Total % friable Asbestos in Soil	Total % Asbestos in Soil
Western Australian Department of Health (WA DoH) (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia		
All Site uses	**0.001%**	
Parks, public open spaces, playing fields		0.02%

Sample ID	Client Sample Number	Sample Weights (kg)						> 7mm ACM			Asbestos Fines / Friable Asbestos						Total % friable Asbestos in Soil	Total % Asbestos in Soil
		Total Sample (kg)	Total 500ml Sub	>7mm Fraction (g)	2-7mm Fraction (g)	<2mm Sub Sample	<2mm Excess (g)	>7mm ACM (g)	% Asbestos in ACM	% Asbestos in Soil (>7mm)	2-7 mm ACM (g)	% Asbestos in ACM	% Asbestos in Soil (2-7mm)	<2mm ACM (g)	% Asbestos in ACM	% Asbestos in Soil (<2mm)		
BS032994	**ETP04_0.4-0.6_SV**		402.72		214.68	101.39	86.65				No asbestos detected			No asbestos detected				0.0000%
BS032995	**ETP07_0.3-0.5_SV**		439.12		240.63	101.47	97.02				0.0001	100	0.0000%	0%	100%	0.00099%	0.001%	0.0010%
BS032996	**ETP09_0.1-0.3_SV**		513.31		271.65	102.66	139.00				0.001	100	0.0000%	No asbestos detected		0.00000%	0.000%	0.0000%
BS032997	**ETP13_0.2-0.4_SV**		503.04		313.22	100.60	89.22				No asbestos detected		-	No asbestos detected		0.00000%	-	0.0000%
BS032998	**ETP18_0.1-0.3_SV**		458.49		259.58	100.53	98.38				No asbestos detected		-	No asbestos detected		0.00000%	-	0.0000%
BS032999	**ETP19_0.2-0.3_SV**		515.03		261.81	101.43	151.79				No asbestos detected		-	No asbestos detected		0.00000%	-	0.0000%
BS033000	**ETP22_0.2-0.4_SV**		626.40		277.18	103.09	246.13				0.001	100	0.00004%	0.001	100%	0.00097%	0.001%	0.0010%
BS033001	**ETP22_0.6-0.8_SV**	10.0	426.23	430.62	191.31	100.25	134.67	430.62	0.15	0.0150%	0.211	15	0.0017%	0.001	100%	0.00100%	**0.0027%**	0.0177%
BS033002	**ETP23_0.2-0.4_SV**		489.51		239.42	100.77	149.32				0.001	100	0.00004%	No asbestos detected		0.00000%	0.000%	0.0000%
BS033003	**ETP22_0.5_BLK**			119.61				No asbestos detected								0.00000%	0.000%	0.0000%

italics Weights on lab sheet incorrect as fractions do not sum to whole.
ND = not detected
Highlighted cells = less than detection limit. Conservatively assumed to be 0.001g

bold: result exceeds Western Australian Guidelines acceptance criteria for total % asbestos in soil
Shaded grey result exceeds Western Australian Guidelines acceptance criteria for parks, public open spaces, and playing fields.

Appendix F

Hill Laboratory Result Tables for Soils

Hill Laboratories
BETTER TESTING BETTER RESULTS

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Hamilton 3240, New Zealand

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Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	AECOM New Zealand Limited	**Lab No:**	1490864	SPv1
Contact:	H Wright	**Date Registered:**	21-Oct-2015	
	C/- AECOM Consulting Services (NZ) Limited	**Date Reported:**	04-Nov-2015	
	PO Box 4479	**Quote No:**		
	CHRISTCHURCH 8051	**Order No:**	60444747	
		Client Reference:	60444747	
		Submitted By:	S McDonald	

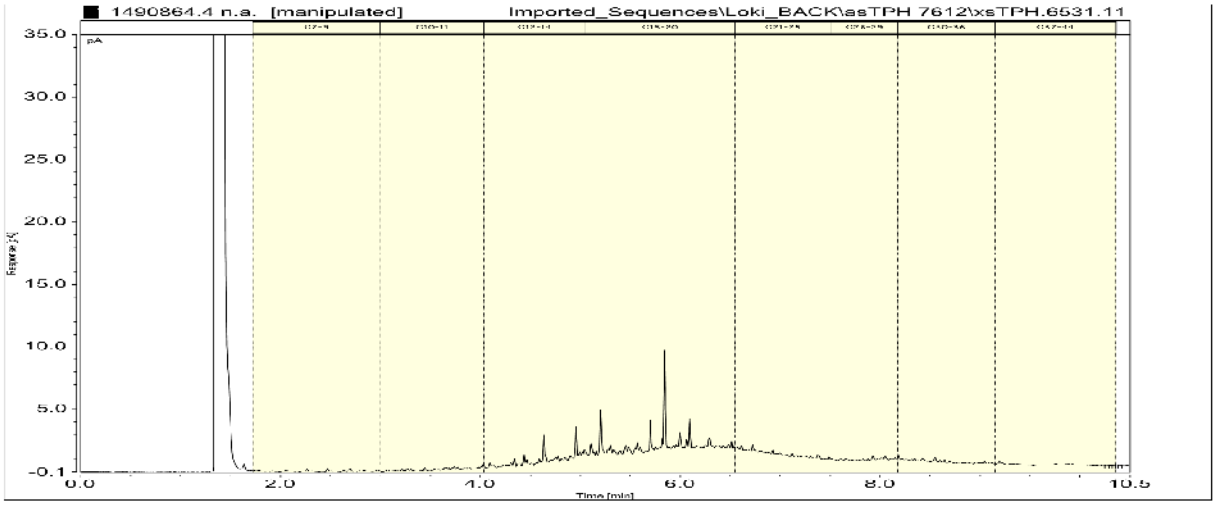
Sample Type: Soil

Sample Name:		ETP01_1.5-1.6 19-Oct-2015 10:35 am	ETP02_0.2-0.3 19-Oct-2015 11:10 am	ETP04_0.7-0.8 19-Oct-2015 1:15 pm	ETP04_1.6-1.7 19-Oct-2015 1:40 pm	ETP06_0.9-1 19-Oct-2015 2:35 pm
Lab Number:		1490864.4	1490864.6	1490864.11	1490864.12	1490864.14
Individual Tests						
Dry Matter	g/100g as rcvd	92	78	77	70	73
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	11	8	8	9	10
Total Recoverable Cadmium	mg/kg dry wt	0.82	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	22	24	24	27	24
Total Recoverable Copper	mg/kg dry wt	57	13	11	11	11
Total Recoverable Lead	mg/kg dry wt	590	29	26	27	25
Total Recoverable Mercury	mg/kg dry wt	0.56	0.34	0.21	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	18	19	19	21	18
Total Recoverable Zinc	mg/kg dry wt	320	87	84	91	81
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	-	-	-	-	< 0.06
Toluene	mg/kg dry wt	-	-	-	-	< 0.06
Ethylbenzene	mg/kg dry wt	-	-	-	-	< 0.06
m&p-Xylene	mg/kg dry wt	-	-	-	-	< 0.12
o-Xylene	mg/kg dry wt	-	-	-	-	< 0.06
Pentachlorophenol Screening in Soil by LCMSMS						
Pentachlorophenol (PCP)	mg/kg dry wt	-	-	< 0.05	-	-
2,3,4,6-Tetrachlorophenol (TCP)	mg/kg dry wt	-	-	< 0.05	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 9	< 9	< 10	< 9
C10 - C14	mg/kg dry wt	87	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	360	< 40	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	450	< 70	< 70	< 70	< 70

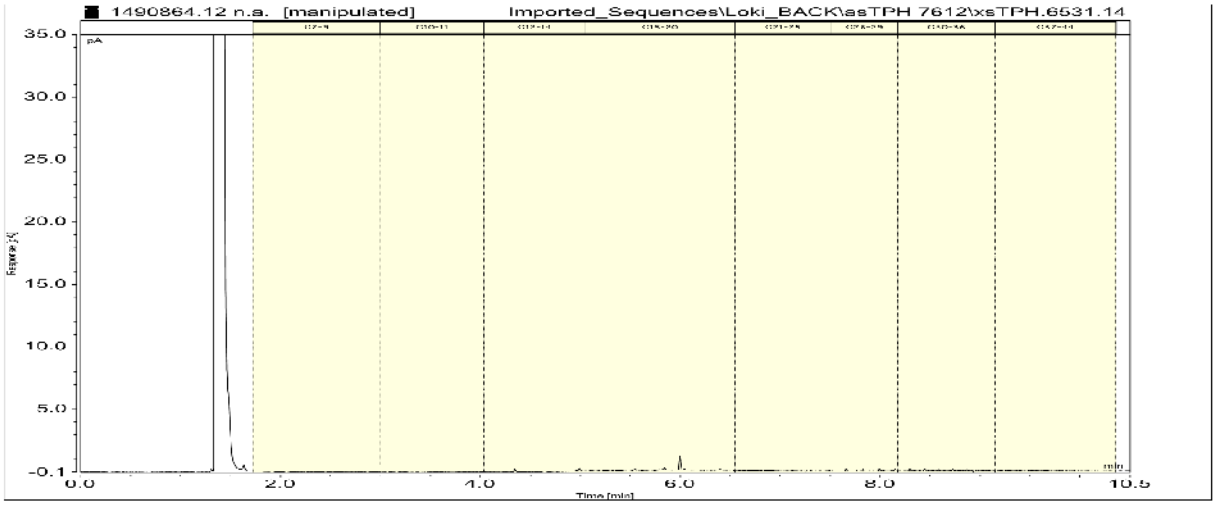
Sample Name:		ETP07_0.1-0.2 19-Oct-2015 3:20 pm	ETP07_1.2-1.3 19-Oct-2015 4:00 pm			
Lab Number:		1490864.16	1490864.18			
Individual Tests						
Dry Matter	g/100g as rcvd	88	72	-	-	-
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	< 2	9	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	-	-	-
Total Recoverable Chromium	mg/kg dry wt	9	25	-	-	-
Total Recoverable Copper	mg/kg dry wt	46	10	-	-	-
Total Recoverable Lead	mg/kg dry wt	16.3	25	-	-	-

Sample Type: Soil						
Sample Name:		ETP07_0.1-0.2 19-Oct-2015 3:20 pm	ETP07_1.2-1.3 19-Oct-2015 4:00 pm			
Lab Number:		1490864.16	1490864.18			
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	-	-	-
Total Recoverable Nickel	mg/kg dry wt	29	19	-	-	-
Total Recoverable Zinc	mg/kg dry wt	69	85	-	-	-
Tributyl Tin Trace in Soil samples by GCMS						
Dibutyltin (as Sn)	mg/kg dry wt	0.016	-	-	-	-
Monobutyltin (as Sn)	mg/kg dry wt	0.056	-	-	-	-
Tributyltin (as Sn)	mg/kg dry wt	0.013	-	-	-	-
Triphenyltin (as Sn)	mg/kg dry wt	< 0.003	-	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 9	-	-	-
C10 - C14	mg/kg dry wt	< 20	< 20	-	-	-
C15 - C36	mg/kg dry wt	< 40	< 40	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	-	-	-

1490864.4
ETP01_1.5-1.6 19-Oct-2015 10:35 am
Client Chromatogram for TPH by FID



1490864.12
ETP04_1.6-1.7 19-Oct-2015 1:40 pm
Client Chromatogram for TPH by FID



Analyst's Comments

Appendix No.1 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	4, 6, 11-12, 14, 16, 18
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	4, 6, 11-12, 14, 16, 18
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	14
Pentachlorophenol Screening in Soil by LCMSMS	Solvent extraction with sonication, dilution, analysis by LCMSMS with online SPE. Tested on dried sample	0.010 mg/kg dry wt	11
Tributyl Tin Trace in Soil samples by GCMS	Solvent extraction, ethylation, SPE cleanup, GC-MS SIM analysis. Tested on dried sample	0.003 - 0.007 mg/kg dry wt	16
Total Petroleum Hydrocarbons in Soil*	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	4, 6, 11-12, 14, 16, 18
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	4, 6, 11-12, 14, 16, 18
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	4, 6, 11-12, 14, 16, 18

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

Pg 1 / Job No: **1490864** Date Recv: 20-Oct-15 11:20

Received by: Natalia Leatua

Hill Laboratories
BETTER TESTING BETTER RESULTS
R J Hill Laboratories Lin
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand | Web www.hill-labs.co.nz

3114908643

Job Information Summary

Client:	AECOM New Zealand Limited	**Lab No:**	1490864
Contact:	H Wright	**Date Registered:**	21-Oct-2015 10:06 am
	C/- AECOM Consulting Services (NZ) Limited	**Priority:**	Normal
	PO Box 4479	**Quote No:**	
	CHRISTCHURCH 8051	**Order No:**	60444747
		Client Reference:	60444747
		Add. Client Ref:	
		Submitted By:	S McDonald
		Charge To:	AECOM New Zealand Limited
		Target Date:	23-Oct-2015 4:30 pm

23/10/2015 Analysis as noted below. Thanks, Rachael.

Results to Hannah Wright and Anna Lukes please

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	ETP01_0.2-0.3 19-Oct-2015 9:45 am	Soil	cGSoil, cGSoil	Hold Cold
2	ETP01_0.6-0.7 19-Oct-2015 9:55 am	Soil	cGSoil, cGSoil	Hold Cold
3	ETP01_1.2-1.3 19-Oct-2015 10:20 am	Soil	cGSoil, cGSoil	Hold Cold
4	ETP01_1.5-1.6 19-Oct-2015 10:35 am	Soil	GSoil300	Hold Cold TPH, HM+Hg (Screen)
5	ETP01_2.1-2.2 19-Oct-2015 10:45 am	Soil	GSoil300	Hold Cold
6	ETP02_0.2-0.3 19-Oct-2015 11:10 am	Soil	GSoil300, GSoil30(	Hold Cold TPH, HM+Hg (Screen)
7	ETP02_1-1.1 19-Oct-2015 11:25 am	Soil	GSoil300, GSoil30(	Hold Cold
8	ETP02_1.7-1.8 19-Oct-2015 11:45 am	Soil	cGSoil, cGSoil	Hold Cold
9	ETP02_2.8-2.9 19-Oct-2015 12:00 pm	Soil	cGSoil, cGSoil	Hold Cold
10	ETP04_0.1-0.2 19-Oct-2015 1:00 pm	Soil	cGSoil, GSoil300	Hold Cold
11	ETP04_0.7-0.8 19-Oct-2015 1:15 pm	Soil	cGSoil, cGSoil	Hold Cold TPH, HM+Hg (Screen) + PCP (Trace)
12	ETP04_1.6-1.7 19-Oct-2015 1:40 pm	Soil	GSoil300, cGSoil	Hold Cold TPH, HM+Hg (Screen)
13	ETP06_0.2-0.3 19-Oct-2015 2:20 pm	Soil	cGSoil, cGSoil	Hold Cold
14	ETP06_0.9-1 19-Oct-2015 2:35 pm	Soil	cGSoil, cGSoil	Hold Cold TPH, HM+Hg (Screen), BTEX
15	ETP06_2.1-2.2 19-Oct-2015 2:45 pm	Soil	cGSoil, cGSoil	Hold Cold
16	ETP07_0.1-0.2 19-Oct-2015 3:20 pm	Soil	cGSoil, cGSoil	Hold Cold TPH, HM+Hg (Screen), TBT (Trace)
17	ETP07_0.5-0.6 19-Oct-2015 3:45 pm	Soil	cGSoil, cGSoil	Hold Cold
18	ETP07_1.2-1.3 19-Oct-2015 4:00 pm	Soil	cGSoil, cGSoil	Hold Cold TPH, HM+Hg (Screen)

Please see 2x Questions re sample labels.
(1 x 1491304.12
1 x 1491304.33)

Form:

AECOM

Chain of Custody & Analysis Request Form

AECOM - Christchurch
PO Box 710
Christchurch 8140
Phone: 03 966 6119
Fax: 03 966 6001
Email: hannah.wright@aecom.com

Laboratory Details
Lab. Name: R J Hill Laboratories Ltd
Lab. Address: 1 Clyde St, Hamilton
Contact Name: Jean Connick
Lab. Ref:
Tel: 07 858 2000
Fax: 07 858 2001
Preliminary Report by:
Final Report by:
Lab Quote No:

Project Name:
Project Number: 60444747
Purchase Order Number:

Sample collected by: Scott McDonald
Sample Results to be returned to: Hannah Wright of AECOM Consulting Services

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days)	☐ Yes	☐ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☐ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☐ N/A
4. Special storage requirements?	☐ Yes	☐ No	☐ N/A
5. Preservation requirements?	☐ Yes	☐ No	☐ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☐ N/A
7. Report Format: Email: hannah.wright@aecom.com	8. Project Manager: H Wright		tel: 03 966 6119

Lab. ID	Sample ID	Sampling Date & time (on)	Sampling Date & Time (off)	Matrix: soil	water	other	Preservation: filt'ed	acid	Ice	other	Container (No. & type)	Hold Cold	Heavy Metals + Mercury (SCREEN)	TPH (oil Industry)	BTEX (oil industry)	PCP (TRACE)	TBT (TRACE	ONOP (TRACE)	OCPs (TRACE)	Remarks & comments
	ETP04_0.7_0.8	14/10/15		✓								✓								
	ETP04_1.6_1.7	"		✓								✓								
	ETP06_0.2_0.3	"		✓								✓								
	ETP06_0.9_1	"		✓								✓								
	ETP06_2.1_2.2	"		✓								✓								
	ETP07_0.1_0.2	"		✓								✓								
	ETP007_0.5_0.6	"		✓								✓								
	ETP07_1.2_1.3	"		✓								✓								

Relinquished By:
Name: Date:
of: Time:

Received by:
Name: Emily A. Date:
of: Hill Labs Chch Time:

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ B
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

7.9c

Form:

AECOM

Chain of Custody & Analysis Request Form

AECOM - Christchurch
PO Box 710
Christchurch 8140
Phone: 03 966 6119
Fax: 03 966 6001
Email: hannah.wright@aecom.com

Laboratory Details
Lab. Name: R J Hill Laboratories Ltd
Lab. Address: 1 Clyde St, Hamilton
Contact Name: Jean Connick
Lab. Ref:
Tel: 07 858 2000
Fax: 07 858 2001
Preliminary Report by:
Final Report by:
Lab Quote No:

Project Name:
Project Number: 60444747
Purchase Order Number:

Sample collected by: Scott McDonald
Sample Results to be returned to: Hannah Wright of AECOM Consulting Services

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days)	☐ Yes	☐ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☐ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☐ N/A
4. Special storage requirements?	☐ Yes	☐ No	☐ N/A
5. Preservation requirements?	☐ Yes	☐ No	☐ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☐ N/A
7. Report Format: Email: hannah.wright@aecom.com	8. Project Manager: H Wright		tel: 03 966 6119

Lab. ID	Sample ID	Sampling Date & time (on)	Sampling Date & Time (off)	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Hold Cold	Heavy Metals + Mercury (SCREEN)	TPH (oil Industry)	BTEX (oil industry)	PCP (TRACE)	TBT (TRACE	ONOP (TRACE)	OCPs (TRACE)	Remarks & comments
	ETP01 0.2-0.3	19.10.15		✓								✓								
	ETP01_0.6-0.7	"		✓								✓								
	ETP01_1.2-1.3	"		✓								✓								
	ETP01_1.5_1.6	"		✓								✓								
	ETP01_2.1_2.2	"		✓								✓								
	ETP02_0.2-0.3	"		✓								✓								
	ETP02_1-1.1	"		✓								✓								
	ETP02-1.7-1.8	"		✓								✓								
	ETP02_2.8-2.9	"		✓								✓								
	ETP04_0.1_0.2	"		✓								✓								

Relinquished By:
Name: Date:
of: Time:

Received by:
Name: Emily A. Date:
of: Hill Labs Time:

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Job No: 149 0864
Date Recv: 20-Oct-15 11:20
Received by: Natalia Leatua
3114908643

7.9

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
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Hamilton 3240, New Zealand

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Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	AECOM Consulting Services (NZ) Limited	**Lab No:**	1491304	SPv2
Contact:	H Wright	**Date Registered:**	22-Oct-2015	
	C/- AECOM Consulting Services (NZ) Limited	**Date Reported:**	09-Nov-2015	
	PO Box 4479	**Quote No:**		
	CHRISTCHURCH 8051	**Order No:**	60444747	
		Client Reference:	60444747	
		Submitted By:	S McDonald	

Sample Type: Soil

Sample Name:		ETP3 0.2-0.3 20-Oct-2015 2:46 pm	ETP3 1.5-1.9 20-Oct-2015 3:00 pm	ETP14 0.2-0.3 20-Oct-2015 1:00 pm	ETP15 0.7-0.8 20-Oct-2015 12:00 pm	ETP15 1.5-1.6 20-Oct-2015 12:10 pm
Lab Number:		1491304.1	1491304.3	1491304.5	1491304.10	1491304.11
Individual Tests						
Dry Matter	g/100g as rcvd	91	85	79	76	71
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	24	3	8	-	7
Total Recoverable Cadmium	mg/kg dry wt	0.34	< 0.10	< 0.10	-	< 0.10
Total Recoverable Chromium	mg/kg dry wt	23	15	23	-	23
Total Recoverable Copper	mg/kg dry wt	198	15	12	-	9
Total Recoverable Lead	mg/kg dry wt	450	18.2	41	-	24
Total Recoverable Mercury	mg/kg dry wt	16.9	< 0.10	< 0.10	-	0.12
Total Recoverable Nickel	mg/kg dry wt	15	19	18	-	17
Total Recoverable Zinc	mg/kg dry wt	380	57	89	-	77
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	-	-	-	-	< 0.06
Toluene	mg/kg dry wt	-	-	-	-	< 0.06
Ethylbenzene	mg/kg dry wt	-	-	-	-	< 0.06
m&p-Xylene	mg/kg dry wt	-	-	-	-	< 0.12
o-Xylene	mg/kg dry wt	-	-	-	-	< 0.06
Organochlorine Pesticides Trace in Soil						
Aldrin	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
alpha-BHC	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
beta-BHC	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
delta-BHC	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
gamma-BHC (Lindane)	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
cis-Chlordane	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
trans-Chlordane	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
2,4'-DDD	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
4,4'-DDD	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
2,4'-DDE	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
4,4'-DDE	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
2,4'-DDT	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
4,4'-DDT	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Total DDT Isomers	mg/kg dry wt	-	-	< 0.006	< 0.006	-
Dieldrin	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Endosulfan I	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Endosulfan II	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Endosulfan sulphate	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Endrin	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-

Sample Type: Soil						
Sample Name:		ETP3 0.2-0.3 20-Oct-2015 2:46 pm	ETP3 1.5-1.9 20-Oct-2015 3:00 pm	ETP14 0.2-0.3 20-Oct-2015 1:00 pm	ETP15 0.7-0.8 20-Oct-2015 12:00 pm	ETP15 1.5-1.6 20-Oct-2015 12:10 pm
Lab Number:		1491304.1	1491304.3	1491304.5	1491304.10	1491304.11
Organochlorine Pesticides Trace in Soil						
Endrin aldehyde	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Endrin ketone	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Heptachlor	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Heptachlor epoxide	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Hexachlorobenzene	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Methoxychlor	mg/kg dry wt	-	-	< 0.0010	< 0.0010	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	-	< 0.002	< 0.002	-
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Acetochlor	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Alachlor	mg/kg dry wt	-	-	< 0.006	< 0.006	-
Atrazine	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Atrazine-desethyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Atrazine-desisopropyl	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Azaconazole	mg/kg dry wt	-	-	< 0.004	< 0.004	-
Azinphos-methyl	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Benalaxyl	mg/kg dry wt	-	-	< 0.004	< 0.004	-
Bitertanol	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Bromacil	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Bromopropylate	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Butachlor	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Captan	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Carbaryl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Carbofuran	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Chlorfluazuron	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Chlorothalonil	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Chlorpyrifos	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Chlorpyrifos-methyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Chlortoluron	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Cyanazine	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Cyfluthrin	mg/kg dry wt	-	-	< 0.009	< 0.010	-
Cyhalothrin	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Cypermethrin	mg/kg dry wt	-	-	< 0.018	< 0.019	-
Deltamethrin (including Tralomethrin)	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Diazinon	mg/kg dry wt	-	-	< 0.004	< 0.004	-
Dichlofluanid	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Dichloran	mg/kg dry wt	-	-	< 0.03	< 0.03	-
Dichlorvos	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Difenoconazole	mg/kg dry wt	-	-	< 0.011	< 0.011	-
Dimethoate	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Diphenylamine	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Diuron	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Fenpropimorph	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Fluazifop-butyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Fluometuron	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Flusilazole	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Fluvalinate	mg/kg dry wt	-	-	< 0.006	< 0.006	-
Furalaxyl	mg/kg dry wt	-	-	< 0.004	< 0.004	-
Haloxyfop-methyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Hexaconazole	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Hexazinone	mg/kg dry wt	-	-	< 0.004	< 0.004	-
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	mg/kg dry wt	-	-	< 0.04	< 0.04	-
Kresoxim-methyl	mg/kg dry wt	-	-	< 0.004	< 0.004	-

Sample Type: Soil						
Sample Name:		ETP3 0.2-0.3 20-Oct-2015 2:46 pm	ETP3 1.5-1.9 20-Oct-2015 3:00 pm	ETP14 0.2-0.3 20-Oct-2015 1:00 pm	ETP15 0.7-0.8 20-Oct-2015 12:00 pm	ETP15 1.5-1.6 20-Oct-2015 12:10 pm
Lab Number:		1491304.1	1491304.3	1491304.5	1491304.10	1491304.11
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Linuron	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Malathion	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Metalaxyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Methamidophos	mg/kg dry wt	-	-	< 0.04	< 0.04	-
Metolachlor	mg/kg dry wt	-	-	< 0.006	< 0.006	-
Metribuzin	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Molinate	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Myclobutanil	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Naled	mg/kg dry wt	-	-	< 0.04	< 0.04	-
Norflurazon	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Oxadiazon	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Oxyfluorfen	mg/kg dry wt	-	-	< 0.004	< 0.004	-
Paclobutrazol	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Parathion-ethyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Parathion-methyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Pendimethalin	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Permethrin	mg/kg dry wt	-	-	< 0.003	< 0.003	-
Pirimicarb	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Pirimiphos-methyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Prochloraz	mg/kg dry wt	-	-	< 0.04	< 0.04	-
Procymidone	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Prometryn	mg/kg dry wt	-	-	< 0.004	< 0.004	-
Propachlor	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Propanil	mg/kg dry wt	-	-	< 0.03	< 0.03	-
Propazine	mg/kg dry wt	-	-	< 0.004	< 0.004	-
Propiconazole	mg/kg dry wt	-	-	< 0.006	< 0.006	-
Pyriproxyfen	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Quizalofop-ethyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Simazine	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Simetryn	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Sulfentrazone	mg/kg dry wt	-	-	< 0.04	< 0.04	-
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	mg/kg dry wt	-	-	< 0.015	< 0.016	-
Tebuconazole	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Terbacil	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Terbufos	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Terbumeton	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Terbuthylazine	mg/kg dry wt	-	-	< 0.004	< 0.004	-
Terbuthylazine-desethyl	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Terbutryn	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Thiabendazole	mg/kg dry wt	-	-	< 0.04	< 0.04	-
Thiobencarb	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Tolylfluanid	mg/kg dry wt	-	-	< 0.004	< 0.004	-
Triazophos	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Trifluralin	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Vinclozolin	mg/kg dry wt	-	-	< 0.008	< 0.008	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 8	< 8	-	< 10
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	-	< 20
C15 - C36	mg/kg dry wt	210	< 40	< 40	-	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	210	< 70	< 70	-	< 70

Sample Name:		ETP12 0.1-0.2 20-Oct-2015 10:10 am	ETP12 1.0-1.1 20-Oct-2015 11:00 am	ETP5 0.7-0.8 20-Oct-2015 1:50 pm	ETP5 1.5-1.6 20-Oct-2015 2:00 pm	ETP11 0.2-0.3 20-Oct-2015 8:00 am
Lab Number:		1491304.13	1491304.14	1491304.18	1491304.19	1491304.21

Sample Type: Soil						
Sample Name:		ETP12 0.1-0.2 20-Oct-2015 10:10 am	ETP12 1.0-1.1 20-Oct-2015 11:00 am	ETP5 0.7-0.8 20-Oct-2015 1:50 pm	ETP5 1.5-1.6 20-Oct-2015 2:00 pm	ETP11 0.2-0.3 20-Oct-2015 8:00 am
Lab Number:		1491304.13	1491304.14	1491304.18	1491304.19	1491304.21
Individual Tests						
Dry Matter	g/100g as rcvd	83	75	83	73	79
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	-	8	14	8	8
Total Recoverable Cadmium	mg/kg dry wt	-	< 0.10	0.13	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	-	23	17	25	25
Total Recoverable Copper	mg/kg dry wt	-	9	100	11	14
Total Recoverable Lead	mg/kg dry wt	-	22	156	27	30
Total Recoverable Mercury	mg/kg dry wt	-	0.12	0.19	0.12	0.26
Total Recoverable Nickel	mg/kg dry wt	-	17	16	18	18
Total Recoverable Zinc	mg/kg dry wt	-	79	179	84	88
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	-	< 0.06	-	-	-
Toluene	mg/kg dry wt	-	< 0.06	-	-	-
Ethylbenzene	mg/kg dry wt	-	< 0.06	-	-	-
m&p-Xylene	mg/kg dry wt	-	< 0.12	-	-	-
o-Xylene	mg/kg dry wt	-	< 0.06	-	-	-
Organochlorine Pesticides Trace in Soil						
Aldrin	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
alpha-BHC	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
beta-BHC	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
delta-BHC	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
gamma-BHC (Lindane)	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
cis-Chlordane	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
trans-Chlordane	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
2,4'-DDD	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
4,4'-DDD	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
2,4'-DDE	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
4,4'-DDE	mg/kg dry wt	< 0.0010	-	-	-	0.0096
2,4'-DDT	mg/kg dry wt	< 0.0010	-	-	-	0.0012
4,4'-DDT	mg/kg dry wt	0.0021	-	-	-	0.0063
Total DDT Isomers	mg/kg dry wt	< 0.006	-	-	-	0.017
Dieldrin	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Endosulfan I	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Endosulfan II	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Endosulfan sulphate	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Endrin	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Endrin aldehyde	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Endrin ketone	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Heptachlor	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Heptachlor epoxide	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Hexachlorobenzene	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Methoxychlor	mg/kg dry wt	< 0.0010	-	-	-	< 0.0010
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.002	-	-	-	< 0.002
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Acetochlor	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Alachlor	mg/kg dry wt	< 0.006	-	-	-	< 0.006
Atrazine	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Atrazine-desethyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Atrazine-desisopropyl	mg/kg dry wt	< 0.014	-	-	-	< 0.015
Azaconazole	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Azinphos-methyl	mg/kg dry wt	< 0.014	-	-	-	< 0.015
Benalaxyl	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Bitertanol	mg/kg dry wt	< 0.014	-	-	-	< 0.015

Sample Type: Soil						
Sample Name:		ETP12 0.1-0.2 20-Oct-2015 10:10 am	ETP12 1.0-1.1 20-Oct-2015 11:00 am	ETP5 0.7-0.8 20-Oct-2015 1:50 pm	ETP5 1.5-1.6 20-Oct-2015 2:00 pm	ETP11 0.2-0.3 20-Oct-2015 8:00 am
Lab Number:		1491304.13	1491304.14	1491304.18	1491304.19	1491304.21
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Bromacil	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Bromopropylate	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Butachlor	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Captan	mg/kg dry wt	< 0.014	-	-	-	< 0.015
Carbaryl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Carbofuran	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Chlorfluazuron	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Chlorothalonil	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Chlorpyrifos	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Chlorpyrifos-methyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Chlortoluron	mg/kg dry wt	< 0.014	-	-	-	< 0.015
Cyanazine	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Cyfluthrin	mg/kg dry wt	< 0.009	-	-	-	< 0.010
Cyhalothrin	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Cypermethrin	mg/kg dry wt	< 0.017	-	-	-	< 0.019
Deltamethrin (including Tralomethrin)	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Diazinon	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Dichlofluanid	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Dichloran	mg/kg dry wt	< 0.03	-	-	-	< 0.03
Dichlorvos	mg/kg dry wt	< 0.010	-	-	-	< 0.010
Difenoconazole	mg/kg dry wt	< 0.010	-	-	-	< 0.011
Dimethoate	mg/kg dry wt	< 0.014	-	-	-	< 0.015
Diphenylamine	mg/kg dry wt	< 0.014	-	-	-	< 0.015
Diuron	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Fenpropimorph	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Fluazifop-butyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Fluometuron	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Flusilazole	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Fluvalinate	mg/kg dry wt	< 0.006	-	-	-	< 0.006
Furalaxyl	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Haloxyfop-methyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Hexaconazole	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Hexazinone	mg/kg dry wt	< 0.004	-	-	-	< 0.004
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	mg/kg dry wt	< 0.04	-	-	-	< 0.04
Kresoxim-methyl	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Linuron	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Malathion	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Metalaxyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Methamidophos	mg/kg dry wt	< 0.04	-	-	-	< 0.04
Metolachlor	mg/kg dry wt	< 0.006	-	-	-	< 0.006
Metribuzin	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Molinate	mg/kg dry wt	< 0.014	-	-	-	< 0.015
Myclobutanil	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Naled	mg/kg dry wt	< 0.04	-	-	-	< 0.04
Norflurazon	mg/kg dry wt	< 0.014	-	-	-	< 0.015
Oxadiazon	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Oxyfluorfen	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Paclobutrazol	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Parathion-ethyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Parathion-methyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Pendimethalin	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Permethrin	mg/kg dry wt	< 0.003	-	-	-	< 0.003
Pirimicarb	mg/kg dry wt	< 0.007	-	-	-	< 0.008

Sample Type: Soil						
Sample Name:		ETP12 0.1-0.2 20-Oct-2015 10:10 am	ETP12 1.0-1.1 20-Oct-2015 11:00 am	ETP5 0.7-0.8 20-Oct-2015 1:50 pm	ETP5 1.5-1.6 20-Oct-2015 2:00 pm	ETP11 0.2-0.3 20-Oct-2015 8:00 am
Lab Number:		1491304.13	1491304.14	1491304.18	1491304.19	1491304.21
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Pirimiphos-methyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Prochloraz	mg/kg dry wt	< 0.04	-	-	-	< 0.04
Procymidone	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Prometryn	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Propachlor	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Propanil	mg/kg dry wt	< 0.03	-	-	-	< 0.03
Propazine	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Propiconazole	mg/kg dry wt	< 0.006	-	-	-	< 0.006
Pyriproxyfen	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Quizalofop-ethyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Simazine	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Simetryn	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Sulfentrazone	mg/kg dry wt	< 0.04	-	-	-	< 0.04
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	mg/kg dry wt	< 0.014	-	-	-	< 0.015
Tebuconazole	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Terbacil	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Terbufos	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Terbumeton	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Terbuthylazine	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Terbuthylazine-desethyl	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Terbutryn	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Thiabendazole	mg/kg dry wt	< 0.04	-	-	-	< 0.04
Thiobencarb	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Tolylfluanid	mg/kg dry wt	< 0.004	-	-	-	< 0.004
Triazophos	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Trifluralin	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Vinclozolin	mg/kg dry wt	< 0.007	-	-	-	< 0.008
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	< 9	< 8	< 9	< 9
C10 - C14	mg/kg dry wt	-	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	-	< 40	107	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	< 70	107	< 70	< 70

Sample Name:		ETP10 0.2-0.3 20-Oct-2015 8:50 am	ETP10 0.8-0.9 20-Oct-2015 8:55 am	ETP13 0.8-0.9 21-Oct-2015 8:25 am	ETP19 1.8-1.9 21-Oct-2015 9:45 am	ETP22 0.6-0.7 21-Oct-2015 11:00 am
Lab Number:		1491304.24	1491304.25	1491304.29	1491304.34	1491304.37
Individual Tests						
Dry Matter	g/100g as rcvd	83	75	76	71	79
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	-	6	8	6	23
Total Recoverable Cadmium	mg/kg dry wt	-	< 0.10	< 0.10	< 0.10	1.99
Total Recoverable Chromium	mg/kg dry wt	-	23	26	25	42
Total Recoverable Copper	mg/kg dry wt	-	9	11	11	470
Total Recoverable Lead	mg/kg dry wt	-	22	27	26	11,700
Total Recoverable Mercury	mg/kg dry wt	-	< 0.10	0.22	0.19	4.0
Total Recoverable Nickel	mg/kg dry wt	-	17	19	18	47
Total Recoverable Zinc	mg/kg dry wt	-	79	88	85	3,200
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	-	< 0.06	-	-	-
Toluene	mg/kg dry wt	-	< 0.06	-	-	-
Ethylbenzene	mg/kg dry wt	-	< 0.06	-	-	-
m&p-Xylene	mg/kg dry wt	-	< 0.12	-	-	-
o-Xylene	mg/kg dry wt	-	< 0.06	-	-	-

Sample Type: Soil						
Sample Name:		ETP10 0.2-0.3 20-Oct-2015 8:50 am	ETP10 0.8-0.9 20-Oct-2015 8:55 am	ETP13 0.8-0.9 21-Oct-2015 8:25 am	ETP19 1.8-1.9 21-Oct-2015 9:45 am	ETP22 0.6-0.7 21-Oct-2015 11:00 am
Lab Number:		1491304.24	1491304.25	1491304.29	1491304.34	1491304.37
Organochlorine Pesticides Trace in Soil						
Aldrin	mg/kg dry wt	< 0.0010	-	-	-	-
alpha-BHC	mg/kg dry wt	< 0.0010	-	-	-	-
beta-BHC	mg/kg dry wt	< 0.0010	-	-	-	-
delta-BHC	mg/kg dry wt	< 0.0010	-	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.0010	-	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.0010	-	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.0010	-	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.0010	-	-	-	-
4,4'-DDD	mg/kg dry wt	0.0011	-	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.0010	-	-	-	-
4,4'-DDE	mg/kg dry wt	0.0035	-	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.0010	-	-	-	-
4,4'-DDT	mg/kg dry wt	0.0071	-	-	-	-
Total DDT Isomers	mg/kg dry wt	0.012	-	-	-	-
Dieldrin	mg/kg dry wt	< 0.0010	-	-	-	-
Endosulfan I	mg/kg dry wt	< 0.0010	-	-	-	-
Endosulfan II	mg/kg dry wt	< 0.0010	-	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.0010	-	-	-	-
Endrin	mg/kg dry wt	< 0.0010	-	-	-	-
Endrin aldehyde	mg/kg dry wt	< 0.0010	-	-	-	-
Endrin ketone	mg/kg dry wt	< 0.0010	-	-	-	-
Heptachlor	mg/kg dry wt	< 0.0010	-	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.0010	-	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.0010	-	-	-	-
Methoxychlor	mg/kg dry wt	< 0.0010	-	-	-	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.002	-	-	-	-
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Acetochlor	mg/kg dry wt	< 0.008	-	-	-	-
Alachlor	mg/kg dry wt	< 0.006	-	-	-	-
Atrazine	mg/kg dry wt	< 0.008	-	-	-	-
Atrazine-desethyl	mg/kg dry wt	< 0.008	-	-	-	-
Atrazine-desisopropyl	mg/kg dry wt	< 0.015	-	-	-	-
Azaconazole	mg/kg dry wt	< 0.004	-	-	-	-
Azinphos-methyl	mg/kg dry wt	< 0.015	-	-	-	-
Benalaxyl	mg/kg dry wt	< 0.004	-	-	-	-
Bitertanol	mg/kg dry wt	< 0.015	-	-	-	-
Bromacil	mg/kg dry wt	< 0.008	-	-	-	-
Bromopropylate	mg/kg dry wt	< 0.008	-	-	-	-
Butachlor	mg/kg dry wt	< 0.008	-	-	-	-
Captan	mg/kg dry wt	< 0.015	-	-	-	-
Carbaryl	mg/kg dry wt	< 0.008	-	-	-	-
Carbofuran	mg/kg dry wt	< 0.008	-	-	-	-
Chlorfluazuron	mg/kg dry wt	< 0.008	-	-	-	-
Chlorothalonil	mg/kg dry wt	< 0.008	-	-	-	-
Chlorpyrifos	mg/kg dry wt	< 0.008	-	-	-	-
Chlorpyrifos-methyl	mg/kg dry wt	< 0.008	-	-	-	-
Chlortoluron	mg/kg dry wt	< 0.015	-	-	-	-
Cyanazine	mg/kg dry wt	< 0.008	-	-	-	-
Cyfluthrin	mg/kg dry wt	< 0.009	-	-	-	-
Cyhalothrin	mg/kg dry wt	< 0.008	-	-	-	-
Cypermethrin	mg/kg dry wt	< 0.018	-	-	-	-
Deltamethrin (including Tralomethrin)	mg/kg dry wt	< 0.008	-	-	-	-
Diazinon	mg/kg dry wt	< 0.004	-	-	-	-

Sample Type: Soil						
Sample Name:		ETP10 0.2-0.3 20-Oct-2015 8:50 am	ETP10 0.8-0.9 20-Oct-2015 8:55 am	ETP13 0.8-0.9 21-Oct-2015 8:25 am	ETP19 1.8-1.9 21-Oct-2015 9:45 am	ETP22 0.6-0.7 21-Oct-2015 11:00 am
Lab Number:		1491304.24	1491304.25	1491304.29	1491304.34	1491304.37
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Dichlofluanid	mg/kg dry wt	< 0.008	-	-	-	-
Dichloran	mg/kg dry wt	< 0.03	-	-	-	-
Dichlorvos	mg/kg dry wt	< 0.010	-	-	-	-
Difenoconazole	mg/kg dry wt	< 0.010	-	-	-	-
Dimethoate	mg/kg dry wt	< 0.015	-	-	-	-
Diphenylamine	mg/kg dry wt	< 0.015	-	-	-	-
Diuron	mg/kg dry wt	0.021	-	-	-	-
Fenpropimorph	mg/kg dry wt	< 0.008	-	-	-	-
Fluazifop-butyl	mg/kg dry wt	< 0.008	-	-	-	-
Fluometuron	mg/kg dry wt	< 0.008	-	-	-	-
Flusilazole	mg/kg dry wt	< 0.008	-	-	-	-
Fluvalinate	mg/kg dry wt	< 0.006	-	-	-	-
Furalaxyl	mg/kg dry wt	< 0.004	-	-	-	-
Haloxyfop-methyl	mg/kg dry wt	< 0.008	-	-	-	-
Hexaconazole	mg/kg dry wt	< 0.008	-	-	-	-
Hexazinone	mg/kg dry wt	< 0.004	-	-	-	-
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	mg/kg dry wt	< 0.04	-	-	-	-
Kresoxim-methyl	mg/kg dry wt	< 0.004	-	-	-	-
Linuron	mg/kg dry wt	< 0.008	-	-	-	-
Malathion	mg/kg dry wt	< 0.008	-	-	-	-
Metalaxyl	mg/kg dry wt	< 0.008	-	-	-	-
Methamidophos	mg/kg dry wt	< 0.04	-	-	-	-
Metolachlor	mg/kg dry wt	< 0.006	-	-	-	-
Metribuzin	mg/kg dry wt	< 0.008	-	-	-	-
Molinate	mg/kg dry wt	< 0.015	-	-	-	-
Myclobutanil	mg/kg dry wt	< 0.008	-	-	-	-
Naled	mg/kg dry wt	< 0.04	-	-	-	-
Norflurazon	mg/kg dry wt	< 0.015	-	-	-	-
Oxadiazon	mg/kg dry wt	< 0.008	-	-	-	-
Oxyfluorfen	mg/kg dry wt	< 0.004	-	-	-	-
Paclobutrazol	mg/kg dry wt	< 0.008	-	-	-	-
Parathion-ethyl	mg/kg dry wt	< 0.008	-	-	-	-
Parathion-methyl	mg/kg dry wt	< 0.008	-	-	-	-
Pendimethalin	mg/kg dry wt	< 0.008	-	-	-	-
Permethrin	mg/kg dry wt	< 0.003	-	-	-	-
Pirimicarb	mg/kg dry wt	< 0.008	-	-	-	-
Pirimiphos-methyl	mg/kg dry wt	< 0.008	-	-	-	-
Prochloraz	mg/kg dry wt	< 0.04	-	-	-	-
Procymidone	mg/kg dry wt	< 0.008	-	-	-	-
Prometryn	mg/kg dry wt	< 0.004	-	-	-	-
Propachlor	mg/kg dry wt	< 0.008	-	-	-	-
Propanil	mg/kg dry wt	< 0.03	-	-	-	-
Propazine	mg/kg dry wt	< 0.004	-	-	-	-
Propiconazole	mg/kg dry wt	< 0.006	-	-	-	-
Pyriproxyfen	mg/kg dry wt	< 0.008	-	-	-	-
Quizalofop-ethyl	mg/kg dry wt	< 0.008	-	-	-	-
Simazine	mg/kg dry wt	< 0.008	-	-	-	-
Simetryn	mg/kg dry wt	< 0.008	-	-	-	-
Sulfentrazone	mg/kg dry wt	< 0.04	-	-	-	-
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	mg/kg dry wt	< 0.015	-	-	-	-
Tebuconazole	mg/kg dry wt	< 0.008	-	-	-	-
Terbacil	mg/kg dry wt	< 0.008	-	-	-	-
Terbufos	mg/kg dry wt	< 0.008	-	-	-	-

Sample Type: Soil						
Sample Name:		ETP10 0.2-0.3 20-Oct-2015 8:50 am	ETP10 0.8-0.9 20-Oct-2015 8:55 am	ETP13 0.8-0.9 21-Oct-2015 8:25 am	ETP19 1.8-1.9 21-Oct-2015 9:45 am	ETP22 0.6-0.7 21-Oct-2015 11:00 am
Lab Number:		1491304.24	1491304.25	1491304.29	1491304.34	1491304.37
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Terbumeton	mg/kg dry wt	< 0.008	-	-	-	-
Terbuthylazine	mg/kg dry wt	< 0.004	-	-	-	-
Terbuthylazine-desethyl	mg/kg dry wt	< 0.008	-	-	-	-
Terbutryn	mg/kg dry wt	< 0.008	-	-	-	-
Thiabendazole	mg/kg dry wt	< 0.04	-	-	-	-
Thiobencarb	mg/kg dry wt	< 0.008	-	-	-	-
Tolylfluanid	mg/kg dry wt	< 0.004	-	-	-	-
Triazophos	mg/kg dry wt	< 0.008	-	-	-	-
Trifluralin	mg/kg dry wt	< 0.008	-	-	-	-
Vinclozolin	mg/kg dry wt	< 0.008	-	-	-	-
Pentachlorophenol Screening in Soil by LCMSMS						
Pentachlorophenol (PCP)	mg/kg dry wt	-	-	< 0.05	-	-
2,3,4,6-Tetrachlorophenol (TCP)	mg/kg dry wt	-	-	< 0.05	-	-
Tributyl Tin Trace in Soil samples by GCMS						
Dibutyltin (as Sn)	mg/kg dry wt	-	-	-	-	< 0.005
Monobutyltin (as Sn)	mg/kg dry wt	-	-	-	-	< 0.007
Tributyltin (as Sn)	mg/kg dry wt	-	-	-	-	< 0.004
Triphenyltin (as Sn)	mg/kg dry wt	-	-	-	-	< 0.003
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	< 9	< 9	< 9	< 9
C10 - C14	mg/kg dry wt	-	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	-	< 40	< 40	< 40	410
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	< 70	< 70	< 70	410

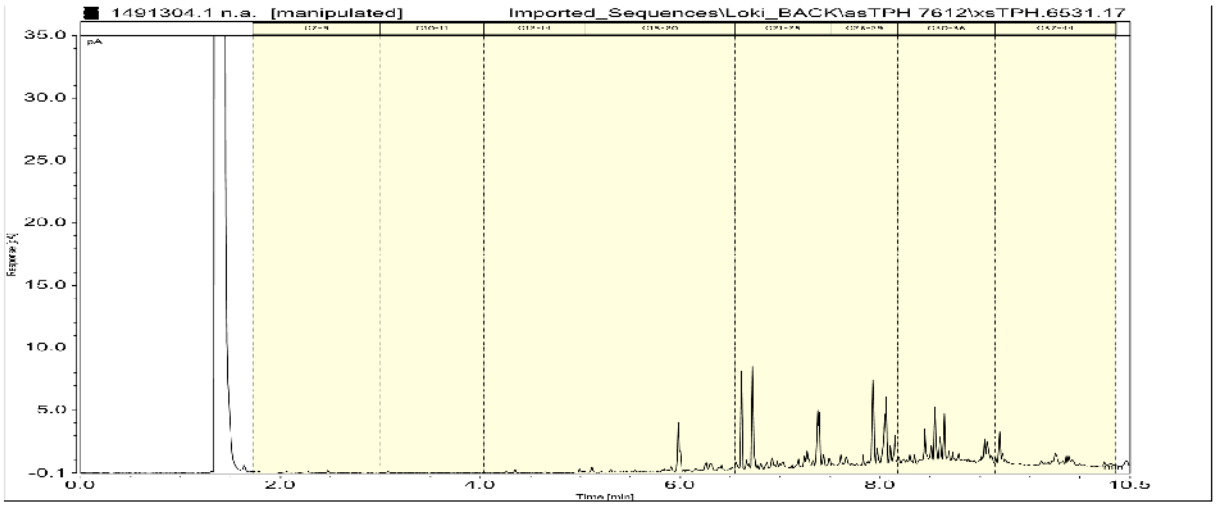
Sample Name:		ETP16 0.2 20-Oct-2015 4:45 pm	ETP17 0.2 20-Oct-2015 4:00 pm	ETP17 2.2 20-Oct-2015 4:00 pm		
Lab Number:		1491304.38	1491304.42	1491304.44		
Individual Tests						
Dry Matter	g/100g as rcvd	88	88	68	-	-
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	6	-	8	-	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	-	< 0.10	-	-
Total Recoverable Chromium	mg/kg dry wt	19	-	23	-	-
Total Recoverable Copper	mg/kg dry wt	10	-	12	-	-
Total Recoverable Lead	mg/kg dry wt	28	-	27	-	-
Total Recoverable Mercury	mg/kg dry wt	0.15	-	< 0.10	-	-
Total Recoverable Nickel	mg/kg dry wt	14	-	18	-	-
Total Recoverable Zinc	mg/kg dry wt	72	-	80	-	-
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	-	-	< 0.07	-	-
Toluene	mg/kg dry wt	-	-	< 0.07	-	-
Ethylbenzene	mg/kg dry wt	-	-	< 0.07	-	-
m&p-Xylene	mg/kg dry wt	-	-	< 0.13	-	-
o-Xylene	mg/kg dry wt	-	-	< 0.07	-	-
Organochlorine Pesticides Trace in Soil						
Aldrin	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-
alpha-BHC	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-
beta-BHC	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-
delta-BHC	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.0010	0.005	-	-	-
4,4'-DDD	mg/kg dry wt	0.0024	0.011	-	-	-

Sample Type: Soil							
Sample Name:		ETP16 0.2 20-Oct-2015 4:45 pm	ETP17 0.2 20-Oct-2015 4:00 pm	ETP17 2.2 20-Oct-2015 4:00 pm			
Lab Number:		1491304.38	1491304.42	1491304.44			
Organochlorine Pesticides Trace in Soil							
2,4'-DDE	mg/kg dry wt	< 0.0010	0.011	-	-	-	
4,4'-DDE	mg/kg dry wt	0.131	1.52	-	-	-	
2,4'-DDT	mg/kg dry wt	0.0089	0.159	-	-	-	
4,4'-DDT	mg/kg dry wt	0.093	0.59	-	-	-	
Total DDT Isomers	mg/kg dry wt	0.24	2.3	-	-	-	
Dieldrin	mg/kg dry wt	< 0.0010	< 0.002	-	-	-	
Endosulfan I	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Endosulfan II	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Endosulfan sulphate	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Endrin	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Endrin aldehyde	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Endrin ketone	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Heptachlor	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Heptachlor epoxide	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Hexachlorobenzene	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Methoxychlor	mg/kg dry wt	< 0.0010	< 0.0010	-	-	-	
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.002	< 0.002	-	-	-	
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS							
Acetochlor	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Alachlor	mg/kg dry wt	< 0.006	< 0.006	-	-	-	
Atrazine	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Atrazine-desethyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Atrazine-desisopropyl	mg/kg dry wt	< 0.014	< 0.014	-	-	-	
Azaconazole	mg/kg dry wt	< 0.004	< 0.004	-	-	-	
Azinphos-methyl	mg/kg dry wt	< 0.014	< 0.014	-	-	-	
Benalaxyl	mg/kg dry wt	< 0.004	< 0.004	-	-	-	
Bitertanol	mg/kg dry wt	< 0.014	< 0.014	-	-	-	
Bromacil	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Bromopropylate	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Butachlor	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Captan	mg/kg dry wt	< 0.014	< 0.014	-	-	-	
Carbaryl	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Carbofuran	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Chlorfluazuron	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Chlorothalonil	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Chlorpyrifos	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Chlorpyrifos-methyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Chlortoluron	mg/kg dry wt	< 0.014	< 0.014	-	-	-	
Cyanazine	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Cyfluthrin	mg/kg dry wt	< 0.009	< 0.009	-	-	-	
Cyhalothrin	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Cypermethrin	mg/kg dry wt	< 0.017	< 0.017	-	-	-	
Deltamethrin (including Tralomethrin)	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Diazinon	mg/kg dry wt	< 0.004	< 0.004	-	-	-	
Dichlofluanid	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Dichloran	mg/kg dry wt	< 0.03	< 0.03	-	-	-	
Dichlorvos	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Difenoconazole	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Dimethoate	mg/kg dry wt	< 0.014	< 0.014	-	-	-	
Diphenylamine	mg/kg dry wt	< 0.014	< 0.014	-	-	-	
Diuron	mg/kg dry wt	< 0.007	0.010	-	-	-	
Fenpropimorph	mg/kg dry wt	< 0.007	< 0.007	-	-	-	
Fluazifop-butyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-	

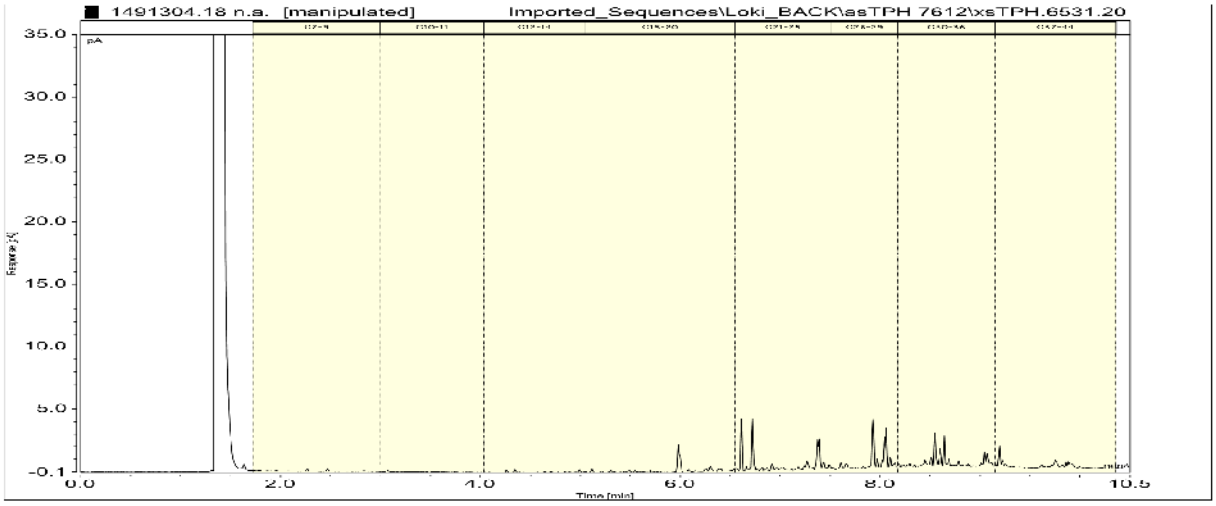
Sample Type: Soil						
Sample Name:		ETP16 0.2 20-Oct-2015 4:45 pm	ETP17 0.2 20-Oct-2015 4:00 pm	ETP17 2.2 20-Oct-2015 4:00 pm		
Lab Number:		1491304.38	1491304.42	1491304.44		
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Fluometuron	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Flusilazole	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Fluvalinate	mg/kg dry wt	< 0.006	< 0.006	-	-	-
Furalaxyl	mg/kg dry wt	< 0.004	< 0.004	-	-	-
Haloxyfop-methyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Hexaconazole	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Hexazinone	mg/kg dry wt	< 0.004	< 0.004	-	-	-
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	mg/kg dry wt	< 0.04	< 0.04	-	-	-
Kresoxim-methyl	mg/kg dry wt	< 0.004	< 0.004	-	-	-
Linuron	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Malathion	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Metalaxyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Methamidophos	mg/kg dry wt	< 0.04	< 0.04	-	-	-
Metolachlor	mg/kg dry wt	< 0.006	< 0.006	-	-	-
Metribuzin	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Molinate	mg/kg dry wt	< 0.014	< 0.014	-	-	-
Myclobutanil	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Naled	mg/kg dry wt	< 0.04	< 0.04	-	-	-
Norflurazon	mg/kg dry wt	< 0.014	< 0.014	-	-	-
Oxadiazon	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Oxyfluorfen	mg/kg dry wt	< 0.004	< 0.004	-	-	-
Paclobutrazol	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Parathion-ethyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Parathion-methyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Pendimethalin	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Permethrin	mg/kg dry wt	< 0.003	< 0.003	-	-	-
Pirimicarb	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Pirimiphos-methyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Prochloraz	mg/kg dry wt	< 0.04	< 0.04	-	-	-
Procymidone	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Prometryn	mg/kg dry wt	< 0.004	< 0.004	-	-	-
Propachlor	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Propanil	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Propazine	mg/kg dry wt	< 0.004	< 0.004	-	-	-
Propiconazole	mg/kg dry wt	< 0.006	< 0.006	-	-	-
Pyriproxyfen	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Quizalofop-ethyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Simazine	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Simetryn	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Sulfentrazone	mg/kg dry wt	< 0.04	< 0.04	-	-	-
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	mg/kg dry wt	< 0.014	< 0.014	-	-	-
Tebuconazole	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Terbacil	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Terbufos	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Terbumeton	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Terbuthylazine	mg/kg dry wt	< 0.004	< 0.004	-	-	-
Terbuthylazine-desethyl	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Terbutryn	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Thiabendazole	mg/kg dry wt	< 0.04	< 0.04	-	-	-
Thiobencarb	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Tolylfluanid	mg/kg dry wt	< 0.004	< 0.004	-	-	-
Triazophos	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Trifluralin	mg/kg dry wt	< 0.007	< 0.007	-	-	-

Sample Type: Soil						
Sample Name:		ETP16 0.2 20-Oct-2015 4:45 pm	ETP17 0.2 20-Oct-2015 4:00 pm	ETP17 2.2 20-Oct-2015 4:00 pm		
Lab Number:		1491304.38	1491304.42	1491304.44		
Organonitro&phosphorus Pesticides Trace in MR Soil by GCMS						
Vinclozolin	mg/kg dry wt	< 0.007	< 0.007	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Acenaphthene	mg/kg dry wt	-	< 0.03	-	-	-
Acenaphthylene	mg/kg dry wt	-	0.24	-	-	-
Anthracene	mg/kg dry wt	-	0.34	-	-	-
Benzo[a]anthracene	mg/kg dry wt	-	3.9	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	6.0	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	7.2	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	-	4.5	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	-	2.7	-	-	-
Chrysene	mg/kg dry wt	-	3.9	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	-	0.90	-	-	-
Fluoranthene	mg/kg dry wt	-	7.2	-	-	-
Fluorene	mg/kg dry wt	-	0.05	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	4.7	-	-	-
Naphthalene	mg/kg dry wt	-	0.14	-	-	-
Phenanthrene	mg/kg dry wt	-	1.91	-	-	-
Pyrene	mg/kg dry wt	-	6.7	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	-	< 10	-	-
C10 - C14	mg/kg dry wt	< 20	-	< 20	-	-
C15 - C36	mg/kg dry wt	42	-	< 40	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	-	< 70	-	-

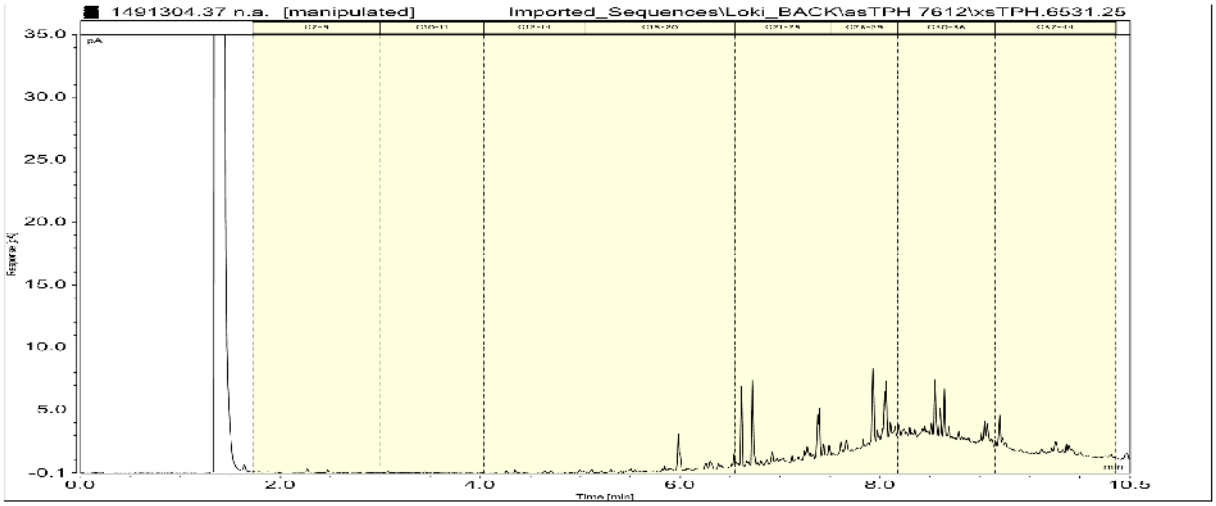
1491304.1
ETP3 0.2-0.3 20-Oct-2015 2:46 pm
Client Chromatogram for TPH by FID



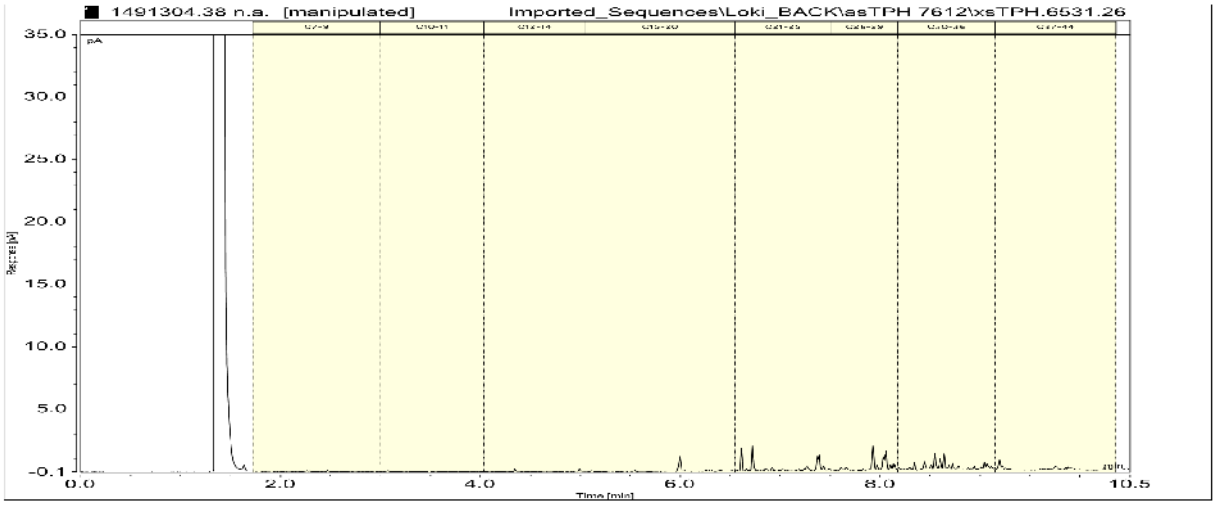
1491304.18
ETP5 0.7-0.8 20-Oct-2015 1:50 pm
Client Chromatogram for TPH by FID



1491304.37
ETP22 0.6-0.7 21-Oct-2015 11:00 am
Client Chromatogram for TPH by FID



1491304.38
ETP16 0.2 20-Oct-2015 4:45 pm
Client Chromatogram for TPH by FID



Analyst's Comments

It has been noted that the method performance for Iprodione for ONOP analysis is not acceptable therefore we are unable to report this compound at this present time.

Appendix No.1 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1, 3, 5, 11, 14, 18-19, 21, 25, 29, 34, 37-38, 44
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	1, 3, 5, 11, 14, 18-19, 21, 25, 29, 34, 37-38, 44
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	11, 14, 25, 44
Organochlorine/nitro&phosphorus Pest.s Trace in Soils, GC-MS	Sonication extraction, GPC cleanup, GC-MS analysis. Tested on as received sample	0.0010 - 0.03 mg/kg dry wt	5, 10, 13, 21, 24, 38, 42
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	0.010 - 0.05 mg/kg dry wt	42
Pentachlorophenol Screening in Soil by LCMSMS	Solvent extraction with sonication, dilution, analysis by LCMSMS with online SPE. Tested on dried sample	0.010 mg/kg dry wt	29
Tributyl Tin Trace in Soil samples by GCMS	Solvent extraction, ethylation, SPE cleanup, GC-MS SIM analysis. Tested on dried sample	0.003 - 0.007 mg/kg dry wt	37
Total Petroleum Hydrocarbons in Soil*	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1, 3, 5, 11, 14, 18-19, 21, 25, 29, 34, 37-38, 44
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1, 3, 5, 10-11, 13-14, 18-19, 21, 24-25, 29, 34, 37-38, 42, 44
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1, 3, 5, 11, 14, 18-19, 21, 25, 29, 34, 37-38, 44

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

2/5

Job No: **1491304**

Date Recv: 21-Oct-15 08:02

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limi
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zea

Received by: Natalia Leatua

3114913047

Job Information Summary

Client:	AECOM Consulting Services (NZ) Limited	**Lab No:**	1491304
Contact:	H Wright	**Date Registered:**	22-Oct-2015 8:41 am
	C/- AECOM Consulting Services (NZ) Limited	**Priority:**	Normal
	PO Box 4479	**Quote No:**	
	CHRISTCHURCH 8051	**Order No:**	60444747
		Client Reference:	60444747
		Add. Client Ref:	
		Submitted By:	S McDonald
		Charge To:	AECOM New Zealand Limited
		Target Date:	27-Oct-2015 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	ETP3 0.2-0.3 20-Oct-2015 2:46 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen)
2	ETP3 0.8-0.9 20-Oct-2015 2:45 pm	Soil	GSoil300, GSoil30(	Hold Cold
3	ETP3 1.5-1.9 20-Oct-2015 3:00 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen)
4	ETP3 2.6-2.7 20-Oct-2015 3:00 pm	Soil	GSoil300, GSoil30(	Hold Cold
5	ETP14 0.2-0.3 20-Oct-2015 1:00 pm	Soil	cGSoil, cGSoil	~~Hold Cold~~ TPH, HM+Hg(Screen), ONOP & OCP(Trace)
6	ETP14 1.3 20-Oct-2015 1:10 pm	Soil	cGSoil, cGSoil	Hold Cold
7	ETP14 2.4 20-Oct-2015 1:10 pm	Soil	GSoil300, cGSoil	Hold Cold
8	ETP14 3 20-Oct-2015 1:10 pm	Soil	GSoil300, cGSoil	Hold Cold
9	ETP15 0.2-0.3 20-Oct-2015 12:00 pm	Soil	GSoil300, cGSoil	Hold Cold
10	ETP15 0.7-0.8 20-Oct-2015 12:00 pm	Soil	GSoil300, cGSoil	~~Hold Cold~~ ONOP & OCP (Trace)
11	ETP15 1.5-1.6 20-Oct-2015 12:10 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen), BTEX
12	ETP15 20-Oct-2015 12:30 pm	Soil	GSoil300, GSoil30(	Hold Cold
13	ETP12 0.1-0.2 20-Oct-2015 10:10 am	Soil	cGSoil, cGSoil	~~Hold Cold~~ ONOP & OCP (Trace)
14	ETP12 1.0-1.1 20-Oct-2015 11:00 am	Soil	cGSoil, cGSoil	~~Hold Cold~~ TPH, HM+Hg(Screen), BTEX
15	ETP12 1.8-1.9 20-Oct-2015 11:15 am	Soil	GSoil300, cGSoil	Hold Cold
16	ETP12 2.7-2.8 20-Oct-2015 11:25 am	Soil	cGSoil, cGSoil	Hold Cold
17	ETP5 0.2-0.3 20-Oct-2015 1:38 pm	Soil	GSoil300, cGSoil	Hold Cold
18	ETP5 0.7-0.8 20-Oct-2015 1:50 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen)
19	ETP5 1.5-1.6 20-Oct-2015 2:00 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen)
20	ETP5 2.8 20-Oct-2015 2:10 pm	Soil	GSoil300, GSoil30(	Hold Cold
21	ETP11 0.2-0.3 20-Oct-2015 8:00 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen), ONOP & OCP(Trace)
22	ETP11 0.9-1.0 20-Oct-2015 8:10 am	Soil	cGSoil, cGSoil	Hold Cold
23	ETP11 2.0-2.1 20-Oct-2015 9:30 am	Soil	cGSoil, cGSoil	Hold Cold
24	ETP10 0.2-0.3 20-Oct-2015 8:50 am	Soil	cGSoil, cGSoil	~~Hold Cold~~ ONOP & OCP (Trace)
25	ETP10 0.8-0.9 20-Oct-2015 8:55 am	Soil	GSoil300, cGSoil	~~Hold Cold~~ TPH, HM+Hg(Screen), BTEX
26	ETP10 1.8 20-Oct-2015 9:00 am	Soil	cGSoil, cGSoil	Hold Cold
27	ETP10 3.0 20-Oct-2015 9:15 am	Soil	GSoil300, cGSoil	Hold Cold
28	ETP13 0.1-0.2 21-Oct-2015 8:15 am	Soil	GSoil300, cGSoil	Hold Cold

Is this ETP15 2.8-2.9 ?

5/5

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
29	ETP13 0.8-0.9 21-Oct-2015 8:25 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen), PCP(Trace)
30	ETP13 1.7-1.8 21-Oct-2015 8:45 am	Soil	GSoil300, GSoil30(	Hold Cold
31	ETP13 2.9-3.0 21-Oct-2015 8:50 am	Soil	GSoil300, GSoil30(	Hold Cold
32	ETP19 0.2-0.3 21-Oct-2015 9:30 am	Soil	GSoil300, GSoil30(	Hold Cold
33	ETP 0.9-1.0 21-Oct-2015 9:40 am	Soil	GSoil300, GSoil30(	Hold Cold
34	ETP19 1.8-1.9 21-Oct-2015 9:45 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen)
35	ETP19 2.8-2.9 21-Oct-2015 9:50 am	Soil	GSoil300, GSoil30(	Hold Cold
36	ETP22 0.2-0.3 21-Oct-2015 10:20 am	Soil	GSoil300, GSoil30(	Hold Cold
37	ETP22 0.6-0.7 21-Oct-2015 11:00 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen), TBT(Trace)
38	ETP16 0.2 20-Oct-2015 4:45 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen), ONOP OCP (Trace)
39	ETP16 1.1 20-Oct-2015 4:45 pm	Soil	GSoil300, GSoil30(	Hold Cold
40	ETP16 1.9 20-Oct-2015 4:50 pm	Soil	GSoil300, GSoil30(	Hold Cold
41	ETP16 3.2-3.3 20-Oct-2015 4:50 pm	Soil	GSoil300, GSoil30(	Hold Cold
42	ETP17 0.2 20-Oct-2015 4:00 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ ONOP & OCP (Trace)
43	ETP17 1.0-1.1 20-Oct-2015 4:00 pm	Soil	GSoil300	Hold Cold
44	ETP17 2.2 20-Oct-2015 4:00 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM+Hg(Screen), BTEX
45	ETP17 2.7-2.8 20-Oct-2015 4:10 pm	Soil	GSoil300, GSoil30(	Hold Cold
46	ETP15 1-1.1 20-Oct-2015 4:00 pm	Soil	cGSoil	Hold Cold

IS. this ETP19 ?

3114913047

Received by: Natalia Leatua

Job No: 149 1304

Date Recv: 21-Oct-15 08:02

Form:

Chain of Custody & Analysis Request Form

AECOM - Christchurch
PO Box 710
Christchurch 8140

Phone: 03 966 6119
Fax: 03 966 6001
Email: hannah.wright@aecom.com

Laboratory Details

Lab. Name: R J Hill Laboratories Ltd
Lab. Address: 1 Clyde St, Hamilton
Contact Name: Jean Connick
Lab. Ref:

Tel: 07 858 2000
Fax: 07 858 2001
Preliminary Report by:
Final Report by:
Lab Quote No:

Project Name:

Project Number: 60444747

Purchase Order Number:

Sample collected by: Scott McDonald

Sample Results to be returned to: Hannah Wright of AECOM Consulting Services

Specifications:

	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days)	☐ Yes	☐ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☐ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☐ N/A
4. Special storage requirements?	☐ Yes	☐ No	☐ N/A
5. Preservation requirements?	☐ Yes	☐ No	☐ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☐ N/A

7. Report Format: Email: hannah.wright@aecom.com 8. Project Manager: H Wright tel: 03 966 6119

Lab. ID	Sample ID	Sampling Date & time (on)	Sampling Date & Time (off)	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)
ETP15	1.5-1.6			✓							
ETP15	2.8-2.9			✓							
ETP12	0.1-1.1			✓							
ETP12	1-1.1			✓							
ETP12	1.8-1.9			✓							
ETP12	2.7-2.8			✓							
ETP5	0.2-0.3			✓							
ETP5	0.8			✓							
ETP5	1.5-1.6			✓							
ETP5	2.8			✓							

Analysis Request

Hold Cold	Heavy Metals + Mercury (SCREEN)	TPH (oil Industry)	BTEX (oil industry)	PCP (TRACE)	TBT (TRACE	ONOP (TRACE)	OCPs (TRACE)	Remarks & comments
✓								
✓								
✓								
✓								
✓								
✓								
✓								
✓								
✓								
✓								

Relinquished By:

Name: Date:
of: Time:

Received by:

Name: Net
of: Hill Labs
Date: 21/10
Time: 0800

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled? 12.9°C	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Form:

AECOM

Chain of Custody & Analysis Request Form

AECOM - Christchurch
PO Box 710
Christchurch 8140
Phone: 03 966 6119
Fax: 03 966 6001
Email: hannah.wright@aecom.com

Laboratory Details
Lab. Name: R J Hill Laboratories Ltd
Lab. Address: 1 Clyde St, Hamilton
Contact Name: Jean Connick
Lab. Ref:
Tel: 07 858 2000
Fax: 07 858 2001
Preliminary Report by:
Final Report by:
Lab Quote No:

Project Name:
Project Number: 60444747
Purchase Order Number:

Sample collected by: Scott McDonald
Sample Results to be returned to: Hannah Wright of AECOM Consulting Services

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days)	☐ Yes	☐ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☐ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☐ N/A
4. Special storage requirements?	☐ Yes	☐ No	☐ N/A
5. Preservation requirements?	☐ Yes	☐ No	☐ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☐ N/A
7. Report Format: Email: hannah.wright@aecom.com	8. Project Manager: H Wright		tel: 03 966 6119

Lab. ID	Sample ID	Sampling Date & time (on)	Sampling Date & Time (off)	Matrix: soil	water	other	Preservation: filt'ed	acid	ice	other	Container (No. & type)	Hold Cold	Heavy Metals + Mercury (SCREEN)	TPH (oil Industry)	BTEX (oil industry)	PCP (TRACE)	TBT (TRACE	ONOP (TRACE)	OCPs (TRACE)	Remarks & comments
ETP3	0.2-0.3											✓								
ETP3	0.8-0.9											✓								
ETP3	1.5-1.9											✓								
ETP3	2.6-2.7											✓								
ETP14	0.4-0.3											✓								
ETP14	1.3											✓								
ETP14	2.4											✓								
ETP14	3											✓								
ETP15	0.2											✓								
ETP5	0.7-0.8											✓								

Relinquished By:
Name: Date:
of: Time:

Received by:
Name: Date:
of: Time:

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ P
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

3114913047

Job No: 149 1304
Date Recv: 21-Oct-15 08:02
Received by: Natalia Leatua

Environment

B

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	AECOM Consulting Services (NZ) Limited	**Lab No:**	1492225	SPv1
Contact:	H Wright	**Date Registered:**	23-Oct-2015	
	C/- AECOM Consulting Services (NZ) Limited	**Date Reported:**	04-Nov-2015	
	PO Box 4479	**Quote No:**		
	CHRISTCHURCH 8051	**Order No:**	60444747	
		Client Reference:	60444747	
		Submitted By:	S McDonald	

Sample Type: Soil

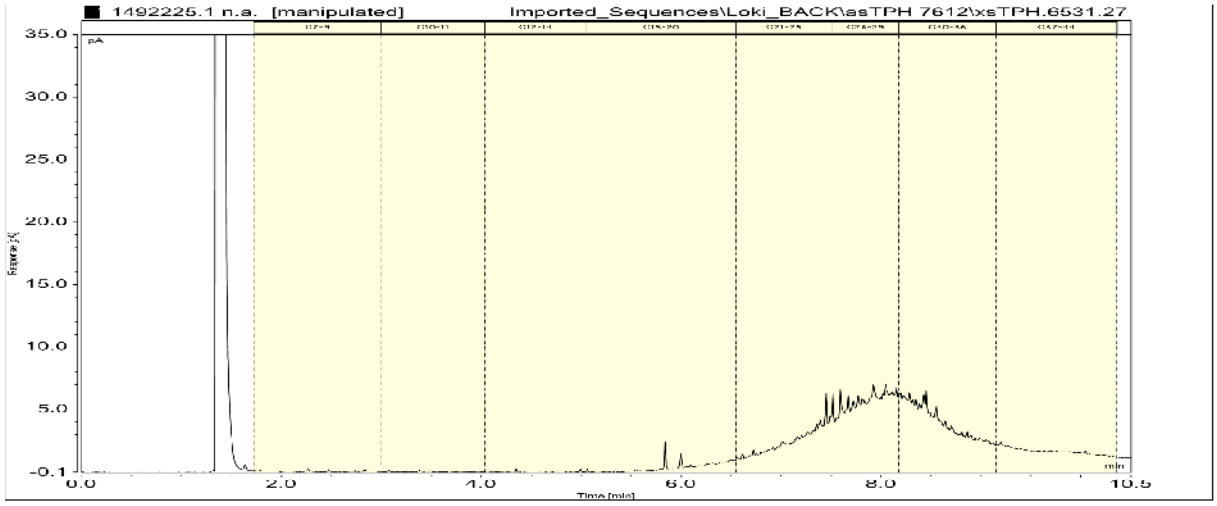
Sample Name:		ETP26_0.2-0.3 22-Oct-2015 12:50 pm	ETP26_0.8-0.9 22-Oct-2015 1:05 pm	ETP25_0.1-0.2 22-Oct-2015 11:30 am	ETP25_1.8-1.9 22-Oct-2015 12:00 pm	ETP24_0.7-0.8 22-Oct-2015 10:30 am
Lab Number:		1492225.1	1492225.2	1492225.3	1492225.5	1492225.8
Individual Tests						
Dry Matter	g/100g as rcvd	91	83	84	69	90
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	7	5	5	5	6
Total Recoverable Cadmium	mg/kg dry wt	0.18	0.23	0.20	< 0.10	0.20
Total Recoverable Chromium	mg/kg dry wt	19	10	15	24	15
Total Recoverable Copper	mg/kg dry wt	590	91	29	8	32
Total Recoverable Lead	mg/kg dry wt	29	35	87	23	58
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	0.14
Total Recoverable Nickel	mg/kg dry wt	20	22	19	18	16
Total Recoverable Zinc	mg/kg dry wt	250	112	122	79	106
Tributyl Tin Trace in Soil samples by GCMS						
Dibutyltin (as Sn)	mg/kg dry wt	-	0.26	-	-	-
Monobutyltin (as Sn)	mg/kg dry wt	-	0.081	-	-	-
Tributyltin (as Sn)	mg/kg dry wt	-	1.03	-	-	-
Triphenyltin (as Sn)	mg/kg dry wt	-	< 0.003	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 8	< 8	< 10	< 8
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	156	< 20
C15 - C36	mg/kg dry wt	570	240	< 40	310	210
Total hydrocarbons (C7 - C36)	mg/kg dry wt	570	240	< 70	470	210

Sample Name:		ETP24_2.0-2.1 22-Oct-2015 10:30 am	ETP23_0.8-0.9 22-Oct-2015 9:20 am	ETP23_1.2 22-Oct-2015 9:30 am	ETP08_0.2-0.3 22-Oct-2015 7:50 am	ETP08_1.8-1.9 22-Oct-2015 8:10 am
Lab Number:		1492225.9	1492225.11	1492225.12	1492225.14	1492225.16
Individual Tests						
Dry Matter	g/100g as rcvd	71	89	59	93	74
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	7	3	17	< 2	6
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.22	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	22	8	8	10	20
Total Recoverable Copper	mg/kg dry wt	8	43	27	108 #1	6
Total Recoverable Lead	mg/kg dry wt	21	11.1	34	16.6 #1	18.6
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	0.11	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	15	27	12	27	13
Total Recoverable Zinc	mg/kg dry wt	71	81	50	83	61
Pentachlorophenol Screening in Soil by LCMSMS						

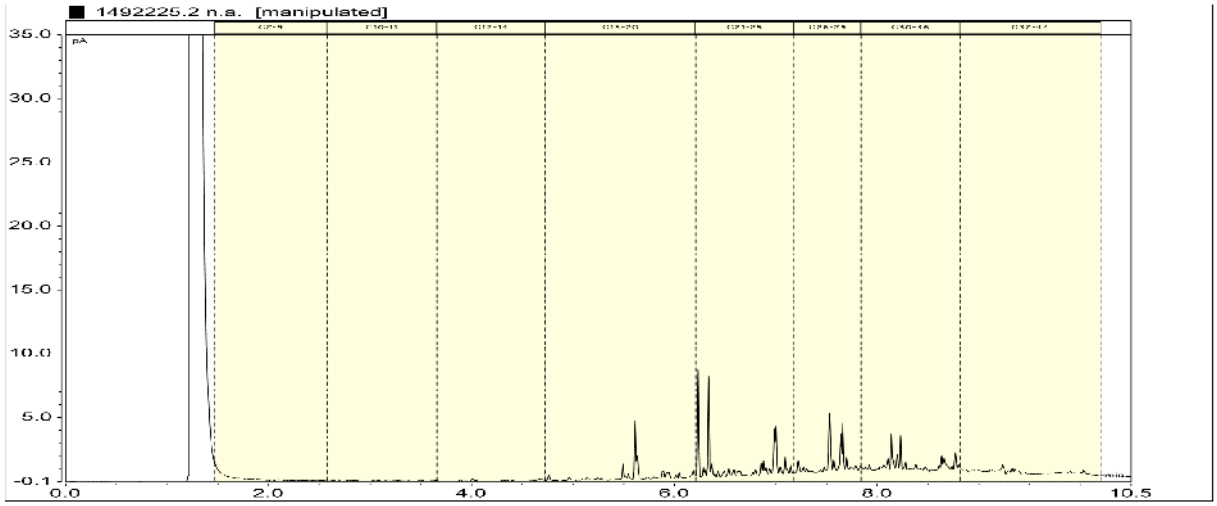
Sample Type: Soil						
Sample Name:		ETP24_2.0-2.1 22-Oct-2015 10:30 am	ETP23_0.8-0.9 22-Oct-2015 9:20 am	ETP23_1.2 22-Oct-2015 9:30 am	ETP08_0.2-0.3 22-Oct-2015 7:50 am	ETP08_1.8-1.9 22-Oct-2015 8:10 am
Lab Number:		1492225.9	1492225.11	1492225.12	1492225.14	1492225.16
Pentachlorophenol Screening in Soil by LCMSMS						
Pentachlorophenol (PCP)	mg/kg dry wt	< 0.05	-	-	-	-
2,3,4,6-Tetrachlorophenol (TCP)	mg/kg dry wt	< 0.05	-	-	-	-
Tributyl Tin Trace in Soil samples by GCMS						
Dibutyltin (as Sn)	mg/kg dry wt	-	-	-	0.011	-
Monobutyltin (as Sn)	mg/kg dry wt	-	-	-	0.008	-
Tributyltin (as Sn)	mg/kg dry wt	-	-	-	0.018	-
Triphenyltin (as Sn)	mg/kg dry wt	-	-	-	< 0.003	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 10	< 8	20	< 8	< 9
C10 - C14	mg/kg dry wt	< 20	< 20	1,040	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	67,000	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	68,000	< 70	< 70

Sample Name:		ETP20_0.7-0.8 21-Oct-2015 1:35 pm	ETP18_0.8-0.9 21-Oct-2015 2:40 pm	ETP09_1.1-1.2 21-Oct-2015 4:15 pm	ETP21_0.1-0.2 21-Oct-2015 11:55 am	ETP22_2.6-2.7 21-Oct-2015 11:25 am
Lab Number:		1492225.19	1492225.23	1492225.26	1492225.28	1492225.32
Individual Tests						
Dry Matter	g/100g as rcvd	86	79	73	92	66
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	3	7	7	18	7
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	3.8	< 0.10
Total Recoverable Chromium	mg/kg dry wt	13	24	22	22	23
Total Recoverable Copper	mg/kg dry wt	6	11	9	230	10
Total Recoverable Lead	mg/kg dry wt	12.9	27	23	650	26
Total Recoverable Mercury	mg/kg dry wt	< 0.10	0.42	< 0.10	4.3	0.15
Total Recoverable Nickel	mg/kg dry wt	8	17	16	27	17
Total Recoverable Zinc	mg/kg dry wt	45	83	80	2,500	82
Pentachlorophenol Screening in Soil by LCMSMS						
Pentachlorophenol (PCP)	mg/kg dry wt	-	< 0.05	-	-	-
2,3,4,6-Tetrachlorophenol (TCP)	mg/kg dry wt	-	< 0.05	-	-	-
Tributyl Tin Trace in Soil samples by GCMS						
Dibutyltin (as Sn)	mg/kg dry wt	-	-	< 0.005	-	-
Monobutyltin (as Sn)	mg/kg dry wt	-	-	< 0.007	-	-
Tributyltin (as Sn)	mg/kg dry wt	-	-	< 0.004	-	-
Triphenyltin (as Sn)	mg/kg dry wt	-	-	< 0.003	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 9	< 9	< 8	< 10
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	970	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	< 70	970	< 70

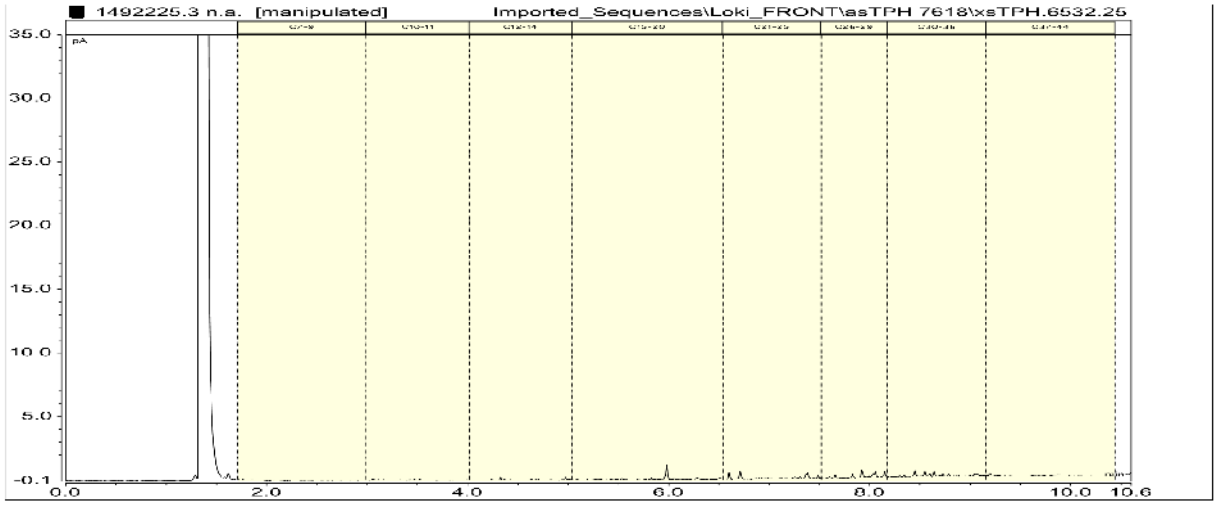
1492225.1
ETP26_0.2-0.3 22-Oct-2015 12:50 pm
Client Chromatogram for TPH by FID



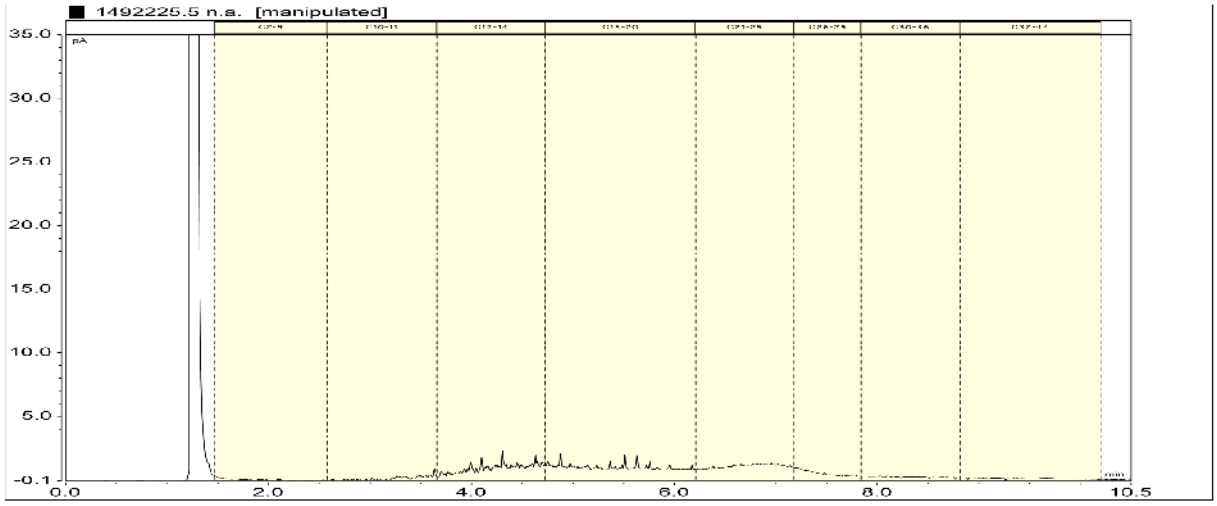
1492225.2
ETP26_0.8-0.9 22-Oct-2015 1:05 pm
Client Chromatogram for TPH by FID



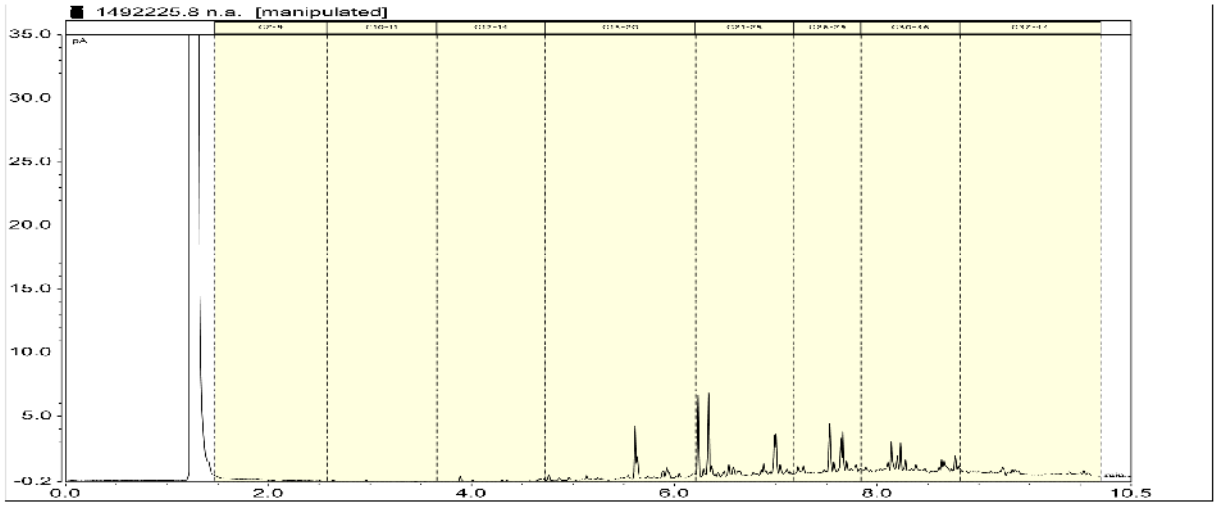
1492225.3
ETP25_0.1-0.2 22-Oct-2015 11:30 am
Client Chromatogram for TPH by FID



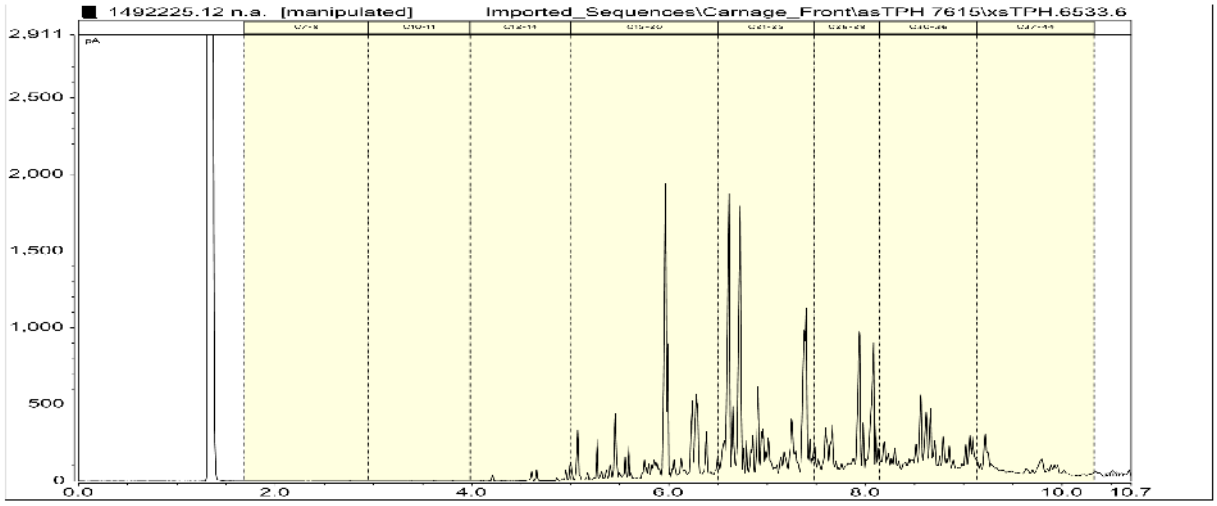
1492225.5
ETP25_1.8-1.9 22-Oct-2015 12:00 pm
Client Chromatogram for TPH by FID



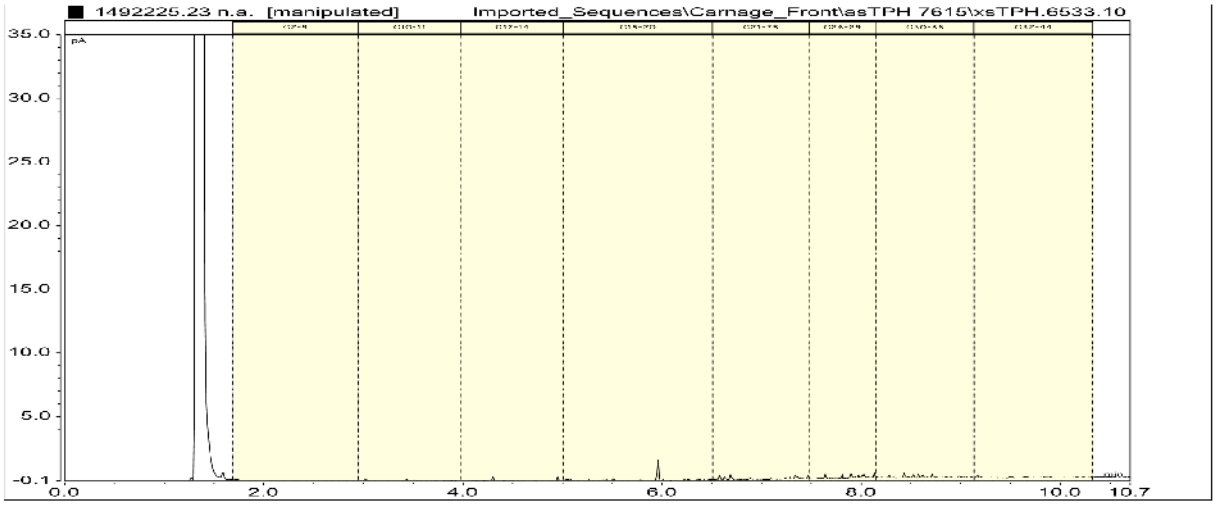
1492225.8
ETP24_0.7-0.8 22-Oct-2015 10:30 am
Client Chromatogram for TPH by FID



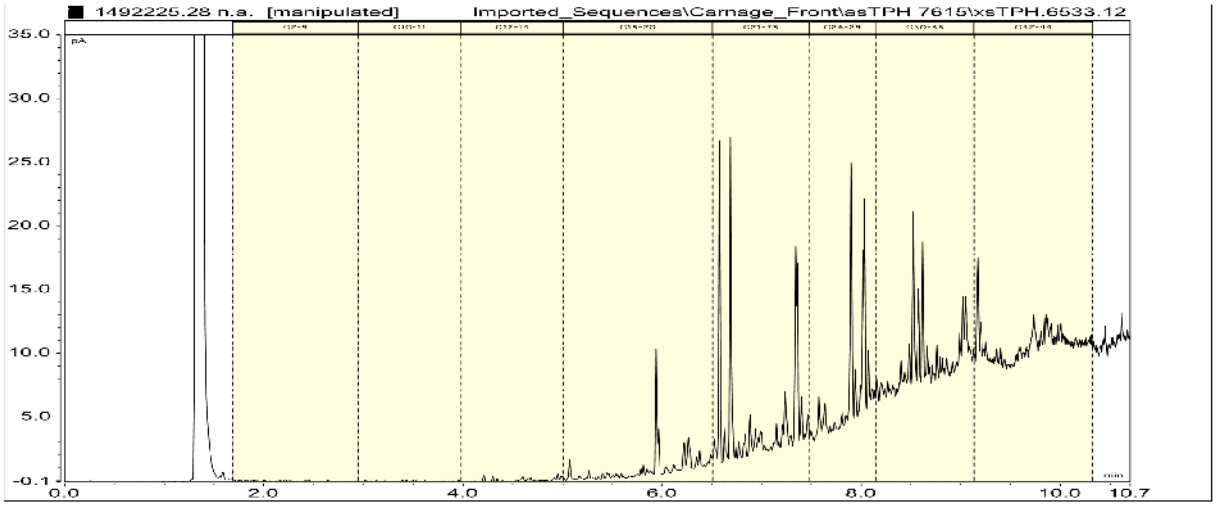
1492225.12
ETP23_1.2 22-Oct-2015 9:30 am
Client Chromatogram for TPH by FID



1492225.23
ETP18_0.8-0.9 21-Oct-2015 2:40 pm
Client Chromatogram for TPH by FID



1492225.28
ETP21_0.1-0.2 21-Oct-2015 11:55 am
Client Chromatogram for TPH by FID



Analyst's Comments

#1 It should be noted that the replicate analyses performed on this sample as part of our in-house Quality Assurance procedures showed greater variation than would normally be expected. This may reflect the heterogeneity of the sample.

Appendix No.1 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-3, 5, 8-9, 11-12, 14, 16, 19, 23, 26, 28, 32
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	1-3, 5, 8-9, 11-12, 14, 16, 19, 23, 26, 28, 32
Pentachlorophenol Screening in Soil by LCMSMS	Solvent extraction with sonication, dilution, analysis by LCMSMS with online SPE. Tested on dried sample	0.010 mg/kg dry wt	9, 23
Tributyl Tin Trace in Soil samples by GCMS	Solvent extraction, ethylation, SPE cleanup, GC-MS SIM analysis. Tested on dried sample	0.003 - 0.007 mg/kg dry wt	2, 14, 26

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Petroleum Hydrocarbons in Soil*	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1-3, 5, 8-9, 11-12, 14, 16, 19, 23, 26, 28, 32
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-3, 5, 8-9, 11-12, 14, 16, 19, 23, 26, 28, 32
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-3, 5, 8-9, 11-12, 14, 16, 19, 23, 26, 28, 32

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

Job No: 149225 Date Recv: 22-Oct-15 15:57

Received by: Emma Anquetil-Moran

3114922251

12.5

Form:

Chain of Custody & Analysis Request Form

AECOM - Christchurch
PO Box 710
Christchurch 8140
Phone: 03 966 6119
Fax: 03 966 6001
Email: hannah.wright@aecom.com

Laboratory Details
Lab. Name: R J Hill Laboratories Ltd
Lab. Address: 1 Clyde St, Hamilton
Contact Name: Jean Connick
Lab. Ref:
Tel: 07 858 2000
Fax: 07 858 2001
Preliminary Report by:
Final Report by:
Lab Quote No:

Project Name:
Project Number: 60444747
Purchase Order Number:
Sample collected by: Scott McDonald
Sample Results to be returned to: Hannah Wright of AECOM Consulting Services

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days)	☐ Yes	☒ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☐ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☐ N/A
4. Special storage requirements?	☐ Yes	☐ No	☐ N/A
5. Preservation requirements?	☐ Yes	☐ No	☐ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☐ N/A
7. Report Format: Email: hannah.wright@aecom.com 8. Project Manager: H Wright tel: 03 966 6119			

Lab. ID	Sample ID	Sampling Date & time (on)	Sampling Date & Time (off)	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Analysis Request: Hold Cold	Heavy Metals + Mercury (SCREEN)	TPH (oil Industry)	BTEX (oil industry)	PCP (TRACE)	TBT (TRACE	ONOP (TRACE)	OCPs (TRACE)	Remarks & comments
	ETP26-0.2-0.3											X								
	ETP26-0.8-0.9											X								
	ETP25-0.1-0.2											X								
	ETP25-0.9-1.0											X								
	ETP25-1.8-1.9											X								
	ETP25-2.8-2.9											X								
	ETP24-0.2-0.3											X								
	ETP24-0.7-0.8											X								
	ETP24-2.0-2.1											X								
	ETP23-0.2-0.3											X								

Relinquished By:
Name: Scott McDonald Date: 22/10
of: AECOM Time: 3:50

Received by:
Name: Emma Date: 22/10
of: Hill Labs Time: 15:50

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Form:

AECOM

Chain of Custody & Analysis Request Form

AECOM - Christchurch
PO Box 710
Christchurch 8140
Phone: 03 966 6119
Fax: 03 966 6001
Email: hannah.wright@aecom.com

Laboratory Details
Lab. Name: R J Hill Laboratories Ltd
Lab. Address: 1 Clyde St, Hamilton
Contact Name: Jean Connick
Lab. Ref:
Tel: 07 858 2000
Fax: 07 858 2001
Preliminary Report by:
Final Report by:
Lab Quote No:

Project Name:
Project Number: 60444747
Purchase Order Number:

Sample collected by: Scott McDonald
Sample Results to be returned to: Hannah Wright of AECOM Consulting Services

Specifications:

	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days)	☐ Yes	☒ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☐ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☐ N/A
4. Special storage requirements?	☐ Yes	☐ No	☐ N/A
5. Preservation requirements?	☐ Yes	☐ No	☐ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☐ N/A

7. Report Format: Email: hannah.wright@aecom.com 8. Project Manager: H Wright tel: 03 966 6119

Lab. ID	Sample ID	Sampling Date & time (on)	Sampling Date & Time (off)	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Analysis Request: Hold Cold	Heavy Metals + Mercury (SCREEN)	TPH (oil Industry)	BTEX (oil industry)	PCP (TRACE)	TBT (TRACE	ONOP (TRACE)	OCPs (TRACE)	Remarks & comments
	ETP23_0.8-0.9											X								
	ETP23_1.2											X								
	ETP23_2.2-2.3											X								
	ETP08_0.2-0.3											X								
	ETP08_0.8-0.9											X								
	ETP08_1.8-1.9											X								
	ETP08_2.7-2.8											X								
	ETP20_0.1-0.2											X								
	ETP20_0.7-0.8											X								
	ETP20_1.4-1.5											X								

Relinquished By:
Name: Scott McD Date: 22/10
of: AECOM Time: 3:50

Received by:
Name: Date:
of: Time:

Received in good condition? Yes/No/NA
Samples received chilled? Yes/No/NA
Yes/No/NA

Method of Shipment ☐ Courier ☐ Postal ☐ By Hand
Consignment Note No.
Transport Co:

Form:

AECOM

Chain of Custody & Analysis Request Form

AECOM - Christchurch
PO Box 710
Christchurch 8140

Phone: 03 966 6119
Fax: 03 966 6001
Email: hannah.wright@aecom.com

Laboratory Details

Lab. Name: R J Hill Laboratories Ltd
Lab. Address: 1 Clyde St, Hamilton
Contact Name: Jean Connick
Lab. Ref:

Tel: 07 858 2000
Fax: 07 858 2001
Preliminary Report by:
Final Report by:
Lab Quote No:

Project Name:

Project Number: 60444747

Purchase Order Number:

Sample collected by: Scott McDonald

Sample Results to be returned to: Hannah Wright of AECOM Consulting Services

Specifications:

	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days)	☐ Yes	☒ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☐ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☐ N/A
4. Special storage requirements?	☐ Yes	☐ No	☐ N/A
5. Preservation requirements?	☐ Yes	☐ No	☐ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☐ N/A
7. Report Format: Email: hannah.wright@aecom.com	8. Project Manager: H Wright		tel: 03 966 6119

Lab. ID	Sample ID	Sampling Date & time (on)	Sampling Date & Time (off)	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Hold Cold	Heavy Metals + Mercury (SCREEN)	TPH (oil Industry)	BTEX (oil industry)	PCP (TRACE)	TBT (TRACE	ONOP (TRACE)	OCPs (TRACE)	Remarks & comments
	ETP20_2.2-2.3											X								
	ETP18_0.2-0.3											X								
	ETP18_0.8-0.9											X								
	ETP18_1.9-2.0											X								
	ETP09_0.1-0.2											X								
	ETP09_1.1-1.2											X								
	ETP09_2.1-2.2											X								
	ETP021_0.1-0.2											X								
	ETP21_0.7-0.8											X								
	ETP21_1.4-1.5											X								

Relinquished By:

Name: Scott McD Date: 22/10
of: AECOM Time: 3:50

Received by:

Name: Date:
of: Time:

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Form:

AECOM

Chain of Custody & Analysis Request Form

AECOM - Christchurch
PO Box 710
Christchurch 8140
Phone: 03 966 6119
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Laboratory Details
Lab. Name: R J Hill Laboratories Ltd
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Sample collected by: Scott McDonald
Sample Results to be returned to: Hannah Wright of AECOM Consulting Services

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days)	☐ Yes	☒ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☐ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☐ N/A
4. Special storage requirements?	☐ Yes	☐ No	☐ N/A
5. Preservation requirements?	☐ Yes	☐ No	☐ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☐ N/A
7. Report Format: Email: hannah.wright@aecom.com	8. Project Manager: H Wright		tel: 03 966 6119

Lab. ID	Sample ID	Sampling Date & time (on)	Sampling Date & Time (off)	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Hold Cold	Heavy Metals + Mercury (SCREEN)	TPH (oil Industry)	BTEX (oil industry)	PCP (TRACE)	TBT (TRACE	ONOP (TRACE)	OCPs (TRACE)	Remarks & comments
	ETP22-1.6-1.7											X								
	ETP22-2.6-2.7											X								

Relinquished By:
Name: Scott McDonald Date: 22-10-2015
of: AECOM Time: 3:50pm

Received by:
Name: Date:
of: Time:

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

4 / 5

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
25	ETP09_0.1-0.2 21-Oct-2015 4:10 pm	Soil	GSoil300, GSoil30(	Hold Cold
26	ETP09_1.1-1.2 21-Oct-2015 4:15 pm	Soil	GSoil300, GSoil30(	Hold Cold TPH, HM+Hg (Screen), TBT (Trace)
27	ETP09_2.1-2.2 21-Oct-2015 4:25 pm	Soil	GSoil300, GSoil30(	Hold Cold
28	ETP21_0.1-0.2 21-Oct-2015 11:55 am	Soil	GSoil300, GSoil30(	Hold Cold TPH, HM+Hg (Screen)
29	ETP21_0.7-0.8 21-Oct-2015 12:20 pm	Soil	GSoil300, GSoil30(	Hold Cold
30	ETP21_1.4-1.5 21-Oct-2015 12:30 pm	Soil	GSoil300, GSoil30(	Hold Cold
31	ETP22_1.6-1.7 21-Oct-2015 11:10 am	Soil	GSoil300, GSoil30(	Hold Cold
32	ETP22_2.6-2.7 21-Oct-2015 11:25 am	Soil	GSoil300, GSoil30(	Hold Cold TPH, HM+Hg (Screen)

Job No: 3149 2225
Date Recv: 22-Oct-15 15:57
Received by: Emma Anquetil-Moran

Hill Laboratories
BETTER TESTING BETTER RESULTS
R J Hill Laboratories Lin
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand | Web www.

3114922251

Job Information Summary

Client:	AECOM Consulting Services (NZ) Limited	**Lab No:**	1492225
Contact:	H Wright	**Date Registered:**	23-Oct-2015 9:34 am
	C/- AECOM Consulting Services (NZ) Limited	**Priority:**	Normal
	PO Box 4479	**Quote No:**	
	CHRISTCHURCH 8051	**Order No:**	60444747
		Client Reference:	60444747
		Add. Client Ref:	
		Submitted By:	S McDonald
		Charge To:	AECOM New Zealand Limited
		Target Date:	28-Oct-2015 4:30 pm

Samples

No.	Sample Name	Sample Type	Containers	Tests Requested
1	ETP26_0.2-0.3 22-Oct-2015 12:50 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (screen)
2	ETP26_0.8-0.9 22-Oct-2015 1:05 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen), TBT (Trace
3	ETP25_0.1-0.2 22-Oct-2015 11:30 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen)
4	ETP25_0.9-1.0 22-Oct-2015 11:45 am	Soil	GSoil300, GSoil30(	Hold Cold
5	ETP25_1.8-1.9 22-Oct-2015 12:00 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen)
6	ETP25_2.8-2.9 22-Oct-2015 12:10 pm	Soil	GSoil300, GSoil30(	Hold Cold
7	ETP24_0.2-0.3 22-Oct-2015 10:15 am	Soil	GSoil300, GSoil30(	Hold Cold
8	ETP24_0.7-0.8 22-Oct-2015 10:30 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen)
9	ETP24_2.0-2.1 22-Oct-2015 10:30 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen), PCP (Trace)
10	ETP23_0.2-0.3 22-Oct-2015 9:00 am	Soil	GSoil300, GSoil30(	Hold Cold
11	ETP23_0.8-0.9 22-Oct-2015 9:20 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen)
12	ETP23_1.2 22-Oct-2015 9:30 am	Soil	GSoil300	Hold Cold TPH, HM + Hg (Screen)
13	ETP23_2.2-2.3 22-Oct-2015 9:35 am	Soil	GSoil300, GSoil30(	Hold Cold
14	ETP08_0.2-0.3 22-Oct-2015 7:50 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen), TBT (Trace)
15	ETP08_0.8-0.9 22-Oct-2015 8:00 am	Soil	GSoil300, GSoil30(	Hold Cold
16	ETP08_1.8-1.9 22-Oct-2015 8:10 am	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen)
17	ETP08_2.7-2.8 22-Oct-2015 8:20 am	Soil	GSoil300, GSoil30(	Hold Cold
18	ETP20_0.1-0.2 21-Oct-2015 1:30 pm	Soil	GSoil300, GSoil30(	Hold Cold
19	ETP20_0.7-0.8 21-Oct-2015 1:35 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen)
20	ETP20_1.4-1.5 21-Oct-2015 1:30 pm	Soil	GSoil300, GSoil30(	Hold Cold
21	ETP20_2.2-2.3 21-Oct-2015 1:48 pm	Soil	GSoil300, GSoil30(	Hold Cold
22	ETP18_0.2-0.3 21-Oct-2015 2:30 pm	Soil	GSoil300, GSoil30(	Hold Cold
23	ETP18_0.8-0.9 21-Oct-2015 2:40 pm	Soil	GSoil300, GSoil30(	~~Hold Cold~~ TPH, HM + Hg (Screen), PCP (Trace)
24	ETP18-1.9-2.0 21-Oct-2015 2:50 pm	Soil	GSoil300, GSoil30(	Hold Cold

DATE: 4th November 2015

JOB NUMBER: J107867 (1)

PRECISE
CONSULTING & LABORATORY

AECOM NZ Ltd (Christchurch)

Level 2
2 Hazeldean Road
Addington
Christchurch
8024

Client Reference: 60444747

Dear Frank MacDonald,

Re: Asbestos Identification Analysis – Naval Point

Eleven (11) samples received on 23rd October 2015 by Luana Piuila-Afitu.

The results of fibre analysis were performed by Adam Maurice of Precise Consulting and Laboratory Ltd on 2nd November 2015.

The sample(s) were stated to be from Naval Point .

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

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

Should you require further information please contact Adam Maurice.

Yours sincerely

Adam Maurice
PRECISE LABORATORY IDENTIFIER

Precise Consulting & Laboratory Ltd Limited
Unit 4, 91 Byron Street, Sydenham, Christchurch 8023
P: (03) 943 5394 W: www.preciseconsulting.co.nz

Sample Analysis Results

PRECISE
CONSULTING & LABORATORY

Job No: J107867

4 November 2015

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.

Identified by:

Adam Maurice
Approved Identifier

Reviewed by:

Adam Maurice
Key Technical Person

Site Address: Naval Point

Sample ID	Client Sample Number	Sample Location/Description/Dimensions	Analysis Results
BS032994	ETP04_0.4-0.6_SV	Quantitative Asbestos Non-Homogeneous Soil 402.72g	No Asbestos Detected Organic Fibre Type
BS032995	ETP07_0.3-0.5_SV	Quantitative Asbestos Non-Homogeneous Soil 439.12g	**Amosite (Brown Asbestos) Organic Fibre Type**
BS032996	ETP09_0.1-0.3_SV	Quantitative Asbestos Non-Homogeneous Soil 513.31g	**Chrysotile (White Asbestos) Organic Fibre Type**

Precise Consulting & Laboratory Ltd Limited
Unit 4, 91 Byron Street, Sydenham, Christchurch 8023
P: (03) 943 5394 W: www.preciseconsulting.co.nz

IANZ ACCREDITED LABORATORY
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Sample Analysis Results

PRECISE
CONSULTING & LABORATORY

Job No: J107867

4 November 2015

Site Address: Naval Point			
Sample ID	**Client Sample Number**	**Sample Location/Description/Dimensions**	**Analysis Results**
BS032997	ETP13_0.2-0.4_SV	Quantitative Asbestos Non-Homogeneous Soil 503.04g	No Asbestos Detected Organic Fibre Type
BS032998	ETP18_0.1-0.3_SV	Quantitative Asbestos Non-Homogeneous Soil 458.49g	No Asbestos Detected Organic Fibre Type
BS032999	ETP19_0.2-0.3_SV	Quantitative Asbestos Non-Homogeneous Soil 515.03g	No Asbestos Detected Organic Fibre Type
BS033000	ETP22_0.2-0.4_SV	Quantitative Asbestos Non-Homogeneous Soil 626.40g	**Chrysotile (White Asbestos)** **Man-Made Mineral Fibre** **Organic Fibre Type**
BS033001	ETP22_0.6-0.8_SV	Quantitative Asbestos Non-Homogeneous Soil 426.23g	**Chrysotile (White Asbestos)** **Organic Fibre Type**
BS033002	ETP23_0.2-0.4_SV	Quantitative Asbestos Non-Homogeneous Soil 489.51g	**Chrysotile (White Asbestos)** **Organic Fibre Type**
BS033003	ETP22_0.5_Blk	>7mm Fragments Plaster Debris 119.16g	No Asbestos Detected Man-Made Mineral Fibre Organic Fibre Type
BS033004	ETP22_0.6-0.8_Blk	>7mm Fragments Cement Sheet Debris 430.62g	**Chrysotile (White Asbestos)** **Organic Fibre Type**

Precise Consulting & Laboratory Ltd Limited
Unit 4, 91 Byron Street, Sydenham, Christchurch 8023
P: (03) 943 5394 W: www.preciseconsulting.co.nz

Appendix 1: Soil Analysis Raw Data

Job No: J107867

Wednesday, 4th November 2015

Sample ID	Client Sample Number	Sample Weights						>7mm Asbestos Containing Material (ACM)[1]		Asbestos Fines/Fibrous Asbestos[1]				Trace Asbestos Detected (Y/N)[2]
		Total 10L (Kg)	Total 500mL Sub-Sample (g)	>7mm Fraction (g)	2-7mm Fraction (g)	<2mm Sub Sample (g)	<2mm Excess (g)	>7mm ACM (g)	Form & %[3]	2-7mm ACM (g)	Form & %[3]	<2mm ACM (g)	Form & %[3]	
BS032994	ETP04_ 0.4-0.6_ SV	-	402.72	-	214.68	101.39	86.65	-	-	No Asbestos Detected	-	No Asbestos Detected	-	No
BS032995	ETP07_ 0.3-0.5_ SV	-	439.12	-	240.63	101.47	97.02	-	-	<0.001	Free Fibres 100%	<0.001	Free Fibres 100%	No
BS032996	ETP09_ 0.1-0.3_ SV	-	513.31	-	271.65	102.66	139.00	-	-	<0.001	Free Fibres 100%	No Asbestos Detected	-	No
BS032997	ETP13_ 0.2-0.4_ SV	-	503.04	-	313.22	100.60	89.22	-	-	No Asbestos Detected	-	No Asbestos Detected	-	No
BS032998	ETP18_ 0.1-0.3_ SV	-	458.49	-	259.58	100.53	98.38	-	-	No Asbestos Detected	-	No Asbestos Detected	-	No
BS032999	ETP19_ 0.2-0.3_ SV	-	515.03	-	261.81	101.43	151.79	-	-	No Asbestos Detected	-	No Asbestos Detected	-	No
BS033000	ETP22_ 0.2-0.4_ SV	-	626.40	-	277.18	103.09	246.13	-	-	<0.001	Free Fibres 100%	<0.001	Free Fibres 100%	No

Precise Consulting & Laboratory Ltd Limited

Unit 4, 91 Byron Street, Sydenham, Christchurch 8023

P: (03) 943 5394 W: www.preciseconsulting.co.nz

Sample ID	Client Sample Number	Sample Weights						>7mm Asbestos Containing Material (ACM)[1]		Asbestos Fines/Fibrous Asbestos[1]				Trace Asbestos Detected (Y/N)[2]
		Total 10L (Kg)	Total 500mL Sub-Sample (g)	>7mm Fraction (g)	2-7mm Fraction (g)	<2mm Sub Sample (g)	<2mm Excess (g)	>7mm ACM (g)	Form & %[3]	2-7mm ACM (g)	Form & %[3]	<2mm ACM (g)	Form & %[3]	
BS033001	ETP22_ 0.6-0.8_ SV	-	426.23	-	191.31	100.25	134.67	-	-	0.211	Cement Sheet 15%	<0.001	Free Fibres 100%	No
BS033002	ETP23_ 0.2-0.4_ SV	-	489.51	-	239.42	100.77	149.32	-	-	<0.001	Free Fibres 100%	No Asbestos Detected	-	No
BS033003	ETP22_ 0.5_Blk	-	-	119.16	-	-	-	No Asbestos Detected	-	-	-	-	-	-
BS033004	ETP22_ 0.6-0.8_ Blk	-	-	430.62	-	-	-	430.62	Cement Sheet 15%	-	-	-	-	-

1 These results are raw weighed data presented as per the Western Australian Guidelines and may be under the reporting limit for guidelines AS4964 of 0.1g/kg

2 Trace asbestos detected is indicative that freely liberated respirable fibres are present and dust control measures should be implemented or increased on site. This is not the sole indicator for the friable nature of the asbestos present.

3 Asbestos percentage is determined using EPA-600-R-93-116: Method for the Determination of Asbestos in Bulk Building Materials and are outside of IANZ accreditation #1097 and is therefore not endorsed by IANZ

Precise Consulting & Laboratory Ltd Limited

Unit 4, 91 Byron Street, Sydenham, Christchurch 8023

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Appendix G

Groundwater Analytical Result Tables

Table 12 Total Metals Groundwater Analytical Results compared to ANZECC Guidelines and ECAN Coastal Plan Limits

AECOM Location ID	TP03	TP05	TP10	TP12	TP15	TP20	TP18	TP23	ANZECC	ECAN Coastal Plan
AECOM Field ID	TP03	TP05	TP10	TP12	TP15	TP20	TP18	TP23		
Laboratory Sample Reference	1499722.5	1500069.2	1499722.1	1499722.2	1499722.3	1499722.4	1500069.1	1499722.5		
Date Sampled	11/11/2015	11/11/2015	10/11/2015	10/11/2015	10/11/2015	10/11/2015	11/11/2015	10/11/2015		
Observations									Level of protection - 90% Trigger values for marine water	Coastal CR Water
Metals Trace										
Total Recoverable Arsenic (g/m^3)	0.036	*0.058*	0.00166	0.041	0.021	0.0195	0.034	0.0169	-	0.05
Total Recoverable Cadmium (g/m^3)	*0.0041*	<0.00021	<0.00021	<0.00021	0.0004	0.00027	<0.00021	<0.00021	0.014	0.002
Total Recoverable Chromium (g/m^3)	0.0109	<0.0011	0.002	**0.038**	**0.026**	0.004	<0.0011	<0.0011	0.02	0.05
Total Recoverable Copper (g/m^3)	***1.780***	***0.040***	***0.0143***	***0.025***	***0.038***	***0.021***	***0.0117***	***0.0087***	0.003	0.005
Total Recoverable Lead (g/m^3)	***0.0115***	0.0025	0.0024	***0.044***	***0.041***	***0.0063***	0.0025	<0.0011	0.0066	0.005
Total Recoverable Nickel (g/m^3)	*0.049*	<0.007	0.007	*0.032*	*0.032*	0.008	<0.007	0.007	0.2	0.015
Total Recoverable Zinc (g/m^3)	***1.78***	0.0059	<0.0042	***0.132***	***0.094***	***0.100***	<0.0042	0.0106	0.023	0.05
Tributyl Tin Trace in Soil samples by GCMS										
Dibutyltin (as Sn) (g/m^3)		<0.00011				<0.00011				
Tributyltin (as Sn) (g/m^3)		**0.00009**				<0.00009			0.00002	
Triphenyltin (as Sn) (g/m^3)		<0.00007				<0.00007				

[1]Australian and New Zealand Guidelines for fresh and marine water quality (ANZECC) Ecological Level of Protection 90% Trigger values for marine water.

Bold - exceeds theAustralian and New Zealand Guidelines for fresh and marine water quality (ANZECC) Ecological Level of Protection 90% Trigger values for marine water.

Italics - exceeds the ECAN Coastal Guidelines for Class Coastal CR Water, 2011.

Table 13 Total Petroleum Hydrocarbons Groundwater Analytical Results compared to Module 5 Applicable Tier I Guidelines

AECOM Location ID	**TP05**	**TP03**	**TP10**	**TP12**	**TP15**	**TP18**	**TP20**	**TP23**	MfE 1999 Guidelines (Revised 2011): Tier 1 Groundwater Acceptance Criteria - SAND[3]	MfE 1999 Guidelines (Revised 2011): Tier 1 Groundwater Acceptance Criteria - Sandy SILT[3]
AECOM Field ID	TP05	TP03	TP10	TP12	TP15	TP18	TP20	TP23		
Laboratory Sample Reference	1500069.2	1500069.3	14997722.1	1499722.2	1499722.3	1500069.1	1499122.4	1499722.5		
Date Sampled	11/11/2015	11/11/2015	10/11/2015	10/11/2015	10/11/2015	11/11/2015	10/11/2015	10/11/2015		
Observations										
Total Petroleum Hydrocarbons (TPH)										
C_7-C_9 (g/m^3)	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	S[(1)]	S[(1)]
C_{10}-C_{14} (g/m^3)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	S[(1)]	S[(1)]
C_{15}-C_{36} (g/m^3)	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	S[(1)]	S[(1)]
Total hydrocarbons (C_7 - C_{36}) (g/m^3)	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	-	-
BTEX in water by headspace GC-MS										
Benzene (g/m^3)								<0.0010	5.2	18
Toluene (g/m^3)								<0.0010	(460)[2]	S[(1)]
Ethylbenzene (g/m^3)								<0.0010	(110)[2]	S[(1)]
m&p-Xylene (g/m^3)								<0.002	S[(1)]	S[(1)]
o-Xylene (g/m^3)								<0.0010		

AECOM Location ID	**TP5**	**TP20**	MfE 1999 Guidelines (Revised 2011): Tier 1 Groundwater Acceptance Criteria1
AECOM Field ID	TP5	TP20	
Laboratory Sample Reference	1500069.2	1499722.4	
Date Sampled	11/11/2015	10/11/2015	
Observations			
Polycyclic Aromatic Hydrocarbons Trace in SVOC Water Samples			
Naphthalene (g/m^3)	0.0005	0.0006	22

[1] Calculated water criteria exceeds solubility limit for pure compound in water.

2 Values in brackets exceed solubility limit for compound in water when present as part of a typical gasoline mixture. Solubility is dependant upon composition of the gasoline mixture and so uncertainity arises as to the actual solubility limit of a mixture in water. For futher explanation refer to Appendix 4M of Module 4.

[3] Ministry for the Environment, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Revised 2011) (MfE 1999 Guidelines). Module 5 - Tier 1 Groundwater Acceptance Criteria

Bold - exceeds the Ministry for the Environment, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Revised 2011) (MfE 1999 Guidelines).

Table 14 Detections PCP and Pesticides Groundwater Analytical Results compared to Applicable Tier I Guidelines

AECOM Location ID	**TP5**	**TP10**	**TP23**	**TP18**	**ANZECC[1]**	**USEPA[2]**
AECOM Field ID	TP5	TP10	TP23	TP18		
Laboratory Sample Reference	1500069.2	14997722.1	1499722.5	1500069.1		
Date Sampled	11/11/2015	10/11/2015	10/11/2015	11/11/2015		
Observations					Level of protection - 90% Trigger values for marine water	Protection of Groundwater
Pentachlorophenol Trace in Water by GC-ED						
Pentachlorophenol (PCP) (g/m^3)	<0.000010		<0.000010	<0.000010	0.033	
2,3,4,6-Tetrachlorophenol (TCP) (g/m^3)	<0.000010		<0.000010	<0.000010		
Organochlorine Pesticides Trace in Soil						
OrganoNitrogen & Phosphorus pesticides, Trace, liq/liq GCMS						
Diuron (g/m^3)		0.00006			-	0.015

[1]Australian and New Zealand Guidelines for fresh and marine water quality (ANZECC) Ecological Level of Protection 90% Trigger values for marine water.

[2]USEPA Summary Regional Screening Tables, November 2015

Bold - exceeds the Australian and New Zealand Guidelines for fresh and marine water quality (ANZECC) Ecological Level of Protection 90% Trigger values for marine water.

Appendix H

Hill Laboratory Result Sheets for Groundwater

Hill Laboratories
BETTER TESTING BETTER RESULTS

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ANALYSIS REPORT

Client:	AECOM New Zealand Limited	**Lab No:**	1499722 SPv2
Contact:	H Wright	**Date Registered:**	12-Nov-2015
	C/- AECOM Consulting Services (NZ) Limited	**Date Reported:**	01-Dec-2015
	PO Box 4479	**Quote No:**	43362
	CHRISTCHURCH 8051	**Order No:**	60444747
		Client Reference:	60444747 Naval Point CCC
		Submitted By:	H Wright

Sample Type: Saline

Sample Name:		TP10 10-Nov-2015 11:25 am	TP12 10-Nov-2015 12:50 pm	TP15 10-Nov-2015 2:10 pm	TP20 10-Nov-2015 3:20 pm	TP23 10-Nov-2015
Lab Number:		1499722.1	1499722.2	1499722.3	1499722.4	1499722.5
Individual Tests						
Total Arsenic*	g/m³	0.0166	0.041	0.021	0.0195	0.0169
Total Cadmium*	g/m³	< 0.00021	< 0.00021	0.00040	0.00027	< 0.00021
Total Chromium*	g/m³	0.0020	0.038	0.026	0.0040	< 0.0011
Total Copper*	g/m³	0.0143	0.025	0.038	0.021	0.0087
Total Lead*	g/m³	0.0024	0.044	0.041	0.0063	< 0.0011
Total Nickel*	g/m³	0.007	0.032	0.032	0.008	0.007
Total Zinc*	g/m³	< 0.0042	0.132	0.094	0.100	0.0106
OrganoNitrogen & Phosphorus pesticides, trace, liq/liq GCMS						
Acetochlor*	g/m³	< 0.00004	-	< 0.00004	-	-
Alachlor*	g/m³	< 0.00004	-	< 0.00004	-	-
Atrazine*	g/m³	< 0.00004	-	< 0.00004	-	-
Atrazine-desethyl*	g/m³	< 0.00004	-	< 0.00004	-	-
Atrazine-desisopropyl*	g/m³	< 0.00008	-	< 0.00008	-	-
Azaconazole*	g/m³	< 0.00002	-	< 0.00002	-	-
Azinphos-methyl*	g/m³	< 0.00008	-	< 0.00008	-	-
Benalaxyl*	g/m³	< 0.00002	-	< 0.00002	-	-
Bitertanol*	g/m³	< 0.00008	-	< 0.00008	-	-
Bromacil*	g/m³	< 0.00004	-	< 0.00004	-	-
Bromopropylate*	g/m³	< 0.00004	-	< 0.00004	-	-
Butachlor*	g/m³	< 0.00004	-	< 0.00004	-	-
Captan*	g/m³	< 0.00008	-	< 0.00008	-	-
Carbaryl*	g/m³	< 0.00004	-	< 0.00004	-	-
Carbofenothion*	g/m³	< 0.00004	-	< 0.00004	-	-
Carbofuran*	g/m³	< 0.00004	-	< 0.00004	-	-
Chlorfluazuron*	g/m³	< 0.00004	-	< 0.00004	-	-
Chlorothalonil*	g/m³	< 0.00004	-	< 0.00004	-	-
Chlorpyrifos*	g/m³	< 0.00004	-	< 0.00004	-	-
Chlorpyrifos-methyl*	g/m³	< 0.00004	-	< 0.00004	-	-
Chlortoluron*	g/m³	< 0.00008	-	< 0.00008	-	-
Cyanazine*	g/m³	< 0.00004	-	< 0.00004	-	-
Cyfluthrin*	g/m³	< 0.00004	-	< 0.00004	-	-
Cyhalothrin*	g/m³	< 0.00004	-	< 0.00004	-	-
Cypermethrin*	g/m³	< 0.00008	-	< 0.00008	-	-
Deltamethrin (including Tralomethrin)*	g/m³	< 0.00006	-	< 0.00006	-	-
Diazinon*	g/m³	< 0.00002	-	< 0.00002	-	-
Dichlofluanid*	g/m³	< 0.00004	-	< 0.00004	-	-
Dichloran*	g/m³	< 0.0002	-	< 0.0002	-	-

Sample Type: Saline						
Sample Name:		TP10 10-Nov-2015 11:25 am	TP12 10-Nov-2015 12:50 pm	TP15 10-Nov-2015 2:10 pm	TP20 10-Nov-2015 3:20 pm	TP23 10-Nov-2015
Lab Number:		1499722.1	1499722.2	1499722.3	1499722.4	1499722.5
OrganoNitrogen & Phosphorus pesticides, trace, liq/liq GCMS						
Dichlorvos*	g/m³	< 0.00008	-	< 0.00008	-	-
Difenoconazole*	g/m³	< 0.00008	-	< 0.00008	-	-
Dimethoate*	g/m³	< 0.00008	-	< 0.00008	-	-
Diphenylamine*	g/m³	< 0.00008	-	< 0.00008	-	-
Diuron*	g/m³	0.00006	-	< 0.00004	-	-
Fenpropimorph*	g/m³	< 0.00004	-	< 0.00004	-	-
Fluazifop-butyl*	g/m³	< 0.00004	-	< 0.00004	-	-
Fluometuron*	g/m³	< 0.00004	-	< 0.00004	-	-
Flusilazole*	g/m³	< 0.00004	-	< 0.00004	-	-
Fluvalinate*	g/m³	< 0.00004	-	< 0.00004	-	-
Furalaxyl*	g/m³	< 0.00002	-	< 0.00002	-	-
Haloxyfop-methyl*	g/m³	< 0.00004	-	< 0.00004	-	-
Hexaconazole*	g/m³	< 0.00004	-	< 0.00004	-	-
Hexazinone*	g/m³	< 0.00002	-	< 0.00002	-	-
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)*	g/m³	< 0.0002	-	< 0.0002	-	-
Kresoxim-methyl*	g/m³	< 0.00002	-	< 0.00002	-	-
Linuron*	g/m³	< 0.00005	-	< 0.00005	-	-
Malathion*	g/m³	< 0.00004	-	< 0.00004	-	-
Metalaxyl*	g/m³	< 0.00004	-	< 0.00004	-	-
Metolachlor*	g/m³	< 0.00004	-	< 0.00004	-	-
Metribuzin*	g/m³	< 0.00004	-	< 0.00004	-	-
Molinate*	g/m³	< 0.00008	-	< 0.00008	-	-
Myclobutanil*	g/m³	< 0.00004	-	< 0.00004	-	-
Naled*	g/m³	< 0.0002	-	< 0.0002	-	-
Norflurazon*	g/m³	< 0.00008	-	< 0.00008	-	-
Oxadiazon*	g/m³	< 0.00004	-	< 0.00004	-	-
Oxyfluorfen*	g/m³	< 0.00002	-	< 0.00002	-	-
Paclobutrazol*	g/m³	< 0.00004	-	< 0.00004	-	-
Parathion-ethyl*	g/m³	< 0.00004	-	< 0.00004	-	-
Parathion-methyl*	g/m³	< 0.00004	-	< 0.00004	-	-
Pendimethalin*	g/m³	< 0.00004	-	< 0.00004	-	-
Permethrin*	g/m³	< 0.00002	-	< 0.00002	-	-
Pirimicarb*	g/m³	< 0.00004	-	< 0.00004	-	-
Pirimiphos-methyl*	g/m³	< 0.00004	-	< 0.00004	-	-
Prochloraz*	g/m³	< 0.0002	-	< 0.0002	-	-
Procymidone*	g/m³	< 0.00004	-	< 0.00004	-	-
Prometryn*	g/m³	< 0.00002	-	< 0.00002	-	-
Propachlor*	g/m³	< 0.00004	-	< 0.00004	-	-
Propanil*	g/m³	< 0.0002	-	< 0.0002	-	-
Propazine*	g/m³	< 0.00002	-	< 0.00002	-	-
Propiconazole*	g/m³	< 0.00004	-	< 0.00004	-	-
Pyriproxyfen*	g/m³	< 0.00004	-	< 0.00004	-	-
Quizalofop-ethyl*	g/m³	< 0.00004	-	< 0.00004	-	-
Simazine*	g/m³	< 0.00004	-	< 0.00004	-	-
Simetryn*	g/m³	< 0.00004	-	< 0.00004	-	-
Sulfentrazone*	g/m³	< 0.0002	-	< 0.0002	-	-
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]*	g/m³	< 0.00008	-	< 0.00008	-	-
Tebuconazole*	g/m³	< 0.00004	-	< 0.00004	-	-
Terbacil*	g/m³	< 0.00004	-	< 0.00004	-	-
Terbufos*	g/m³	< 0.00004	-	< 0.00004	-	-
Terbumeton*	g/m³	< 0.00004	-	< 0.00004	-	-
Terbuthylazine*	g/m³	< 0.00002	-	< 0.00002	-	-
Terbuthylazine-desethyl*	g/m³	< 0.00004	-	< 0.00004	-	-

Sample Type: Saline						
Sample Name:		TP10 10-Nov-2015 11:25 am	TP12 10-Nov-2015 12:50 pm	TP15 10-Nov-2015 2:10 pm	TP20 10-Nov-2015 3:20 pm	TP23 10-Nov-2015
Lab Number:		1499722.1	1499722.2	1499722.3	1499722.4	1499722.5
OrganoNitrogen & Phosphorus pesticides, trace, liq/liq GCMS						
Terbutryn*	g/m³	< 0.00004	-	< 0.00004	-	-
Thiabendazole*	g/m³	< 0.0002	-	< 0.0002	-	-
Thiobencarb*	g/m³	< 0.00004	-	< 0.00004	-	-
Tolylfluanid*	g/m³	< 0.00002	-	< 0.00002	-	-
Triazophos*	g/m³	< 0.00004	-	< 0.00004	-	-
Trifluralin*	g/m³	< 0.00004	-	< 0.00004	-	-
Vinclozolin*	g/m³	< 0.00004	-	< 0.00004	-	-
BTEX in Water by Headspace GC-MS						
Benzene*	g/m³	-	-	-	-	< 0.0010
Toluene*	g/m³	-	-	-	-	< 0.0010
Ethylbenzene*	g/m³	-	-	-	-	< 0.0010
m&p-Xylene*	g/m³	-	-	-	-	< 0.002
o-Xylene*	g/m³	-	-	-	-	< 0.0010
Organochlorine Pesticides Trace in water, By Liq/Liq						
Aldrin*	g/m³	< 0.000005	-	< 0.000005	-	-
alpha-BHC*	g/m³	< 0.000010	-	< 0.000010	-	-
beta-BHC*	g/m³	< 0.000010	-	< 0.000010	-	-
delta-BHC*	g/m³	< 0.000010	-	< 0.000010	-	-
gamma-BHC (Lindane)*	g/m³	< 0.000010	-	< 0.000010	-	-
cis-Chlordane*	g/m³	< 0.000005	-	< 0.000005	-	-
trans-Chlordane*	g/m³	< 0.000005	-	< 0.000005	-	-
2,4'-DDD*	g/m³	< 0.000010	-	< 0.000010	-	-
Total DDT Isomers*	g/m³	< 0.00006	-	< 0.00006	-	-
4,4'-DDD*	g/m³	< 0.000010	-	< 0.000010	-	-
2,4'-DDE*	g/m³	< 0.000010	-	< 0.000010	-	-
4,4'-DDE*	g/m³	< 0.000010	-	< 0.000010	-	-
2,4'-DDT*	g/m³	< 0.000010	-	< 0.000010	-	-
4,4'-DDT*	g/m³	< 0.000010	-	< 0.000010	-	-
Dieldrin*	g/m³	< 0.000005	-	< 0.000005	-	-
Endosulfan I*	g/m³	< 0.000010	-	< 0.000010	-	-
Endosulfan II*	g/m³	< 0.000010	-	< 0.000010	-	-
Endosulfan sulfate*	g/m³	< 0.000010	-	< 0.000010	-	-
Endrin*	g/m³	< 0.000005	-	< 0.000005	-	-
Endrin aldehyde*	g/m³	< 0.000005	-	< 0.000005	-	-
Endrin ketone*	g/m³	< 0.000010	-	< 0.000010	-	-
Heptachlor*	g/m³	< 0.000005	-	< 0.000005	-	-
Heptachlor epoxide*	g/m³	< 0.000005	-	< 0.000005	-	-
Hexachlorobenzene*	g/m³	< 0.00004	-	< 0.00004	-	-
Methoxychlor*	g/m³	< 0.000005	-	< 0.000005	-	-
Total Chlordane [(cis+trans)*100/42]*	g/m³	< 0.00002	-	< 0.00002	-	-
Polycyclic Aromatic Hydrocarbons Trace in Water, By Liq/Liq						
Acenaphthene*	g/m³	< 0.000008	-	-	-	-
Acenaphthylene*	g/m³	< 0.000008	-	-	-	-
Anthracene*	g/m³	< 0.000008	-	-	-	-
Benzo[a]anthracene*	g/m³	< 0.000008	-	-	-	-
Benzo[a]pyrene (BAP)*	g/m³	< 0.000008	-	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene*	g/m³	< 0.000008	-	-	-	-
Benzo[g,h,i]perylene*	g/m³	< 0.000008	-	-	-	-
Benzo[k]fluoranthene*	g/m³	< 0.000008	-	-	-	-
Chrysene*	g/m³	< 0.000008	-	-	-	-
Dibenzo[a,h]anthracene*	g/m³	< 0.000008	-	-	-	-
Fluoranthene*	g/m³	< 0.000008	-	-	-	-
Fluorene*	g/m³	< 0.000008	-	-	-	-

Sample Type: Saline						
Sample Name:		TP10 10-Nov-2015 11:25 am	TP12 10-Nov-2015 12:50 pm	TP15 10-Nov-2015 2:10 pm	TP20 10-Nov-2015 3:20 pm	TP23 10-Nov-2015
Lab Number:		1499722.1	1499722.2	1499722.3	1499722.4	1499722.5
Polycyclic Aromatic Hydrocarbons Trace in Water, By Liq/Liq						
Indeno(1,2,3-c,d)pyrene*	g/m³	< 0.000008	-	-	-	-
Naphthalene*	g/m³	< 0.00004	-	-	-	-
Phenanthrene*	g/m³	< 0.000008	-	-	-	-
Pyrene*	g/m³	< 0.000008	-	-	-	-
Pentachlorophenol Trace in Water by GC-ECD						
Pentachlorophenol (PCP)	g/m³	-	-	-	-	< 0.000010
2,3,4,6-Tetrachlorophenol (TCP)	g/m³	-	-	-	-	< 0.000010
Haloethers Trace in SVOC Water Samples by GC-MS						
Bis(2-chloroethoxy) methane*	g/m³	-	-	-	< 0.0005	-
Bis(2-chloroethyl)ether*	g/m³	-	-	-	< 0.0005	-
Bis(2-chloroisopropyl)ether*	g/m³	-	-	-	< 0.0005	-
4-Bromophenyl phenyl ether*	g/m³	-	-	-	< 0.0005	-
4-Chlorophenyl phenyl ether*	g/m³	-	-	-	< 0.0005	-
Nitrogen containing compounds Trace in SVOC Water Samples, GC-MS						
2,4-Dinitrotoluene*	g/m³	-	-	-	< 0.0010	-
2,6-Dinitrotoluene*	g/m³	-	-	-	< 0.0010	-
Nitrobenzene*	g/m³	-	-	-	< 0.0005	-
N-Nitrosodi-n-propylamine*	g/m³	-	-	-	< 0.0010	-
N-Nitrosodiphenylamine + Diphenylamine	g/m3	-	-	-	< 0.0010	-
Organochlorine Pesticides Trace in SVOC Water Samples by GC-MS						
Aldrin*	g/m³	-	-	-	< 0.0005	-
alpha-BHC*	g/m³	-	-	-	< 0.0005	-
beta-BHC*	g/m³	-	-	-	< 0.0005	-
delta-BHC*	g/m³	-	-	-	< 0.0005	-
gamma-BHC (Lindane)*	g/m³	-	-	-	< 0.0005	-
4,4'-DDD*	g/m³	-	-	-	< 0.0005	-
4,4'-DDE*	g/m³	-	-	-	< 0.0005	-
4,4'-DDT*	g/m³	-	-	-	< 0.0010	-
Dieldrin*	g/m³	-	-	-	< 0.0005	-
Endosulfan I*	g/m³	-	-	-	< 0.0010	-
Endosulfan II*	g/m³	-	-	-	< 0.0010	-
Endosulfan sulfate*	g/m³	-	-	-	< 0.0010	-
Endrin*	g/m³	-	-	-	< 0.0010	-
Endrin ketone*	g/m³	-	-	-	< 0.0010	-
Heptachlor*	g/m³	-	-	-	< 0.0005	-
Heptachlor epoxide*	g/m³	-	-	-	< 0.0005	-
Hexachlorobenzene*	g/m³	-	-	-	< 0.0005	-
Polycyclic Aromatic Hydrocarbons Trace in SVOC Water Samples						
Acenaphthene*	g/m³	-	-	-	< 0.0003	-
Acenaphthylene*	g/m³	-	-	-	< 0.0003	-
Anthracene*	g/m³	-	-	-	< 0.0003	-
Benzo[a]anthracene*	g/m³	-	-	-	< 0.0003	-
Benzo[a]pyrene (BAP)*	g/m³	-	-	-	< 0.0005	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene*	g/m³	-	-	-	< 0.0005	-
Benzo[g,h,i]perylene*	g/m³	-	-	-	< 0.0005	-
Benzo[k]fluoranthene*	g/m³	-	-	-	< 0.0005	-
1&2-Chloronaphthalene	g/m³	-	-	-	< 0.0003	-
Chrysene*	g/m³	-	-	-	< 0.0003	-
Dibenzo[a,h]anthracene*	g/m³	-	-	-	< 0.0005	-
Fluoranthene*	g/m³	-	-	-	< 0.0003	-
Fluorene*	g/m³	-	-	-	< 0.0003	-
Indeno(1,2,3-c,d)pyrene*	g/m³	-	-	-	< 0.0005	-
2-Methylnaphthalene*	g/m³	-	-	-	< 0.0003	-

Sample Type: Saline						
Sample Name:		TP10 10-Nov-2015 11:25 am	TP12 10-Nov-2015 12:50 pm	TP15 10-Nov-2015 2:10 pm	TP20 10-Nov-2015 3:20 pm	TP23 10-Nov-2015
Lab Number:		1499722.1	1499722.2	1499722.3	1499722.4	1499722.5
Polycyclic Aromatic Hydrocarbons Trace in SVOC Water Samples						
Naphthalene*	g/m³	-	-	-	0.0006	-
Phenanthrene*	g/m³	-	-	-	< 0.0003	-
Pyrene*	g/m³	-	-	-	< 0.0003	-
Phenols Trace (drinkingwater) in SVOC Water Samples by GC-MS						
2-Chlorophenol*	g/m³	-	-	-	< 0.0005	-
2,4-Dichlorophenol*	g/m³	-	-	-	< 0.0005	-
2,4,6-Trichlorophenol*	g/m³	-	-	-	< 0.0010	-
Phenols Trace (non-drinkingwater) in SVOC Water Samples by GC-MS						
4-Chloro-3-methylphenol*	g/m³	-	-	-	< 0.0010	-
2,4-Dimethylphenol*	g/m³	-	-	-	< 0.0005	-
3 & 4-Methylphenol (m- + p-cresol)*	g/m³	-	-	-	< 0.0010	-
2-Methylphenol (o-Cresol)*	g/m³	-	-	-	< 0.0005	-
2-Nitrophenol*	g/m³	-	-	-	< 0.0010	-
Pentachlorophenol (PCP)*	g/m³	-	-	-	< 0.010	-
Phenol*	g/m³	-	-	-	< 0.0010	-
2,4,5-Trichlorophenol*	g/m³	-	-	-	< 0.0010	-
Plasticisers Trace (non-drinkingwater) in SVOC Water by GCMS						
Butylbenzylphthalate*	g/m³	-	-	-	< 0.0010	-
Diethylphthalate*	g/m³	-	-	-	< 0.0010	-
Dimethylphthalate*	g/m³	-	-	-	< 0.0010	-
Di-n-butylphthalate*	g/m³	-	-	-	< 0.0010	-
Di-n-octylphthalate*	g/m³	-	-	-	< 0.0010	-
Plasticisers Trace (drinkingwater) in SVOC Water Samples by GCMS						
Bis(2-ethylhexyl)phthalate*	g/m³	-	-	-	< 0.003	-
Di(2-ethylhexyl)adipate*	g/m³	-	-	-	< 0.0010	-
Other Halogenated compounds Trace (drinkingwater) in SVOC Water						
1,2-Dichlorobenzene*	g/m³	-	-	-	< 0.0010	-
1,3-Dichlorobenzene*	g/m³	-	-	-	< 0.0010	-
1,4-Dichlorobenzene*	g/m³	-	-	-	< 0.0010	-
Other Halogenated compounds Trace (non-drinkingwater) in SVOC						
Hexachlorobutadiene*	g/m³	-	-	-	< 0.0010	-
Hexachloroethane*	g/m³	-	-	-	< 0.0010	-
1,2,4-Trichlorobenzene*	g/m³	-	-	-	< 0.0005	-
Other SVOC Trace in SVOC Water Samples by GC-MS						
Benzyl alcohol*	g/m³	-	-	-	< 0.005	-
Carbazole*	g/m³	-	-	-	< 0.0005	-
Dibenzofuran*	g/m³	-	-	-	< 0.0005	-
Isophorone*	g/m³	-	-	-	< 0.0005	-
Tributyl Tin Trace in Water samples by GCMS						
Dibutyltin (as Sn)*	g/m³	-	-	-	< 0.00011	-
Tributyltin (as Sn)*	g/m³	-	-	-	< 0.00009	-
Triphenyltin (as Sn)*	g/m³	-	-	-	< 0.00007	-
Total Petroleum Hydrocarbons in Water						
C7 - C9*	g/m³	< 0.10	< 0.10	0.11	< 0.10	< 0.10
C10 - C14*	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36*	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)*	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Analyst's Comments

Appendix No.1 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Saline

Test	Method Description	Default Detection Limit	Sample No
BTEX in Water by Headspace GC-MS*	Headspace GC-MS analysis, US EPA 8260B [KBIs:26687,3629]	0.0010 - 0.002 g/m^3	5
Organochlorine/Organonitro&phosphorus Pest.s Trace in Water	Liquid / liquid extraction, GPC (if required), GC-MS analysis	-	1, 3
Polycyclic Aromatic Hydrocarbons Trace in Water, By Liq/Liq*	Liquid / liquid extraction, SPE (if required), GC-MS SIM analysis [KBIs:4736,2695]	0.000005 g/m^3	1
Pentachlorophenol Trace in Water by GC-ECD	Solvent extraction, acetylation, GC-ECD analysis	0.000010 g/m^3	5
Semivolatile Organic Compounds Trace in Water by GC-MS	Liquid/Liquid extraction, GPC cleanup (if required), GC-MS FS analysis	-	4
Tributyl Tin Trace in Water samples by GCMS*	Solvent extraction, ethylation, SPE cleanup, GC-MS SIM analysis	0.00003 - 0.00005 g/m^3	4
Total Petroleum Hydrocarbons in Water*	Hexane extraction, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines [KBIs:2803,10734]	0.10 - 0.7 g/m^3	1-5
Total Digestion of Saline Samples*	Nitric acid digestion. APHA 3030 E 22nd ed. 2012 (modified).	-	1-5
Total Arsenic*	Nitric acid digestion, ICP-MS with dynamic reaction cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0042 g/m^3	1-5
Total Cadmium*	Nitric acid digestion, ICP-MS, ultratrace level. APHA 3125 B 22nd ed. 2012.	0.00021 g/m^3	1-5
Total Chromium*	Nitric acid digestion, ICP-MS with dynamic reaction cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0011 g/m^3	1-5
Total Copper*	Nitric acid digestion, ICP-MS with dynamic reaction cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0011 g/m^3	1-5
Total Lead*	Nitric acid digestion, ICP-MS, ultratrace level. APHA 3125 B 22nd ed. 2012.	0.0011 g/m^3	1-5
Total Nickel*	Nitric acid digestion, ICP-MS with universal cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0011 g/m^3	1-5
Total Zinc*	Nitric acid digestion, ICP-MS with dynamic reaction cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0042 g/m^3	1-5

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

AECOM

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION

FROM:	TO:
AECOM Ltd Level 2, 2 Hazeldean Road, Addington, Christchurch 8140	Hill Laboratory
Project Name: Naval Point	Client: CCC
RESULTS ATTENTION: Hannah Wright PROJECT NO:60444747 PURCHASE ORDER NO: SAMPLER(S): Alan Spooner	LAB QUOTE NO: ☑ Normal Priority ☐ High Priority ☐ Urgent Priority ☐ Special Quote RESULTS REQUIRED BY:

SAMPLE ID	MATRIX	DATE/TIME	COMMENTS	CONTAINERS	TPH (SCREEN)	Heavy metals (SCREEN)	PCP	ONOP (TRACE)	SVOC including TBT and OC	BTEX	PAH
				ANALYTES							
TP10	Groundwater	10/11/15			✓	✓		✓			✓
TP12	Groundwater	10/11/15			✓	✓		✓			
TP15	Groundwater	10/11/15	inc Dub of TPH		✓	✓		✓			
TP20	Groundwater	10/11/15			✓	✓			✓		
TP23	Groundwater	10/11/15			✓	✓	✓			✓	
	Groundwater										
	Groundwater										
	Groundwater										
	Groundwater										
	Groundwater										
	Groundwater										
	Groundwater										
	Groundwater										
Total No. of Sample Bottles:				Including:							Blank or Duplicate Samples

CHAIN OF CUSTODY DATA

RELINQUISHED BY		RECEIVED BY		METHOD OF SHIPMENT
NAME: Alan Spooner	DATE: 11/11/15	NAME: T Calder	DATE: 17.4	URS RECEPTION
COMPANY: AECOM Ltd	TIME:	COMPANY: Hill labs	TIME:	HILLS DOCKET

SAMPLE RECEIPT DATA

PLEASE COMPLETE THIS SECTION (CIRCLE AS APPROPRIATE) AND RETURN A COPY IMMEDIATELY AFTER RECEIVING SAMPLES)

ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER	YES / NO	PLEASE CONTACT THE LABORATORY	CUSTODY SEAL INTACT:	YES / NO / NA
			SAMPLES CHILLED:	YES / NO / NA Temp: °C
			LABORATORY BATCH NO:	

SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS:

CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES

REPORTING

REPORT FORMAT: FAX ☐ LETTER ☐ EMAIL ☑ DISK ☐

EMAIL ADDRESS: hannah.wright@aecom.com

INTERNAL USE - AECOM WORK INSTRUCTIONS AND CHECKLIST OVERLEAF

3174997222

Job No: 149722

Date Recv: 11-Nov-15 08:55

Received by: Tamara Calder

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	AECOM New Zealand Limited	**Lab No:**	1500069	SPv2
Contact:	H Wright	**Date Registered:**	12-Nov-2015	
	C/- AECOM Consulting Services (NZ) Limited	**Date Reported:**	30-Nov-2015	
	PO Box 4479	**Quote No:**		
	CHRISTCHURCH 8051	**Order No:**	60444747	
		Client Reference:	60444747 Naval Point CCC	
		Submitted By:	H Wright	

Sample Type: Saline

Sample Name:		TP18 11-Nov-2015 11:09 am	TP05 11-Nov-2015 12:30 pm	TP03 11-Nov-2015 2:20 pm		
Lab Number:		1500069.1	1500069.2	1500069.3		
Individual Tests						
Total Arsenic*	g/m³	0.034	0.058	0.036	-	-
Total Cadmium*	g/m³	< 0.00021	< 0.00021	0.0041	-	-
Total Chromium*	g/m³	< 0.0011	< 0.0011	0.0109	-	-
Total Copper*	g/m³	0.0117	0.040	1.78	-	-
Total Lead*	g/m³	0.0025	0.0025	0.0115	-	-
Total Nickel*	g/m³	< 0.007	< 0.007	0.049	-	-
Total Zinc*	g/m³	< 0.0042	0.0059	1.78	-	-
Pentachlorophenol Trace in Water by GC-ECD						
Pentachlorophenol (PCP)	g/m³	< 0.000010	< 0.000010	-	-	-
2,3,4,6-Tetrachlorophenol (TCP)	g/m³	< 0.000010	< 0.000010	-	-	-
Haloethers Trace in SVOC Water Samples by GC-MS						
Bis(2-chloroethoxy) methane*	g/m³	-	< 0.0005	-	-	-
Bis(2-chloroethyl)ether*	g/m³	-	< 0.0005	-	-	-
Bis(2-chloroisopropyl)ether*	g/m³	-	< 0.0005	-	-	-
4-Bromophenyl phenyl ether*	g/m³	-	< 0.0005	-	-	-
4-Chlorophenyl phenyl ether*	g/m³	-	< 0.0005	-	-	-
Nitrogen containing compounds Trace in SVOC Water Samples, GC-MS						
2,4-Dinitrotoluene*	g/m³	-	< 0.0010	-	-	-
2,6-Dinitrotoluene*	g/m³	-	< 0.0010	-	-	-
Nitrobenzene*	g/m³	-	< 0.0005	-	-	-
N-Nitrosodi-n-propylamine*	g/m³	-	< 0.0010	-	-	-
N-Nitrosodiphenylamine + Diphenylamine	g/m3	-	< 0.0010	-	-	-
Organochlorine Pesticides Trace in SVOC Water Samples by GC-MS						
Aldrin*	g/m³	-	< 0.0005	-	-	-
alpha-BHC*	g/m³	-	< 0.0005	-	-	-
beta-BHC*	g/m³	-	< 0.0005	-	-	-
delta-BHC*	g/m³	-	< 0.0005	-	-	-
gamma-BHC (Lindane)*	g/m³	-	< 0.0005	-	-	-
4,4'-DDD*	g/m³	-	< 0.0005	-	-	-
4,4'-DDE*	g/m³	-	< 0.0005	-	-	-
4,4'-DDT*	g/m³	-	< 0.0010	-	-	-
Dieldrin*	g/m³	-	< 0.0005	-	-	-
Endosulfan I*	g/m³	-	< 0.0010	-	-	-
Endosulfan II*	g/m³	-	< 0.0010	-	-	-
Endosulfan sulfate*	g/m³	-	< 0.0010	-	-	-
Endrin*	g/m³	-	< 0.0010	-	-	-

Sample Type: Saline						
Sample Name:		TP18 11-Nov-2015 11:09 am	TP05 11-Nov-2015 12:30 pm	TP03 11-Nov-2015 2:20 pm		
Lab Number:		1500069.1	1500069.2	1500069.3		
Organochlorine Pesticides Trace in SVOC Water Samples by GC-MS						
Endrin ketone*	g/m³	-	< 0.0010	-	-	-
Heptachlor*	g/m³	-	< 0.0005	-	-	-
Heptachlor epoxide*	g/m³	-	< 0.0005	-	-	-
Hexachlorobenzene*	g/m³	-	< 0.0005	-	-	-
Polycyclic Aromatic Hydrocarbons Trace in SVOC Water Samples						
Acenaphthene*	g/m³	-	< 0.0003	-	-	-
Acenaphthylene*	g/m³	-	< 0.0003	-	-	-
Anthracene*	g/m³	-	< 0.0003	-	-	-
Benzo[a]anthracene*	g/m³	-	< 0.0003	-	-	-
Benzo[a]pyrene (BAP)*	g/m³	-	< 0.0005	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene*	g/m³	-	< 0.0005	-	-	-
Benzo[g,h,i]perylene*	g/m³	-	< 0.0005	-	-	-
Benzo[k]fluoranthene*	g/m³	-	< 0.0005	-	-	-
1&2-Chloronaphthalene	g/m³	-	< 0.0003	-	-	-
Chrysene*	g/m³	-	< 0.0003	-	-	-
Dibenzo[a,h]anthracene*	g/m³	-	< 0.0005	-	-	-
Fluoranthene*	g/m³	-	< 0.0003	-	-	-
Fluorene*	g/m³	-	< 0.0003	-	-	-
Indeno(1,2,3-c,d)pyrene*	g/m³	-	< 0.0005	-	-	-
2-Methylnaphthalene*	g/m³	-	< 0.0003	-	-	-
Naphthalene*	g/m³	-	0.0005	-	-	-
Phenanthrene*	g/m³	-	< 0.0003	-	-	-
Pyrene*	g/m³	-	< 0.0003	-	-	-
Phenols Trace (drinkingwater) in SVOC Water Samples by GC-MS						
2-Chlorophenol*	g/m³	-	< 0.0005	-	-	-
2,4-Dichlorophenol*	g/m³	-	< 0.0005	-	-	-
2,4,6-Trichlorophenol*	g/m³	-	< 0.0010	-	-	-
Phenols Trace (non-drinkingwater) in SVOC Water Samples by GC-MS						
4-Chloro-3-methylphenol*	g/m³	-	< 0.0010	-	-	-
2,4-Dimethylphenol*	g/m³	-	< 0.0005	-	-	-
3 & 4-Methylphenol (m- + p-cresol)*	g/m³	-	< 0.0010	-	-	-
2-Methylphenol (o-Cresol)*	g/m³	-	< 0.0005	-	-	-
2-Nitrophenol*	g/m³	-	< 0.0010	-	-	-
Pentachlorophenol (PCP)*	g/m³	-	< 0.010	-	-	-
Phenol*	g/m³	-	< 0.0010	-	-	-
2,4,5-Trichlorophenol*	g/m³	-	< 0.0010	-	-	-
Plasticisers Trace (non-drinkingwater) in SVOC Water by GCMS						
Butylbenzylphthalate*	g/m³	-	< 0.0010	-	-	-
Diethylphthalate*	g/m³	-	< 0.0010	-	-	-
Dimethylphthalate*	g/m³	-	< 0.0010	-	-	-
Di-n-butylphthalate*	g/m³	-	< 0.0010	-	-	-
Di-n-octylphthalate*	g/m³	-	< 0.0010	-	-	-
Plasticisers Trace (drinkingwater) in SVOC Water Samples by GCMS						
Bis(2-ethylhexyl)phthalate*	g/m³	-	< 0.003	-	-	-
Di(2-ethylhexyl)adipate*	g/m³	-	< 0.0010	-	-	-
Other Halogenated compounds Trace (drinkingwater) in SVOC Water						
1,2-Dichlorobenzene*	g/m³	-	< 0.0010	-	-	-
1,3-Dichlorobenzene*	g/m³	-	< 0.0010	-	-	-
1,4-Dichlorobenzene*	g/m³	-	< 0.0010	-	-	-
Other Halogenated compounds Trace (non-drinkingwater) in SVOC						
Hexachlorobutadiene*	g/m³	-	< 0.0010	-	-	-
Hexachloroethane*	g/m³	-	< 0.0010	-	-	-
1,2,4-Trichlorobenzene*	g/m³	-	< 0.0005	-	-	-

Sample Type: Saline						
Sample Name:		TP18 11-Nov-2015 11:09 am	TP05 11-Nov-2015 12:30 pm	TP03 11-Nov-2015 2:20 pm		
Lab Number:		1500069.1	1500069.2	1500069.3		
Other SVOC Trace in SVOC Water Samples by GC-MS						
Benzyl alcohol*	g/m³	-	< 0.005	-	-	-
Carbazole*	g/m³	-	< 0.0005	-	-	-
Dibenzofuran*	g/m³	-	< 0.0005	-	-	-
Isophorone*	g/m³	-	< 0.0005	-	-	-
Tributyl Tin Trace in Water samples by GCMS						
Dibutyltin (as Sn)*	g/m³	-	< 0.00011	-	-	-
Tributyltin (as Sn)*	g/m³	-	0.00009	-	-	-
Triphenyltin (as Sn)*	g/m³	-	< 0.00007	-	-	-
Total Petroleum Hydrocarbons in Water						
C7 - C9*	g/m³	< 0.10	< 0.10	< 0.10	-	-
C10 - C14*	g/m³	< 0.2	< 0.2	< 0.2	-	-
C15 - C36*	g/m³	< 0.4	< 0.4	< 0.4	-	-
Total hydrocarbons (C7 - C36)*	g/m³	< 0.7	< 0.7	< 0.7	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Saline			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Pentachlorophenol Trace in Water by GC-ECD	Solvent extraction, acetylation, GC-ECD analysis	0.000010 g/m³	1-2
Semivolatile Organic Compounds Trace in Water by GC-MS	Liquid/Liquid extraction, GPC cleanup (if required), GC-MS FS analysis	-	2
Tributyl Tin Trace in Water samples by GCMS*	Solvent extraction, ethylation, SPE cleanup, GC-MS SIM analysis	0.00003 - 0.00005 g/m³	2
Total Petroleum Hydrocarbons in Water*	Hexane extraction, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines [KBIs:2803,10734]	0.10 - 0.7 g/m³	1-3
Total Digestion of Saline Samples*	Nitric acid digestion. APHA 3030 E 22nd ed. 2012 (modified).	-	1-3
Total Arsenic*	Nitric acid digestion, ICP-MS with dynamic reaction cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0042 g/m³	1-3
Total Cadmium*	Nitric acid digestion, ICP-MS, ultratrace level. APHA 3125 B 22nd ed. 2012.	0.00021 g/m³	1-3
Total Chromium*	Nitric acid digestion, ICP-MS with dynamic reaction cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0011 g/m³	1-3
Total Copper*	Nitric acid digestion, ICP-MS with dynamic reaction cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0011 g/m³	1-3
Total Lead*	Nitric acid digestion, ICP-MS, ultratrace level. APHA 3125 B 22nd ed. 2012.	0.0011 g/m³	1-3
Total Nickel*	Nitric acid digestion, ICP-MS with universal cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0011 g/m³	1-3
Total Zinc*	Nitric acid digestion, ICP-MS with dynamic reaction cell, ultratrace. APHA 3125 B 22nd ed. 2012.	0.0042 g/m³	1-3

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

AECOM

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION

FROM:	TO:
AECOM Ltd Level 2, 2 Hazeldean Road, Addington, Christchurch 8140	Hill Laboratory
Project Name: Naval Point	Client: CCC
RESULTS ATTENTION: Hannah Wright PROJECT NO:60444747 PURCHASE ORDER NO: SAMPLER(S): Alan Spooner	LAB QUOTE NO: ☐ Normal Priority ☐ High Priority ☐ Urgent Priority ☐ Special Quote RESULTS REQUIRED BY:

SAMPLE ID	MATRIX	DATE/TIME	COMMENTS	CONTAINERS	TPH (SCREEN)	Heavy metals (SCREEN)	PCP	ONOP (TRACE)	SVOC including TBT and OC	BTEX	PAH					
				ANALYTES												
TP18	Groundwater	11/11/15	Saline		✓	✓	✓									
TP05	Groundwater	11/11/15	"		✓	✓	✓		✓							
TP03	Groundwater	11/11/15	"		✓	✓										
	Groundwater															
	Groundwater															
	Groundwater															
	Groundwater															
	Groundwater															
	Groundwater															
	Groundwater															
	Groundwater															
	Groundwater															
	Groundwater															
Total No. of Sample Bottles:				Including:							Blank or Duplicate Samples					

CHAIN OF CUSTODY DATA

RELINQUISHED BY		RECEIVED BY		METHOD OF SHIPMENT
NAME: Amber Tumu	DATE: 11/11/15	NAME:	DATE:	URS RECEPTION
COMPANY: AECOM Ltd	TIME:	COMPANY:	TIME:	HILLS DOCKET

SAMPLE RECEIPT DATA

PLEASE COMPLETE THIS SECTION (CIRCLE AS APPROPRIATE) AND RETURN A COPY IMMEDIATELY AFTER RECEIVING SAMPLES)

ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER	YES / NO	PLEASE CONTACT THE LABORATORY	CUSTODY SEAL INTACT:	YES / NO / NA
			SAMPLES CHILLED:	YES / NO / NA Temp: °C
			LABORATORY BATCH NO:	

SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS:

CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES

REPORTING

REPORT FORMAT: FAX ☐ LETTER ☐ EMAIL ☑ DISK ☐

EMAIL ADDRESS: hannah.wright@aecom.com

INTERNAL USE - AECOM WORK INSTRUCTIONS AND CHECKLIST OVERLEAF

3115000699

Received by: Elyce Skinner

150 0069

12.1

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	AECOM Consulting Services (NZ) Limited	**Lab No:**	1501457	SPv1
Contact:	H Wright	**Date Registered:**	17-Nov-2015	
	C/- AECOM Consulting Services (NZ) Limited	**Date Reported:**	23-Nov-2015	
	PO Box 4479	**Quote No:**		
	CHRISTCHURCH 8051	**Order No:**	60444747	
		Client Reference:	Naval Point	
		Submitted By:	Alan Spooner	

Sample Type: Saline

Sample Name:		TP12 16-Nov-2015 10:54 am				
Lab Number:		1501457.1				
OrganoNitrogen & Phosphorus pesticides, trace, liq/liq GCMS						
Acetochlor	g/m³	< 0.00004	-	-	-	-
Alachlor	g/m³	< 0.00004	-	-	-	-
Atrazine	g/m³	< 0.00004	-	-	-	-
Atrazine-desethyl	g/m³	< 0.00004	-	-	-	-
Atrazine-desisopropyl	g/m³	< 0.00008	-	-	-	-
Azaconazole	g/m³	< 0.00002	-	-	-	-
Azinphos-methyl	g/m³	< 0.00008	-	-	-	-
Benalaxyl	g/m³	< 0.00002	-	-	-	-
Bitertanol	g/m³	< 0.00008	-	-	-	-
Bromacil	g/m³	< 0.00004	-	-	-	-
Bromopropylate	g/m³	< 0.00004	-	-	-	-
Butachlor	g/m³	< 0.00004	-	-	-	-
Captan	g/m³	< 0.00008	-	-	-	-
Carbaryl	g/m³	< 0.00004	-	-	-	-
Carbofenothion	g/m³	< 0.00004	-	-	-	-
Carbofuran	g/m³	< 0.00004	-	-	-	-
Chlorfluazuron	g/m³	< 0.00004	-	-	-	-
Chlorothalonil	g/m³	< 0.00004	-	-	-	-
Chlorpyrifos	g/m³	< 0.00004	-	-	-	-
Chlorpyrifos-methyl	g/m³	< 0.00004	-	-	-	-
Chlortoluron	g/m³	< 0.00008	-	-	-	-
Cyanazine	g/m³	< 0.00004	-	-	-	-
Cyfluthrin	g/m³	< 0.00004	-	-	-	-
Cyhalothrin	g/m³	< 0.00004	-	-	-	-
Cypermethrin	g/m³	< 0.00008	-	-	-	-
Deltamethrin (including Tralomethrin)	g/m³	< 0.00006	-	-	-	-
Diazinon	g/m³	< 0.00002	-	-	-	-
Dichlofluanid	g/m³	< 0.00004	-	-	-	-
Dichloran	g/m³	< 0.0002	-	-	-	-
Dichlorvos	g/m³	< 0.00008	-	-	-	-
Difenoconazole	g/m³	< 0.00008	-	-	-	-
Dimethoate	g/m³	< 0.00008	-	-	-	-
Diphenylamine	g/m³	< 0.00008	-	-	-	-
Diuron	g/m³	< 0.00004	-	-	-	-
Fenpropimorph	g/m³	< 0.00004	-	-	-	-
Fluazifop-butyl	g/m³	< 0.00004	-	-	-	-
Fluometuron	g/m³	< 0.00004	-	-	-	-
Flusilazole	g/m³	< 0.00004	-	-	-	-
Fluvalinate	g/m³	< 0.00004	-	-	-	-

Sample Type: Saline						
Sample Name:	TP12 16-Nov-2015 10:54 am					
Lab Number:	1501457.1					
OrganoNitrogen & Phosphorus pesticides, trace, liq/liq GCMS						
Furalaxyl	g/m³	< 0.00002	-	-	-	-
Haloxyfop-methyl	g/m³	< 0.00004	-	-	-	-
Hexaconazole	g/m³	< 0.00004	-	-	-	-
Hexazinone	g/m³	< 0.00002	-	-	-	-
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	g/m³	< 0.0002	-	-	-	-
Kresoxim-methyl	g/m³	< 0.00002	-	-	-	-
Linuron	g/m³	< 0.00005	-	-	-	-
Malathion	g/m³	< 0.00004	-	-	-	-
Metalaxyl	g/m³	< 0.00004	-	-	-	-
Metolachlor	g/m³	< 0.00004	-	-	-	-
Metribuzin	g/m³	< 0.00004	-	-	-	-
Molinate	g/m³	< 0.00008	-	-	-	-
Myclobutanil	g/m³	< 0.00004	-	-	-	-
Naled	g/m³	< 0.0002	-	-	-	-
Norflurazon	g/m³	< 0.00008	-	-	-	-
Oxadiazon	g/m³	< 0.00004	-	-	-	-
Oxyfluorfen	g/m³	< 0.00002	-	-	-	-
Paclobutrazol	g/m³	< 0.00004	-	-	-	-
Parathion-ethyl	g/m³	< 0.00004	-	-	-	-
Parathion-methyl	g/m³	< 0.00004	-	-	-	-
Pendimethalin	g/m³	< 0.00004	-	-	-	-
Permethrin	g/m³	< 0.00002	-	-	-	-
Pirimicarb	g/m³	< 0.00004	-	-	-	-
Pirimiphos-methyl	g/m³	< 0.00004	-	-	-	-
Prochloraz	g/m³	< 0.0002	-	-	-	-
Procymidone	g/m³	< 0.00004	-	-	-	-
Prometryn	g/m³	< 0.00002	-	-	-	-
Propachlor	g/m³	< 0.00004	-	-	-	-
Propanil	g/m³	< 0.0002	-	-	-	-
Propazine	g/m³	< 0.00002	-	-	-	-
Propiconazole	g/m³	< 0.00004	-	-	-	-
Pyriproxyfen	g/m³	< 0.00004	-	-	-	-
Quizalofop-ethyl	g/m³	< 0.00004	-	-	-	-
Simazine	g/m³	< 0.00004	-	-	-	-
Simetryn	g/m³	< 0.00004	-	-	-	-
Sulfentrazone	g/m³	< 0.0002	-	-	-	-
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	g/m³	< 0.00008	-	-	-	-
Tebuconazole	g/m³	< 0.00004	-	-	-	-
Terbacil	g/m³	< 0.00004	-	-	-	-
Terbufos	g/m³	< 0.00004	-	-	-	-
Terbumeton	g/m³	< 0.00004	-	-	-	-
Terbuthylazine	g/m³	< 0.00002	-	-	-	-
Terbuthylazine-desethyl	g/m³	< 0.00004	-	-	-	-
Terbutryn	g/m³	< 0.00004	-	-	-	-
Thiabendazole	g/m³	< 0.0002	-	-	-	-
Thiobencarb	g/m³	< 0.00004	-	-	-	-
Tolylfluanid	g/m³	< 0.00002	-	-	-	-
Triazophos	g/m³	< 0.00004	-	-	-	-
Trifluralin	g/m³	< 0.00004	-	-	-	-
Vinclozolin	g/m³	< 0.00004	-	-	-	-
Organochlorine Pesticides Trace in water, By Liq/Liq						
Aldrin	g/m³	< 0.000005	-	-	-	-
alpha-BHC	g/m³	< 0.000010	-	-	-	-

Sample Type: Saline						
Sample Name:		TP12 16-Nov-2015 10:54 am				
Lab Number:		1501457.1				
Organochlorine Pesticides Trace in water, By Liq/Liq						
beta-BHC	g/m³	< 0.000010	-	-	-	-
delta-BHC	g/m³	< 0.000010	-	-	-	-
gamma-BHC (Lindane)	g/m³	< 0.000010	-	-	-	-
cis-Chlordane	g/m³	< 0.000005	-	-	-	-
trans-Chlordane	g/m³	< 0.000005	-	-	-	-
2,4'-DDD	g/m³	< 0.000010	-	-	-	-
Total DDT Isomers	g/m³	< 0.00006	-	-	-	-
4,4'-DDD	g/m³	< 0.000010	-	-	-	-
2,4'-DDE	g/m³	< 0.000010	-	-	-	-
4,4'-DDE	g/m³	< 0.000010	-	-	-	-
2,4'-DDT	g/m³	< 0.000010	-	-	-	-
4,4'-DDT	g/m³	< 0.000010	-	-	-	-
Dieldrin	g/m³	< 0.000005	-	-	-	-
Endosulfan I	g/m³	< 0.000010	-	-	-	-
Endosulfan II	g/m³	< 0.000010	-	-	-	-
Endosulfan sulfate	g/m³	< 0.000010	-	-	-	-
Endrin	g/m³	< 0.000005	-	-	-	-
Endrin aldehyde	g/m³	< 0.000005	-	-	-	-
Endrin ketone	g/m³	< 0.000010	-	-	-	-
Heptachlor	g/m³	< 0.000005	-	-	-	-
Heptachlor epoxide	g/m³	< 0.000005	-	-	-	-
Hexachlorobenzene	g/m³	< 0.00004	-	-	-	-
Methoxychlor	g/m³	< 0.000005	-	-	-	-
Total Chlordane [(cis+trans)*100/42]	g/m³	< 0.00002	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Saline			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Organochlorine/Organonitro&phosphorus Pest.s Trace in Water	Liquid / liquid extraction, GPC (if required), GC-MS analysis	-	1

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

AECOM

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION

FROM:	TO:
AECOM Ltd Level 2, 2 Hazeldean Road, Addington, Christchurch 8140	Hill Laboratory
Project Name: Naval Point	Client: CCC
RESULTS ATTENTION: Hannah Wright PROJECT NO:60444747 PURCHASE ORDER NO: SAMPLER(S): Alan Spooner	LAB QUOTE NO: ☐ Normal Priority ☐ High Priority ☐ Urgent Priority ☐ Special Quote RESULTS REQUIRED BY:

SAMPLE ID	MATRIX	DATE/TIME	COMMENTS
TP12	Groundwater	16/11/15	Sailing
	Groundwater		
	Groundwater		
	Groundwater		
	Groundwater		
	Groundwater		
	Groundwater		
	Groundwater		
	Groundwater		
	Groundwater		
	Groundwater		
	Groundwater		
	Groundwater		
Total No. of Sample Bottles:			

ANALYSES REQUIRED

ANALYTES	CONTAINERS	TPH (SCREEN)	Heavy metals (SCREEN)	PCP	ONOP (TRACE)	SVOC including TBT and OC	BTEX	PAH					
					✓								
Including:													

Blank or Duplicate Samples

CHAIN OF CUSTODY DATA

RELINQUISHED BY
NAME: Amber Mills
COMPANY: AECOM Ltd
DATE: 16/11/15
TIME:

RECEIVED BY
NAME: Tamara Calder Hill Labs
COMPANY:
DATE: 20-8
TIME:

METHOD OF SHIPMENT
URS RECEPTION
HILLS DOCKET

SAMPLE RECEIPT DATA

PLEASE COMPLETE THIS SECTION (CIRCLE AS APPROPRIATE) AND RETURN A COPY IMMEDIATELY AFTER RECEIVING SAMPLES)

ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER	YES / NO	PLEASE CONTACT THE LABORATORY	CUSTODY SEAL INTACT: YES / NO / NA SAMPLES CHILLED: YES / NO / NA LABORATORY BATCH NO:	Temp: °C

SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS:

CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES

REPORTING

REPORT FORMAT: FAX ☐ LETTER ☐ EMAIL ☑ DISK ☐

EMAIL ADDRESS: hannah.wright@aecom.com

INTERNAL USE - AECOM WORK INSTRUCTIONS AND CHECKLIST OVERLEAF

3115014573

Job No: 150 1457

Date Recv: 18-Nov-15 12:10

Received by: Tamara Calder