MVV Environment Services Ltd

Proposed Energy from Waste Plant, Dundee

Geotechnical and Geo-environmental Interpretative Report

Issue 2 | 20 January 2017

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 Introduction

1.1 Introduction and Scope

An Energy from Waste and Combined Heat and Power Facility (EfW CHP) has been proposed in Baldovie, Dundee at National Grid Reference NO 446 328 (**Figures 1 and 2**). The new development is part of the existing Baldovie Industrial estate and is situated to the south of the existing Dundee Energy Recycling Ltd (DERL) site.

Arup (as part of a wider commission) were originally instructed by MVV Environment Services Ltd (MVV) to provide a Geotechnical and Geo-environmental Desk Study for the proposed footprint of the proposed Energy from waste plant and the existing DERL facility. This report was issued in April 2016 [1].

The Desk Study report made recommendations for an intrusive ground investigation to be undertaken. Geotechnical Engineering Limited (GEL) were appointed by MVV to undertake an intrusive investigation designed by Arup. The scope of investigation was designed to investigate the areas of the proposed energy from waste plant and the existing DERL site, as well as a number of other areas of the wider site that were not covered by the desk study report, as requested by MVV. GEL undertook the intrusive investigation between 16th August and 28th September 2016 and produced a Factual Report on Ground Investigation [2].

This report summarises an interpretation of the findings of the GEL investigation, and presents geotechnical and contamination assessments for the proposed EfW CHP development. Recommendations are also made for further work if required. This report should be read in conjunction with the Arup Desk Study Report [1] and GEL's Factual Report [2].

1.2 Approach

The approach to carrying out the intrusive investigation is generally in accordance with:

- British Standards Institute: BS EN 1997-2: 2007 Eurocode 7 – Geotechnical Design – Part 2: Geotechnical Investigation and Testing. (Inc Corrigendum June 2010).
- British Standards Institute: BS EN ISO 22475-1:2006 Geotechnical Investigation and Testing – Sampling Methods and Groundwater measurements. Part 1: Technical Principles for Execution. (Inc Corrigendum June 2007).
- British Standards Institute: BS EN 1997 – 1:2004 Geotechnical Design – Part 1: General Rules.
- DEFRA: Contaminated Land Reports CLR7 – 10, 2002 and CLR11, 2004.

- British Standards Institute: BS10175 Investigation of Potentially Contaminated Sites – Code of Practice. 2001.
- Site Investigation Steering Group: Books 1 to 4 Site Investigation in Construction. 1993.

1.3 Limitations

This report has been prepared for the use of MVV in connection with the proposed development. It should not be relied upon by any third party.

The interpretation of the ground conditions is based on the information obtained from the desk study and ground investigation. All reasonable skill, care and diligence has been exercised in carrying out this report, within the timescales available. Notwithstanding the efforts made in carrying out this study, it is possible that other soil and groundwater conditions, as yet undetected, may exist, and thus must be taken into account in any reliance on the findings of this report.

This report considers the implications of ground contamination (including groundwater and ground gas) across the site. It does not include an assessment of implications of hazardous materials such as asbestos containing materials (ACM). It also does not consider other ground related risks such as unexploded ordnance, ecology, archaeology, obstructions, utilities or non-native invasive plant species.

2 The Site

2.1 Site Location and Description

The proposed development is located within the Baldovie Industrial Estate, to the south of the existing Dundee Energy Recycling Ltd (DERL) at National Grid Reference NO 446 328.

It is bounded to the west by Forties Road, to the north by the existing DERL plant, to the east by open ground covered with vegetation and to the south by a metal scrap yard. A watercourse known as the 'Dighty Water' passes approximately 100m to the south of the site.

The proposed EfW CHP site is of rectangular shape, with approximate dimensions of 75m x 150m, and relatively flat topography. It is understood to comprise an area of open ground with some small areas used for the stockpiling of materials. The ground surface is understood to comprise compacted granular material.

Drive on access to the site can be gained from Forties Road.

2.2 Proposed Development

The proposed development comprises the construction of a new Energy from Waste Combined Heat and Power (EfW CHP) facility, with MVV also taking over the existing DERL Recycling Centre and carrying out ancillary works as part of the proposals, **Figure 2**. These additional areas have also been considered as part of the investigation, as requested by MVV. The proposals for the EfW CHP facility and associated areas are described below.

- **Energy from Waste Combined Heat and Power Facility (Area A) -** A new EfW CHP facility is proposed to be constructed. A plan of the proposed development is shown in **Figure 3**, with an illustration of the proposed development (courtesy of MVV Umwelt) shown in **Image 1**. As shown, in addition to paved and car parking areas, it is envisaged that the development will comprise of a number of buildings, namely: storage areas; tipping hall; bunker; boiler house, administration building; ash bunker; machine house; chimney stacks; reactor and flue gas cleaning building. At the time of writing the proposals are still under development. At the time of writing the proposals are still under development, however it is anticipated that finished floor levels will be 29mAOD.

- **DERL facility (Area E)** - As part of the proposal, MVV will take on the management of the existing DERL facility in addition to the operation of the new EfW plant. Whilst no major construction works are proposed in this area, as part of this study, MVV want to understand and quantify risks associated with potential contamination on the existing DERL site in addition to the proposed development site and the need for any further investigations to characterise geo-environmental risks further. A plan demarking these areas is shown in **Figure 2**.

- **Contractor's Compound and Car Park (Area D)** - As part of the works, MVV are proposing to construct a contractor's compound and car park to the west of the existing DERL recycling centre and proposed EfW facility. As part of this study, investigation to understand shallow ground conditions and geo-environmental constraints in this area has been undertaken.

- **New Pipeline** - The proposals also include the construction of a new pipeline between the existing DERL site and the neighbouring Michelin factory to the east of the site. As part of this study investigation to determine ground conditions and geo-environmental constraints in this area have also been undertaken.

Image 1: The proposed Energy from Waste development (image: MVV Umwelt)

2.3 Summary of Desk Study and Preliminary Investigation Findings

A desk study was prepared by Arup April 2016 covering the sites of the existing DERL site and proposed EfW CHP. The following presents a summary of the findings of the report.

- The historical maps indicate that the DERL site was occupied by a nursery in 1865, the date of the earliest historical map of the site. The nursery was no longer shown after 1903, with the site shown as open ground until 1975. Between 1975 and 1982 an incinerator was constructed at the site, to the north of the proposed development. Between 1994 and 1995, the section between the incinerator and the proposed EfW plant location was occupied by a public refuse tip. The site is at its current layout and use since 2006.

- The historical maps show that the area surrounding the site has been previously used for agricultural purposes. Currently, there is a tyre factory to the south-east of the proposed EfW plant site and a number of industrial sites to the north-west.

- Previous site investigations undertaken on and in the vicinity of the site indicate that the ground conditions at the location of the proposed EfW plant comprise made ground, encountered up to 3m, and deep alluvial deposits overlying sandstone and mudstone bedrock. Superficial deposits have been encountered up to 25m depth below existing ground level. Groundwater is anticipated at depths between 1.48m and 2.80m below existing ground level.

- Given the anticipated loading associated with the development and the tolerance for differential movement, it is envisaged that a piled foundation scheme will be required. Specific details regarding the recommended pile type are to be confirmed on completion of the additional ground investigation. It may be necessary to adopt an active dewatering system to temporarily lower the groundwater table for the construction of the bunkers. Further ground investigation can provide information to advise the required temporary works design.

- The previous geo-environmental investigation performed on the site has identified the presence of potential source – pathway – receptor linkages that require further investigation to permit a full assessment of the risks to human health, the water environment, buried structures and services to be performed.

- The desk study recommended that prior to the site development, additional ground investigation be carried out to confirm the ground conditions below the site area, to provide additional information on the rockhead profile and rock strength and to confirm the extent and nature of any contamination.

The desk study did not explicitly cover the areas of the proposed contractor's compound, car park and pipeline, however, a review of available information indicates that the anticipated ground conditions are broadly consistent with the existing DERL and proposed EfW CHP facility.

3 Preliminary Conceptual Site Model

The following Preliminary Conceptual Site Model is based upon the findings of the desk study [1], amended to take into account the potential further pollutant linkages that could exist associated with the proposed Contractor's Compound/Car Park and Pipeline developments.

3.1 Potential Contamination Sources

3.1.1 On-site

DERL site

The DERL site to the north of the proposed EfW site is an active recycling centre and incinerator plant with a number of chimneys, storage tanks and cooling towers. The DERL site is a registered waste transfer and disposal site and has authorisations for the transfer of wastes including:

- Commercial & Industrial Waste
- Civic Amenity Waste
- Household Waste
- Clinical Wastes
- Highly Infectious Wastes
- Pharmaceutical Waste
- Special Waste (as define in EPA 1990:S62 Of 1996 Regs)
- Substances in Control Of Radioactive Substances Act 1960.

No investigations have been performed within the vicinity of the existing DERL structures at the site and therefore unknown contaminants may be present in this locality. The south-east of the DERL site is located on a former public refuse tip.

Proposed EfW CHP facility

Desk study researches have identified that the made ground within the proposed EfW CHP site to contain chrysotile asbestos.

Contaminants present within the made ground could (predominantly metals and hydrocarbons) be impacting on groundwater and potentially surface water quality.

Elevated ground gases have been identified in natural deposits (peat containing) in SLR BH6 and BH7 performed on the proposed EfW site.

3.1.2 Off-site

Off-site potential sources of contaminants are identified predominantly to the west (Baldovie Industrial Estate), south-east (Michelin tyre factory – known hydrocarbon contamination) and south (scrapyard) of the site.

The scrapyard operation to the south of the site (66m) has an active waste treatment / disposal licence for the storage of waste motor vehicles.

Dundee & Ferry Skip hire, to the west of the site (100m) have an operational waste treatment / disposal licence for Acid in Lead/Acid Batteries from Households; Commercial Waste; Household Waste; Inactive Waste; Industrial Waste; Maximum Waste Permitted By Licence; Waste Oil from Households.

3.2 Potential Receptors

The proposed development comprises the construction of a new Energy from Waste Combined Heat and Power (EfW CHP) plant. The potential receptors for this proposed end-use are as follows:

- Construction and maintenance workers;
- Site Users (Staff and Visitors)
- Adjacent Site Users (off site)
- Surface Water (via groundwater); and
- Structures and services.

3.3 Potential Pathways

The Key pollutant linkages associated with the proposed development are sown in Table 3.1.

Table 3.1: Potential Pollution Linkages

Sources	Pathways	Receptors
On-site ***DERL site*** DERL recycling and incinerator site (waste storage), tanks, chimneys, refuse tip, made ground (various). Contaminants and leachates beneath DERL structures. ***EfW CHP site*** Made ground containing ACM's, metals and hydrocarbons potentially impacting groundwater quality and possible surface water quality. Ground gases in natural deposits (peat). **Off-Site** Surrounding land uses have included and include tanks, electricity sub-station, works, tyre factory (with known free phase hydrocarbon contamination), waste storage and transfer sites.	Inhalation of dust derived from contaminated soil Inhalation of vapours from contaminated soil or groundwater Ingestion of contaminated soil or dust Dermal absorption of contaminants in soil Ingress of soil gas into enclosed spaces	**Human Health** Construction workers Staff and Visitors Adjacent site users (off site) Maintenance workers
	Infiltration and percolation through contaminated soils Vertical leaching into aquifers Lateral migration onto on or off site sources	**Water Environment** Groundwater impacting on quality of Dighty Water
	Chemical attack when in direct contact with soils or groundwater	**Structures and Services** Buried concrete structures

3.4 Summary

From the desk study it is apparent that there are a number of uncertainties regarding potential contaminant pathways at the site. Further intrusive investigations were therefore considered to be required to:

- Confirm the nature of the underlying soils and bedrock, in particular the geotechnical properties of the natural soils and rock;
- Determine the nature and extent of any contaminants in the soil and groundwater;
- Determine potential contamination pathways;
- Assess the risk associated with any contaminants present at the site.

A preliminary Conceptual Site Model (CSM) is presented in **Figure 4**. This CSM will be revisited following the completion of additional ground investigations.

4 Ground Investigation

GEL was commissioned by MVV to undertake a ground investigation of the four areas of the site identified in Section 2.2, to a scope of work designed by Arup. The purpose of the ground investigation was to:

- Confirm the nature of the underlying soils and bedrock, in particular the geotechnical properties of the natural soils and rock;
- Determine the nature and extent of any contaminants in the soil and groundwater;
- Determine potential contamination pathways;
- Assess the risk associated with any contaminants present at the site.

The factual information arising from the investigation is presented within GEL's Factual Report [2].

4.1 Scope

The works comprised the following:

Area A - Proposed EfW CHP facility

- 5 No Cable percussive boreholes to rockhead (18.2 to 25.9mbgl)) (Boreholes BHR01 to BHR05).
- 4 No Rotary cored continuations to obtain between 15.5 and 20.3m of core (BHR01-03, 05)
- 1 No Rotary Borehole (BHR04) was open holed from surface to rockhead (24.9m) then cored to 41.1mbgl.
- 3 No Cable Percussive Boreholes (BHS09 to BHS11) were drilled to depths between 15 and 15.45mbgl.
- 8 No machine excavated trial pits to depths varying between 1.35 and 4.6mbgl. (TP01 – 08)
- 3 No machine excavated trial pits to depths between 3.7 and 4.5m bgl. The purpose of these pits was to help delineate the extent of asbestos contamination identified in previous investigation. (TP D01- 03).
- 3 No soakaway infiltration tests (TPs 6 – 8)
- 4 No Dynamic Cone Penetrometer tests (DCPs) were carried out at depths of between 0.5 and 0.8m below ground level in trial pits 3, 4, 6 and 7.
- In-situ geotechnical tests
- Collection of soil, groundwater and rock samples for laboratory testing.
- Installation of 8 No combined gas and groundwater monitoring standpipes.
- 6 rounds of groundwater and gas monitoring visits over a 2 month period

Area D – Proposed construction compound and contractors parking

- 2 No windowless sample holes (BHS12 and BHS13) to depths of 5.00m and 6.45mbgl
- In-situ geotechnical tests
- Collection of soil, groundwater and rock samples for laboratory testing.
- Installation of 2 No combined gas and groundwater monitoring standpipes.
- 6 rounds of groundwater and gas monitoring visits over a 2 month period.

Area E – Existing DERL facility

- 4 No cable percussive boreholes (BHS01-02, BHS04 and BHS08) drilled to depths of 5..25m and 9.40mbgl
- 4 No. windowless sample holes (BHS03, BHS05-07) to depths between 5.00 and 6.45mbgl.
- In-situ geotechnical tests
- Collection of soil, groundwater and rock samples for laboratory testing.
- Installation of 8 No combined gas and groundwater monitoring standpipes.
- 6 rounds of groundwater and gas monitoring visits over a 2 month period.

Route of proposed pipeline

- 5 No Cable percussive boreholes to rockhead (4.2m to 7.0m) (Boreholes BHM01 to BHM05).
- 4 No follow-on rotary cored boreholes into bedrock (between 5.7m and 8.35m core obtained). (Boreholes BHM01to 03 and BHM05)
- 1 No Rotary Borehole (BHM04A) was open holed from surface to rockhead (24.9m) then cored to 41.1mbgl.
- In-situ geotechnical tests
- Collection of soil, groundwater and rock samples for laboratory testing.
- Installation of 5 No combined gas and groundwater monitoring standpipes.
- 6 rounds of groundwater and gas monitoring visits over a 2 month period.

4.2 Geotechnical Sampling

Soil and rotary drilling methods to obtain “Category A” standard samples were deployed for this investigation in accordance with the guidance presented within BS EN 1997-2:2007 and BS EN 22475-1:2006. Due to the presence of gravel, cobbles and boulders within the natural cohesive deposits “Category B” samples were also obtained using an in-situ SPT, U100 samples and conventional shell and auger drilling.

All rock cores obtained from the boreholes conformed to the requirements of BS EN 22475-1:2006 in obtaining “Category A, Quality Class 1” samples.

4.3 Geotechnical Testing

4.3.1 In-situ testing

180 Standard Penetration Tests (SPT's) were undertaken in both cohesive and granular soils in the boreholes during the investigation.

4 No. Dynamic Cone Penetrometer tests were performed within the shallow soils to determine an equivalent California Bearing Ratio (CBR).

Three soil infiltration tests were performed in accordance with BRE Digest 365, in trial pits TP6, 7 and 8.

4.3.2 Laboratory testing

Both during and on completion of the fieldwork element of the investigation, soil samples were transported to GEL's geotechnical laboratory, where the following tests were carried out;

- Natural Moisture Content analyses;
- Atterberg Limit tests;
- Particle Size Distribution analyses;
- Undrained Triaxial tests;
- Oedometer Consolidation Tests;
- California Bearing Ratio (CBR) tests;
- Moisture Condition Value tests at natural moisture content;
- Moisture Condition Value calibration analyses;
- pH and water soluble sulphate tests of soil and rock samples;
- Organic Matter Content tests;
- Uniaxial Compressive Strength (UCS) tests; and
- Point Load Tests

4.4 Geo-environmental Sampling and Testing

Samples for chemical testing were selected to provide an indication of the horizontal and vertical distribution of contaminants across the proposed development area, for input into a risk assessment. The selection of samples also considered the proposed development, site history and the pollutant linkages and receptors to be assessed.

Soil samples were collected within each strata or at 0.50m intervals in the made ground and at 1.00m intervals in the natural soils. Additional samples were also collected if there was visual or olfactory evidence of contamination. All of the

samples were collected in the appropriate containers for the specific analyses required.

All samples collected were stored in cool boxes and dispatched by courier to the chemical testing laboratory

The chemical analysis on the soil and groundwater samples was undertaken by i2 Analytical. The results of the chemical testing are presented within the GEL's Factual Report [2].

4.4.1 Soil Analysis

The following suites of testing were carried out on soil samples:

- **General Contaminant Suite (72 Tests)**: Arsenic, Cadmium, Chromium (total and hexavalent), copper, lead, mercury, beryllium, antimony, nickel, selenium, vanadium and zinc, pH, total cyanide, boron (water soluble), total phenols, and total organic carbon.
- **Asbestos (41 tests)**
- **Asbestos quantification (7 tests)**
- **BTEX and MTBE (71 Tests):** MTBE, Benzene, Toluene, Ethylbenzene, m & p-xylene, and o-xylene.
- **Volatile and Semi-Volatiles Suite (71 tests)** : Including, phenol, benzene, ethylbenzene, toluene and xylene (BTEX), and Polyaromatic Hydrocarbons (PAH)
- **Total Petroleum Hydrocarbons (71 Tests):** TPHCWG Aliphatic/Aromatic Split
- **Polychlorinated Biphenyls (19 Tests)**
- **UKWIR Suite (7 tests)**
- **WAC Testing (10 Tests)**

Aggressive ground testing, including 2:1 sulphate and pH testing was also carried out, as detailed in Section 4.3.2.

Additionally 19 of the soil samples were also submitted for leachate analysis for metals and polyaromatic hydrocarbons.

The samples were carried out in the materials indicated in Table 4.1 below.

Table 4.1: Summary of Soils Testing Carried Out

Suite of Testing	No. of Tests	
	Made Ground	Natural Deposits
General Suite	35	37
Asbestos	41	0
Asbestos quantification	7	0
TPHCWG	34	37
BTEX and MTBE	34	37
VOC and sVOCs	34	37
PCBs	11	8
Leachate	19	0
UKWIR	7	0
WAC Tests	7	3

4.5 Groundwater Analysis

Standpipes were installed on site during the 2016 detailed ground investigation. Groundwater samples were collected from the majority of the monitoring wells, with the exception of boreholes M02, S05, S06, S07 and S10, where insufficient volume of sample could be recovered following purging to allow testing to be carried out.

The following tests were carried out on the groundwater samples:

- **General Contaminant Suite (26 Tests)**: Arsenic, Cadmium, Chromium (total and hexavalent), copper, lead, mercury, beryllium, antimony, nickel, selenium, vanadium and zinc, Potassium, Phenol, Total Cyanide, Sulphate (as SO4) Ammoniacal Nitrogen, Chloride, Nitrate, Nitride, Dissolved Organic Carbon, Calcium Hardness as Calcium Carbonate and pH.
- **Polyaromatic Hydrocarbons (USEPA 16) (26 Tests**);
- **BTEX and Gasoline Range Organic Compounds (26 Tests):** MTBE, Benzene, Toluene, Ethylbenzene, m & p-xylene, and o-xylene.

- **Volatile and Semi-Volatiles Suite (26 tests)** : Including, phenol, benzene, ethylbenzene, toluene and xylene (BTEX), and Polyaromatic Hydrocarbons (PAH)
- **Total Petroleum Hydrocarbons (26 Tests):** TPHCWG Aliphatic/Aromatic Split

The groundwater samples were recovered from monitoring wells installed within the made ground, natural drift deposits and bedrock on two separate occasions.

The suites undertaken during the two monitoring rounds are indicated in Table 4.2 below.

Table 4.2: Summary of Soils Testing Carried Out

Suite of Testing	No. of Tests	
	Round 1	Round 2
General Suite	16	10
Polyaromatics Hydrocarbons	16	10
TPHCWG	16	10
BTEX and MTBE	16	10
VOC and sVOCs	16	10
PCBs	16	10

4.6 Surface Water Analysis

Three surface water samples were collected from the Dighty Water at the locations shown on **Figure 5**. The samples were tested for the same suite of parameters as the groundwater samples.

4.7 Gas Monitoring

Six ground gas monitoring rounds were carried out upon completion of the drilling works on site, between 28th September 2016 and 16th November 2016.

Details of the monitoring wells and response strata are detailed in Table 4.3.

Table 4.3: Monitoring Well Response Zones

Borehole No.	Response Zone (mbgl)		Response Strata
	Top	Bottom	
BHM01	6.0	12.0	Bedrock
BHM02	2.0	3.5	Gravel
BHM03	2.5	3.5	Glacial till and gravel
BHM04	2.5	6.5	Gravel
BHM05	3.0	7.5	Layers of sand, gravel and clay
BHR01	2.0	13.0	Layers of sand, gravel and clay
BHR02	3.5	4.5	Peat
BHR03	0.5	2.0	Made Ground
BHR04A	27.0	38.0	Bedrock
BHR05	2.5	12.0	Layers of clay, sand and gravel
BHS01	1.5	6.0	Sand and gravel
BHS02	2.0	4.5	Sand
BHS03	2.5	6.0	Peat, clay and sand
BHS04	2.0	6.0	Gravel and sand
BHS05	2.5	5.5	Layers of clay, gravel and sand
BHS06	2.0	4.5	Layers of clay and sand
BHS07	0.5	1.5	Made ground
BHS08	2.0	7.0	Silt, gravel and sand
BHS09	3.0	5.0	Clay, peat and gravel
BHS10	1.5	2.5	Made ground
BHS11	9.0	14.0	Sand, silt and clay
BHS12	1.3	3.5	Clay and gravel
BHS13	2.0	5.5	Clay, gravel and sand

Further details regarding the sequence of strata beneath the site, is provided in Section 5.

5 Ground Conditions

5.1 Introduction

The assessment of the ground conditions is based on the EFW Dundee and Angus Factual Report on Ground Investigation produced by Geotechnical Engineering Ltd. [2].

The locations of the exploratory holes are shown on **Figure 5** at the back of the report.

As stated in Section 4.1 the ground investigation targeted four areas:

- Area A: Proposed EfW CHP site
- Area D: Proposed construction compound
- Area E: Existing DERL site
- Route of the proposed pipeline.

The results of the 2016 ground investigation are considered to be generally consistent with the findings of the desk study, with the strata generally comprising variable made ground overlying generally cohesive then granular alluvium with medium dense fluvioglacial sands and gravels at depth. Sandstone bedrock interbedded with siltstone and mudstone was encountered beneath the fluvioglacial deposits.

The thickest accumulations of alluvium were generally encountered in the west of the site, in the areas of Area A: proposed EfW CHP facility, Area D; the proposed construction compound and Are E: the existing DERL site. The results of the investigation indicated that alluvium deposits generally get thinner or are not encountered in the north and the east of the site, in particular along the route of the proposed pipe line.

Peat was encountered in eight exploratory holes across Area A and Area E of the site, ranging in thickness from 0.05m to 1.60m. The peat was variable in nature, with plastic, spongy fibrous, pseudo-fibrous and amorphous peat all recorded on the logs.

The ground conditions encountered for each area are discussed separately below (see Sections 5.2 to 5.6) with separate geotechnical cross sections for each area presented on **Figure 6 to Figure 9**.

5.2 Area A: Proposed EfW CHP Facility

Nine boreholes and eleven trial pits were drilled or excavated to depths between 1.35m and 41.40mbgl in the area of the proposed EfW CHP Site. The exploratory holes encountered made ground overlying thick alluvium deposits with the deep boreholes (BHR Series) encountering fluvioglacial deposits and bedrock at depth.

The strata encountered during the investigation are presented in Table 5.1 below.

Table 5.1 Stratigraphy at the Proposed EfW CHP site

Stratum Description	Depth to top of stratum (m)	Depth to base of stratum (m)	Level of the top of stratum (mAOD)	Level of the base of stratum (mAOD)	Proven thickness (m)
Made Ground	0.00	0.90 – 3.10	27.80 – 28.55	24.95 – 27.00	0.90 – 3.10
Alluvium	0.90 – 3.50	15.00 – 21.00	24.61 – 27.00	7.05 – 12.85	11.90– 19.40
Fluvioglacial sand and gravel	15.00 – 21.00	18.10 – 25.90	7.05 – 12.85	2.15 – 9.96	0.90 – 8.10
Bedrock	18.10 – 25.90	24.90 – 41.10*	2.15 – 9.96	-16.20 – 3.40*	0.90 – 16.80*

* = Thickness of bedrock not proven.

5.2.1 Made Ground

5.2.1.1 Description

Made ground was encountered at the ground surface in all exploratory holes, except for BHR04A, to depths ranging between 0.90m and 3.10mbgl.

The made ground was general described as light brown to dark brown gravelly sand or silt overlying a brown sandy gravel. Both materials were described as containing gravel consisting of brick, sandstone, mortar, tarmac and crystalline (rock). Metal fragments were also encountered. A low to high cobble content and a low boulder content was encountered within the deposits.

Organic fragments are occasionally noted at the top of the deposit and/or at the base where occasional soft to firm cohesive deposits are also present. It is likely that these deposits are reworked alluvium deposits.

Limited descriptions of the in situ density of the made ground indicate the materials to be variable, with descriptions ranging from loose to dense.

5.2.1.2 In-situ Testing

Eleven Standard Penetration Tests (SPTs) were carried out in the made ground. SPT ‘N’ values ranging between 6 and 150 were recorded, confirming the variability of the deposits. Some of the high, extrapolated, ‘N’ values are considered to potentially indicate the presence of cobbles and boulders. The results are plotted against elevation on **Figure 10**.

Five dynamic cone penetration tests were carried out within the made ground from depths ranging between 0.53m to 0.99mbgl to depths ranging between 0.63m to 1.34mbgl. The lack of penetration was due to the density of the granular made ground. The dynamic cone blow counts with depth were then converted into an in-situ California Bearing Ratio by the GI Contractor. CBR values ranging between 7% and 3444% were reported. Particularly high values were noted at the base of the DCP tests and these are considered likely to be a result of the DCP tests refusing on cobbles or boulders. CBR values before refusal ranged between 7% and 440%, reflecting the granular strata described on the logs.

Four soakaway tests were undertaken in TP06, TP07 and TP08 within the made ground. The soil infiltration rate ranged between 2.2 x 10^{-5}m/s and 4.1 x 10^{-6}m/s. These values are typical for a variable granular deposit.

Forty eight in-situ resistivity tests were undertaken in the top 0.5mbgl within the made ground. The results ranged between 24.5 and 201.1ohm m.

5.2.1.3 Laboratory Testing

Two Atterberg Limit tests were undertaken on samples of the cohesive made ground. The results of the tests indicate that the plasticity index of the made ground ranges from 7% to 15%. The results indicate that the cohesive made ground is a low to intermediate plasticity silt. The results are displayed in **Figure 11.**

Twenty Particle Size Distribution tests (PSDs) were undertaken on samples of the made ground. The results indicated the made ground to predominantly comprise slightly silty to silty sandy gravel. The results of two samples tested were classified as slightly sandy gravels. The results of the PSD tests indicate that the made ground is generally variable in nature, however test results indicate that the made ground is typically coarser grained than described in the exploratory hole logs. The results are shown in **Figure 12**.

Seven pH tests and sulphate tests were carried out on samples of the made ground. The pH of the material ranged from 7.5 to 10.2 and the sulphate level ranged from 0.02g/l to 0.31g/l.

5.2.2 Alluvium Deposits

5.2.2.1 Description

Alluvium was encountered in all exploratory holes except BHR04A, TP02 and TP07; which did not penetrate the full thickness of the made ground. The alluvium was encountered at depths ranging between 0.90m and 3.10mbgl, extending to depths ranging between 15.00m and 21.00mbgl. The thickness of the deposit ranged between 12.10m and 19.40m.

The alluvium is indicated to be variable, comprising interbedded cohesive and granular material, generally becoming more granular with depth.

The cohesive alluvium is generally described as very soft to soft, becoming firm or stiff at depth, grey or brown silty clay/clayey silt. It is sometimes described as laminated at depth.

The top of the alluvium to a depth between 3.10m to 5.00mbgl is generally described as cohesive, with organic fragments and an organic odour noted. Layers of peat are also encountered in this organic layer in BHR02, BHR03, BHR04, BHS09, BHS10, BHS11 and TP04 to thicknesses ranging between 0.05m to 1.60m. Descriptions of the peat vary between plastic and spongy fibrous to pseudo-fibrous peat.

The alluvium is generally not described as organic beneath 5mbgl, with the exception of in BHS10, where rare black organic fragments were encountered in a firm clay encountered between 8.00m and 12mbgl.

The granular alluvium is generally described as very loose to loose, becoming medium dense at depth, brown or greyish brown silty sand occasionally sandy or gravelly. A medium dense gravel layer is encountered below the organic clay layer in a number of exploratory holes. Occasional sand layers encountered in the upper organic clay layer are generally green or black in colour, with organic fragments or pockets of peat.

5.2.2.2 Insitu Testing

Seventy five Standard Penetration Tests (SPTs) were carried out in the alluvium deposits. SPT ‘N’ values ranging between 1 and 28 were recorded. The majority of the SPT 'N' values recorded ranged between 10 and 20. An extrapolated ‘N’ value of 200 was reported at 3mbgl in BHR05. The clay layer at this location had a high cobble content and the result is considered an anomaly. The results otherwise confirm the descriptions on the logs with the majority of the results indicating loose granular deposits and generally very soft to soft cohesive deposits. The results are plotted against level on **Figure 10.**

Twelve in-situ hand vanes were carried out in the alluvium. The values range between 32 and 81kPa indicating that the alluvium deposits to be a low to high strength clay. The results are plotted against level on **Figure 13.**

5.2.2.3 Laboratory Testing

Twenty-one Atterberg tests were undertaken on samples of the cohesive alluvium. The results indicated that plasticity indexes range from 8% to 140%. The results confirmed the variability of materials as described in the borehole logs, indicating the cohesive alluvium to range from low to extremely high plasticity. One of these tests was undertaken on a sample of Peat. This sample recorded a plasticity index of 140%, indicating the Peat to be of extremely high plasticity. It is considered that the other extremely high plasticity results may also reflect the localised presence of peat. The results are shown on **Figure 11.**

Twenty-nine moisture content tests were undertaken on samples of the alluvium, recording moisture contents ranging from 20% to 182%. Two moisture content tests were undertaken on samples of Peat, recording moisture contents of 172%

and 295%. It is considered that the other high moisture content tests on samples of alluvium may reflect the localised presence of peat.

Six undrained triaxial tests were undertaken on samples of the cohesive alluvium. The results indicate the deposits to have undrained shear strengths ranging from 15kPa – 56kPa. One of the samples was from a peat layer, this test result indicated an undrained shear strength of 50kPa. The results indicate that the alluvium deposits are typically very low to medium strength. This is generally in agreement with the in-situ hand vane test results. The results are plotted against elevation on **Figure 14.**

Using the relationship proposed by Stroud (1989) based on correlations with plasticity index, an F_1 value of 4.25 was selected for the cohesive alluvium, giving comparable shear strengths of 5kPa and 68kPa within the cohesive alluvium, indicating the cohesive alluvium to be extremely low to medium strength. This further confirms the variability of the materials noted on the exploratory hole logs.

Thirty four Particle Size Distribution Tests were undertaken on samples of the alluvium deposits. The results of the tests indicated the alluvium deposits to predominantly comprise slightly sandy to sandy, slightly clayey to clayey silts, with ten PSD tests indicating slightly gravelly to gravelly sands and sandy gravels. This is broadly in line with the visual descriptions of the cohesive and granular alluvium respectively. The results are shown on **Figure 12.**

Nine oedometer tests were undertaken on samples of the alluvium, three of which were on samples of peat. Results of oedometer tests on samples of peat indicate that the coefficient of volume compressibility to range from 0.383m^3/MN to 1.889m^3/MN at stress ranges between 25kPa and 200kPa. The coefficient of consolidation ranged from 0.20 – 1.60m^2/year. Results of oedmometer tests on other samples of the alluvium indicate that m_v values range from 0.032 – 1.18m^3/MN at stress ranges between 40kPa and 1600kPa. The coefficient of consolidation ranged from 0.07 – 4.60m^2/year. The results are consistent with the soils being of very low to high compressibility. The results of the tests carried out on samples of the peat indicate that the peat is of high to very high compressibility.

Seven Organic Moisture Content tests were undertaken on samples of the alluvium, recording organic moisture content results of <0.40% to 64%. It is considered that the highest recorded organic matter contents are associated with samples of peat.

Fourteen pH tests and sulphate tests were carried out on samples of the alluvium. The pH of the material ranged from 5.6 to 9.3 and the sulphate level ranged from <0.01g/l to 0.40g/l.

5.2.3 Fluvioglacial Deposits

5.2.3.1 Description

Fluvioglacial deposits were encountered in all the BHR series boreholes, with the exception of BHR04A. It was encountered at depths ranging between 15.00m to 21.00mbgl and was between 0.90m and 8.10m thick.

The fluvioglacial deposits comprised multi-coloured dense to very dense slightly sandy to sandy angular to subrounded gravel interbedded with medium dense to dense gravelly to very gravelly sand. The gravel generally comprised sandstone, quartzite and siltstone. A medium subrounded sandstone cobble content is noted in the gravel deposits with cobble layers noted in BHR05.

5.2.3.2 In-situ Testing

Thirteen Standard Penetration Tests (SPTs) were carried out in the fluvioglacial deposits. SPT 'N' values ranging between 6 and 250 were recorded. Three tests were abandoned with no effective penetration recorded, considered to probably reflect cobbles within the deposits. The results confirm the descriptions on the logs with the majority of the results indicating medium dense to very dense deposits. The results are plotted against level on **Figure 10.**

5.2.3.3 Laboratory Testing

Four Particle Size Distribution tests (PSDs) were undertaken on samples of the fluvioglacial deposits. The results of the tests indicate the fluvioglacial deposits to predominantly comprise slightly sandy to sandy gravels. The results of one sample tested indicated the material to be a silty gravelly sand. The results of the PSD tests broadly agree with the exploratory hole log descriptions. The results of the tests are presented in **Figure 12.**

One moisture content test was undertaken on a sample of the fluvioglacial deposit, recording a moisture content of 20%.

Five pH tests and sulphate tests were carried out on samples of the fluvioglacial deposits. The pH of the material ranged from 8.9 to 9.2 and the sulphate level ranged from <0.01g/l to 0.017g/l.

5.2.4 Bedrock

5.2.4.1 Description

Bedrock was encountered in six exploratory holes (BHR series boreholes) at depths ranging between 18.10m to 25.90mbgl. The maximum proven thickness was 16.80m.

The bedrock is variable comprising interbedded sandstone, siltstone and mudstone in varying proportions, with strengths also varying between boreholes. In BHR03 and BHR04A the rock encountered generally comprised weak sandstone

interbedded with very weak with occasional very weak mudstone. The rock composition was similar in BHR02 and BHR05, however, the sandstone is described as medium strong. In BHR01 the rock is generally weak to medium strong siltstone with the top 4.1m of the rock interbedded with stiff clay.

5.2.4.2 In-situ Testing

Two Standard Penetration Tests (SPTs) were carried out in the bedrock. SPT 'N' values of 250 were recorded. These results confirm the bedrock descriptions on the logs. The results are plotted against elevation on **Figure 10.**

5.2.4.3 Laboratory Testing

Twelve Uniaxial Compressive Strength Tests were undertaken on samples of the bedrock. Nine tests were undertaken on samples of sandstone and the results recorded uniaxial compressive strengths ranging from 46.8 – 77.5MPa. Three tests were undertaken on samples of siltstone and the results recorded uniaxial compressive strengths ranging from 32.6 – 42.2MPa. The results indicate the sandstone to be classified as medium strong to strong and the siltstone to be classified as medium strong. This is broadly in line with the descriptions on the borehole logs, however they do not reflect some of the sandstone described as weak on the exploratory hole logs. The results of the UCS testing is plotted against elevation in **Figure 15**.

138 samples of rock core underwent Point Load Testing. 72 of these tests were undertaken on samples of sandstone and recorded $I_{s(50)}$ values ranging from 0.1 – 9.4MPa, with the majority of the results recording $I_{s(50)}$ values of less than 3MPa. 57 tests were undertaken on samples of the siltstone and recorded $I_{s(50)}$ values ranging from 0 - 4.7MPa. Nine tests were undertaken on samples of mudstone, recoding $I_{s(50)}$ values ranging from 0 – 2.8MPa. The results of the point load index testing are plotted against elevation in **Figure 16**.

There is an approximate correlation between the standardised point load index ($I_{s(50)}$) and the UCS. On average, the UCS is 20 to 25 times the $I_{s(50)}$, however the ratio for tests in different rock types can vary, especially in anisotropic rocks [4]. Using a multiplication factor of 20, the equivalent UCS values for sandstone range from 0–120MPa. Equivalent UCS values for the siltstone range from 0-12MPa and the equivalent UCS for the mudstone is 6MPa. These results are generally in agreement with the exploratory hole log descriptions.

Five pH tests and sulphate tests were carried out on samples of the bedrock. The pH of the material ranged from 8.9 to 9.0 and the sulphate level in all samples was recorded as <0.01g/l.

5.3 Area D: Proposed Construction Compound

Two windowless sample holes were sunk to depths between 4.20m and 5.75mbgl in the area of the proposed construction compound. Both encountered thin made ground overlying alluvium deposits.

The strata encountered during the investigation is presented in Table 5.2 below.

Table 5.2 Stratigraphy of the site

Stratum Description	Depth to top of stratum (m)	Depth to base of stratum (m)	Level of the top of stratum (mAOD)	Level of the base of stratum (mAOD)	Proven thickness (m)
Made Ground	0	0.70 – 0.80	27.56 – 27.74	26.76 – 27.01	0.70 – 0.80
Alluvium	0.70 – 0.80	5.00 – 6.45*	26.76 – 27.01	21.29 – 22.56*	4.20 – 5.75

* = Thickness of alluvium not proven.

5.3.1 Made Ground

5.3.1.1 Description

Made ground was encountered in both exploratory holes to depths of 0.70m and 0.80mbgl. The material was generally described as brown slightly sandy clayey brick and sandstone gravel. In BHS13 a firm brown gravelly silty clay with brick was encountered at the surface overlying the granular made ground. Frequent rootlets were encountered in the top 0.2m of both boreholes.

5.3.1.2 In-situ Testing

No in-situ testing was undertaken in this strata.

5.3.1.3 Laboratory Testing

One Particle Size Distribution test (PSD) was undertaken on a sample of the made ground. This sample was classified as a silty sandy gravel. The results are presented in **Figure 19.**

One recompacted California Bearing Ratio test was undertaken on a sample of made ground obtained from 0.50mbgl in BHS12. An average CBR value of 2.5% was recorded.

5.3.2 Alluvium Deposits

5.3.2.1 Description

Alluvium was encountered in both exploratory holes underlying the made ground to depths of 5.20m and 6.45mbgl. The thickness of the deposit was not proven in Area D but had a maximum unproven thickness of 5.75m.

The alluvium deposits are variable comprising interbedded cohesive and granular material generally becoming more granular at depth. The cohesive alluvium is generally described as very soft to soft greyish brown to pinkish brown silty clay.

In the top 2.4mbgl the clay is described as having frequent partially decomposed rootlets and a 0.2m thick deposit in BHS12 encountered at 1.30m is described as peaty.

The granular alluvium is generally described as loose to medium dense brown slightly clayey sandy gravel occasionally gravelly sand. The granular deposit is first encountered below 2.40mbgl as is interbedded with thin layers of soft clay.

5.3.2.2 In-situ Testing

Ten Standard Penetration Tests (SPTs) were carried out in the alluvium. SPT 'N' values ranging between <1 to 25 were obtained. These results confirm the variability of the alluvium. The results are plotted against elevation on **Figure 17.**

5.3.2.3 Laboratory Testing

Three Atterberg limit tests were undertaken in samples of the cohesive alluvium deposits. The tests recorded plasticity indexes ranging from 23 to 41, indicating the materials be classified as highly plastic to extremely highly plastic clays and silts. The results of these tests are presented in Figure 18.

Two Particle Size Distribution tests (PSDs) were undertaken on samples of the alluvium deposits. These samples were classified as clayey silts. The results are presented **in Figure 19.**

One California Bearing Ratio test was undertaken on a recompacted sample of the alluvium deposits from 1.0m depth in BHS13. The test recorded an average CBR value of 0.49%.

One organic matter Content test was undertaken on a sample of the alluvium from BHS13, recording an organic matter content of 1.6%.

5.4 Area E: Existing DERL site

Four windowless sample holes and four cable percussive boreholes were sunk to depths of between 5.00mbgl and 9.40mbgl in the area of the existing DERL site. The exploratory holes generally encountered made ground overlying alluvium and fluvioglacial sands and gravels with bedrock at depth

The aim of the ground investigation in this area was to understand the geo-environmental conditions of the soils under the existing DERL site which MVV will be taking ownership of. Consequently, no geotechnical laboratory testing was undertaken on samples from the exploratory holes in this areas of the site

The strata encountered during the investigation is presented in Table 5.3 below.

Table 5.3 Stratigraphy of the site

Stratum Description	Depth to top of stratum (m)	Depth to base of stratum (m)	Level of the top of stratum (mAOD)	Level of the base of stratum (mAOD)	Proven thickness (m)
Made Ground	0.00	0.50 – 2.00	28.03 – 28.86	26.23 – 28.00	0.50 – 2.00
Alluvium	0.50 – 2.00	4.00 – 7.50	25.45 – 28.00	20.79 - 24.51	3.30 – 5.50
Fluvioglacial sand and gravel	4.00 – 7.50	7.00 - >9.40	20.79 – 24.51	21.50	2.00 - >3.00
Bedrock	7.00	>7.20	21.50	<21.30	>0.20

5.4.1 Made Ground

5.4.1.1 Description

Made ground was encountered in all exploratory holes from ground surface to depths 0.50mbgl to 2.00mbgl. The made ground was generally described as dark brown to greyish brown, very gravelly to gravelly, occasionally clayey fine to coarse sand. The gravel was of fine to coarse sandstone, limestone tarmacadam and rare brick. Rare rootlets and organic fragments were noted.

Layers of tarmacadam or concrete up to 0.40m thick were encountered at ground surface all of the exploratory holes with the exception of BHS03 and BHS07.

Cohesive made ground up to 1.20m thick was encountered in five exploratory holes, BHS03, BHS05, BHS06, BHS07 and BHS08. It was encountered at depths of 0.50mbgl to 1.20mbgl. This material was described as a soft to stiff dark greenish-grey and brown slightly gravelly slightly sandy silty clay. Gravel was subangular and subrounded, fine to coarse of sandstone, limestone and brick.

5.4.1.2 In-situ Testing

Five Standard Penetration Tests (SPTs) were carried out predominantly in the cohesive made ground. SPT ‘N’ values ranging between 7 and 19 were recorded. The results broadly agree with the log description of a soft to stiff silt or clay. The results are plotted against level on **Figure 20.**

5.4.2 Alluvium Deposits

5.4.2.1 Description

Alluvium was encountered in all the exploratory holes underlying the made ground to depths between 4.00mbgl and 7.50mbgl. The proven thickness of the stratum ranged from 2.50m to 5.50m.

The alluvium deposits are variable comprising interbedded cohesive and granular material generally becoming more granular at depth. The cohesive materials were generally described as very soft to firm light brown and grey, occasionally pinkish, greenish and mottled orange, occasionally sandy and gravelly, silty clay. In BHS03, a 0.80m thick layer of peat was encountered at 2.00m depth. This was described as a plastic, dark brown clayey fibrous peat.

The granular materials were generally described as loose to medium dense grey and brown clayey fine to coarse sands and clayey sandy gravels. The gravel was typically of sandstone, siltstone and rare quartz.

5.4.2.2 In-situ Testing

Thirty two Standard Penetration Tests (SPTs) were carried out in the alluvium. SPT ‘N’ values ranged from 2 to 30. The majority of ‘N’ values were under 20. The results confirm the variability of the alluvium material. The results are plotted against level on **Figure 20.**

5.4.3 Fluvioglacial Deposits

5.4.3.1 Description

Fluvioglacial deposits were encountered in all exploratory holes, with the exception of BHS03 and BHS07, to depths of between 7.00 and 9.40mbgl. The thickness of the fluvioglacial deposits ranged from 2.00m to >3.00m.

The fluvioglacial deposits are generally described as medium dense to dense, brown and grey, occasionally slightly clayey sandy gravels with low cobble contents. The gravel is typically angular to rounded of sandstone and rare quartz and siltstone.

5.4.3.2 In-situ Testing

Nine Standard Penetration Tests (SPTs) were carried out in the fluvioglacial deposits. SPT ‘N’ values ranged from 11 to 500. Four extrapolated values between 70 and 500 were recorded when exploratory holes reached obstructions. The remaining ‘N’ values ranged from 11 to 32. These results are in broad agreement with the log descriptions of the fluvioglacial deposits. The results are plotted against elevation on **Figure 20.**

5.4.4 Bedrock

5.4.4.1 Description

Bedrock was encountered in BHS04 at a depth of 7.00mbgl. The thickness of the bedrock was not proven, however the unproven thickness encountered was 0.20m.

The bedrock encountered comprised a weak grey medium grained sandstone recovered as angular to subangular, medium and coarse gravel.

5.4.4.2 In-situ Testing

One Standard Penetration Test (SPT) was carried out in the bedrock. The SPT 'N' value recorded was 375. This is an extrapolated value which is considered to be a result of the SPT refusing on bedrock.

5.5 Route of Proposed Pipeline

Six machine excavated trial pits and five cable percussive boreholes were undertaken along the route of the proposed pipeline to depths of 2.40mbgl and 14.50mbgl. The exploratory holes generally encountered thick deposits of made ground overlying fluvioglacial deposits with bedrock at depth. Alluvium was encountered in two of the exploratory holes.

The strata encountered during the investigation is presented in Table 5.4 below.

Table 5.4 Stratigraphy of the route of the proposed pipeline.

Stratum Description	Depth to top of stratum (m)	Depth to base of stratum (m)	Level of the top of stratum (mAOD)	Level of the base of stratum (mAOD)	Proven thickness (m)
Made Ground	0.00	0.20 - >3.75	27.20 – 32.15	26.45 – 28.85	0.20 -2.80
Alluvium	1.80 – 2.80	2.00 – 5.20	26.54 – 27.86	24.14 – 27.66	0.20 – 2.40
Fluvioglacial sand and gravel	0.20 – 5.20	4.00 – 7.60	24.14 – 28.85	21.74 – 25.66	2.00 – 5.35
Bedrock	4.00 – 7.60	>14.50	21.74 – 25.66	<14.11	>8.35

5.5.1 Made Ground

5.5.1.1 Description

Made ground was encountered in all exploratory holes from ground surface to depths of between 0.20mbgl to >3.75mbgl.

The made ground was generally to be found to be variable with both cohesive and granular materials encountered during the investigation.

Cohesive made ground at the surface typically comprised grass over slightly sandy gravelly silt with gravel of sandstone, siltstone, quartz, concrete and limestone with frequent rootlets and rare brick and concrete. Deeper cohesive made ground was typically described as a stiff to very stiff brown, mottled orange, gravelly sandy silty clay with gravel of sandstone, siltstone and rare quartz.

TPM06 was undertaken in an area with ground levels approximately 2.5-.30m higher than the surrounding boreholes. An assessment of contours on historic maps and the available topographic information for the site has indicated that this material is likely to have been an area of filling. The findings of TPM06 are consistent with this, different from the materials elsewhere. The made ground in TPM06 is described as a very soft to soft grey-brown slightly sandy slightly gravelly clay with frequent organic fragments and a slight organic odour overlying a soft brown slightly gravelly sandy clay with frequent wood and organic fragments with a strong organic odour.

Granular layers of made ground are described as dense orangish-brown slightly clayey sandy gravel and clayey gravelly sand. The gravel is typically of sandstone, siltstone, limestone and quartz.

5.5.1.2 In-situ Testing

Five Standard Penetration Tests (SPTs) were undertaken within the made ground. SPT ‘N’ values ranged from 19 to 67. The results confirm the variability of the made ground materials and generally agrees with the borehole log descriptions. The SPT ‘N’ values are plotted against elevation on **Figure 21.**

Five in-situ hand vane tests were carried out in the cohesive made ground. Undrained shear strengths recorded ranged from 13kPa to 43kPa, indicating the made ground to be a very low to medium strength clay. The results are plotted against elevation on Figure 24.

One Organic Matter content was undertaken in a sample of the made ground from BHM05, recording an organic matter content of <0.40%.

5.5.1.3 Laboratory Testing

Eight Atterberg limit tests were undertaken on samples of the made ground. The plasticity index for samples of made ground ranged from 7 to 19, indicating that the made ground is generally low to intermediate plasticity. No moisture content testing was available for the made ground in this area of the site. The results are

presented in **Figure 22.** Nine moisture content tests were carried out on samples of the made ground, recording moisture contents ranging between 5% and 34%.

Eight Particle Size Distribution Tests (PSDs) were undertaken on samples of the made ground. The results of these tests indicate the made ground to be variable in nature, in agreement with the borehole log descriptions. The samples of made ground were generally classified as sandy silts and silty sandy gravels and gravelly silty sands. The results are shown in **Figure 23.**

Using the relationship proposed by Stroud (1989) based on correlations with plasticity index, an F_1 value of 5 was selected for the cohesive made ground, giving comparable shear strengths of between 95kPa and 205kPa, which would classify the cohesive made ground as having high to very high strength.

The low shear strengths recorded in the hand vane tests are from exploratory hole TPM06 which has been undertaken in the area of a raised bund. The low shear strengths correlate with the TPM06 log descriptions, which are different to the made ground encountered in the rest of area.

One compaction test was undertaken on a sample of made ground from TPM06 at 1.0m depth. This recorded a maximum dry density of 1.58Mg/m^3 at an optimum moisture content of 24%. Based upon this, the available moisture content results indicate the soil to potentially be at optimum moisture content.

Eight pH tests and sulphate tests were carried out on samples of the made ground. The pH of the material ranged from 7.3 to 8.3 and the sulphate level ranged from <0.01g/l to 0.015g/l.

5.5.2 Alluvium Deposits

5.5.2.1 Description

Alluvium was encountered in two of the exploratory holes (BHM02 and BHM05), underlying the made ground to depths of between 2.00mbgl and 5.20mbgl.

The alluvium deposits typically comprised interbedded cohesive and granular materials. The cohesive materials generally comprised soft, locally firm, dark grey-brown, occasionally mottled orange, sandy to very sandy, occasionally gravelly, clay. The granular materials were described as medium dense, brown very clayey fine and medium sand.

5.5.2.2 Insitu Testing

Two Standard Penetration Tests (SPTs) were undertaken within the alluvium deposits. SPT ‘N’ values ranged from 19 to 22. Both of these tests were undertaken within granular materials and agree with the borehole log descriptions of a medium dense granular material. The SPT ‘N’ values are plotted against elevation on **Figure 21.**

5.5.2.3 Laboratory Testing

Two Atterberg Limit tests were undertaken on samples of the Alluvium. The plasticity indexes recorded ranged from 9 to 12, indicating the cohesive alluvium to be a low plasticity clay. The results of the Atterberg Limits testing is presented in **Figure 22.** Two moisture content tests were undertaken on samples of the alluvium, indicating moisture contents ranging from 19% to 21%.

Using the relationship proposed by Stroud (1989) based on correlations with plasticity index, an F_1 value of 6 was selected for the cohesive alluvium, giving comparable shear strengths of between 54 and 72kPa, indicating the cohesive alluvium to be of medium strength.

One Particle Size Distribution test (PSD) was undertaken on a sample of the alluvium deposits. This samples was classified as a sandy silt. The results are presented in **Figure 23.**

5.5.3 Fluvioglacial Deposits

5.5.3.1 Description

Fluvioglacial deposits were encountered in all exploratory holes with the exception of TPM06 underlying the made ground and alluvium to depths of between 4.00mbgl and 7.60mbgl.

The fluvioglacial materials were typically described as medium dense to very dense brown and reddish-brown slightly clayey sandy gravels. The gravel was typically angular to subrounded, fine to coarse of comprised sandstone, siltstone and rare quartz. A stratum of cobbles and boulders were noted in BHM01 and BHM05 at depths of 4.00m and 6.40mbgl respectively.

A very stiff brown slightly sandy very gravelly clay with a medium subrounded sandstone cobble content was encountered at 2.00m depth in BHM03.

Coarse gravel sized pockets of spongy black peat were encountered at 1.90mbgl in TPM01 within the fluvioglacial deposits. It is considered that this is likely to be a localised occurrence and is not evidence of a significant organic component of the drift deposits in this area.

5.5.3.2 In-situ Testing

Sixteen Standard Penetration Tests (SPTs) were undertaken within the fluvioglacial deposits. SPT ‘N’ values ranged from 12 to 375, with the majority of ‘N’ values between 15 and 40. This generally agrees with the borehole log descriptions of a dense to very dense granular material. The very high results are considered to probably relate to the presence of cobbles or boulders. The SPT ‘N’ values are plotted against elevation on **Figure 21.**

5.5.3.3 Laboratory Testing

One Atterberg Limit test was undertaken on a sample of the fluvioglacial deposits from the clay stratum in BHM03. The plasticity index recorded was 4, indicating this material to be a low plasticity clay/silt. The results are presented in **Figure 22**. Two moisture content tests were undertaken on samples of the fluvioglacial deposits, recorded moisture contents ranging from 11% to 14%.

Eleven Particle Size Distribution tests (PSDs) were undertaken on samples of the fluvioglacial deposits. The results generally indicated the fluvioglacial deposits to be variable in nature, with two samples being classified as silty sands, six samples being classified as gravelly silty sands and two samples being classified as gravels. The results of the PSDs are presented in **Figure23.**

Three pH tests and sulphate tests were carried out on samples of the fluviglacial deposits. The pH of the material ranged from 7.8 to 8.2 and the sulphate level in all samples was recorded as <0.01g/l.

5.5.4 Bedrock

5.5.4.1 Description

Bedrock was encountered in five exploratory holes (BHM01 – BHM05) underlying the fluvioglacial deposits to depths of in excess of 14.50mbgl. The base of the bedrock was not proven in this investigation.

The bedrock predominantly comprised weak to medium strong, thinly to thickly laminated light grey, occasionally locally pinkish, medium to coarse grained sandstone. Fractures within the sandstone were very closely to medium spaced and typically planar and smooth.

BHM01 encountered predominantly sandstone, interbedded with mudstone and siltstone. The siltstone was typically described as very weak dark brown siltstone with extremely closely to closely spaced planar smooth fractures. The mudstone was typically described as very weak dark grey mudstone with extremely closely to closely spaced planar smooth fractures. Thin bands of soft to firm dark brown-grey gravelly sandy clay.

5.5.4.2 In-situ Testing

One Standard Penetration Test (SPT) was undertaken within the bedrock, with an SPT ‘N’ value of 214 recorded. The results are shown against level in **Figure 21**.

5.5.4.3 Laboratory Testing

Eleven Unconfined Compressive Strength (UCS) Tests were undertaken on samples of the bedrock. The tests were all undertaken on samples of sandstone and results recorded unconfined compressive strengths ranging from 23MPa to 104MPa, indicating the bedrock to be classified as weak to very strong. This is in agreement with the exploratory hole log descriptions. The results are plotted against elevation in **Figure 25.**

Fifty seven samples of rock core underwent Point Load Testing. 52 of these tests were undertaken on samples of sandstone and recorded $I_{s(50)}$ values ranging from 0MPa to 6MPa. Four tests were undertaken on samples of the siltstone and recorded $I_{s(50)}$ values ranging from 0MPa to 0.6MPa. One test was undertaken on a sample of the mudstone, recoding an $I_{s(50)}$ value of 0.3MPa. The point load index values are plotted against elevation in **Figure 26.**

There is an approximate correlation between the standardised point load index ($I_{s(50)}$) and the UCS. On average, the UCS is 20 to 25 times the $I_{s(50)}$, however the ratio for tests in different rock types can vary, especially in anisotropic rocks [4].Using a multiplication factor of 20, the equivalent UCS values for sandstone range from 0–120MPa. Equivalent UCS values for the siltstone range from 0-12MPa and the equivalent UCS for the mudstone is 6MPa. These results are generally in agreement with the exploratory hole log descriptions.

Three pH tests and sulphate tests were carried out on samples of the bedrock. The pH of the material ranged from 8.9 to 9.1 and the sulphate level in all samples was recorded as <0.01g/l.

5.6 Groundwater

5.6.1 During Site Work

Groundwater was encountered during drilling or in excavations in 36 exploratory holes undertaken during the site works. Only BHR04A, BHS01, BHS04, TP02 and TPM06 did not encounter water. Groundwater was struck at depths ranging between 0.90m and 12.00mbgl, with all but one strike recorded at shallow depths within the top 5mbgl.

The details of these water strikes are tabulated in Table 5.5 below.

Table 5.5 – Summary of groundwater strikes

Exploratory hole	Water strike depth (mbgl)	Comments
BHM01	1.20	Groundwater was encountered within gravel.
	3.00	Groundwater was encountered within the gravel rising to 2.00mbgl in 20 minutes.
BHM02	3.40	Groundwater was encountered within the gravel and did not rise in 20 minutes.
BHM03	3.10	Groundwater was encountered within the gravel rising to 2.10mbgl in 20 minutes.
BHM04	5.00	Groundwater was encountered within gravel.
BHM05	3.20	Groundwater was encountered at a clay and sand interface and rose to 2.80mbgl in 20 minutes.
BHR01	3.40	Groundwater was encountered within the sand rising to 2.00mbgl in 20 minutes.
BHR02	0.90	Groundwater was encountered within the made ground rising to 0.80mbgl in 20 minutes.

Exploratory hole	Water strike depth (mbgl)	Comments
	2.20	Groundwater was encountered within the made ground rising to 1.50mbgl in 20 minutes.
	5.30	Groundwater was encountered at a sand and gravel interface rising to 2.40mbgl in 20 minutes.
BHR03	3.10	Groundwater was encountered at a peat and sand interface rising to 1.00mbgl in 20 minutes.
	12.00	Groundwater was encountered at a clay and sand interface rising to 6.40mbgl in 20 minutes.
BHR04	5.00	Groundwater was encountered at a peat and gravel interface rising to 3.00mbgl in 20 minutes.
BHR05	2.00	Groundwater was encountered within the made ground rising to 1.50mbgl in 20 minutes.
	4.30	Groundwater was encountered at a clay and gravel interface rising to 3.20mbgl in 20 minutes.
BHS02	3.10	Groundwater was encountered within the sand rising to 2.10mbgl in 20 minutes.
BHS03	3.00	Groundwater was encountered within the clay and did not rise in 20 minutes.
BHS05	3.50	Groundwater was encountered within the gravel and did not rise in 20 minutes.
BHS06	3.50	Groundwater was encountered within the sand and did not rise in 20 minutes.
BHS07	2.50	Groundwater was encountered within the clay and did not rise in 20 minutes.
BHS08	3.00	Groundwater was encountered at a silt gravel interface.
BHS09	4.50	Groundwater was encountered at a clay and gravel interface rising to 3.20mbgl in 20 minutes.
BHS10	4.50	Groundwater was encountered at a clay and gravel interface rising to 2.60mbgl in 20 minutes.
BHS11	1.10	Groundwater was encountered within the made ground rising to 0.90mbgl in 20 minutes.
	4.40	Groundwater was encountered within the sand rising to 3.30mbgl in 20 minutes.
BHS12	2.50	Groundwater was encountered within the gravel rising to 1.50mbgl in 20 minutes.
BHS13	2.40	Groundwater was encountered at a clay and gravel interface rising to 1.50mbgl in 20 minutes.
TP01	3.80	Groundwater was encountered at a silt and gravel interface.
TP03	4.30	Groundwater was encountered within the silt at the base of the trial pit.
TP04	0.60	Groundwater was encountered within the made ground.
TP05	1.90	Groundwater was encountered within the made ground.
TP06	1.70	Groundwater was encountered within the made ground.

Exploratory hole	Water strike depth (mbgl)	Comments
TP07	1.30	Groundwater was encountered within the made ground. Water was standing at 1.90mbgl on completion of the excavation.
TP08	1.40	Groundwater was encountered within the made ground rising to 1.20mbgl.
	3.80	Groundwater was encountered within the sand. Water was standing at 3.90mbgl on completion of the excavation.
TPD01	1.50	Groundwater was encountered within the made ground. Water was standing at 3.40mbgl on completion of the excavation.
TPD02	3.70	Groundwater was encountered within the silt at the base of the trial pit.
TPD03	4.50	Groundwater was encountered within the silt at the base of the trial pit.
TPM01	1.05	Groundwater was encountered within the gravel.
TPM02	3.30	Groundwater was encountered at a sand and gravel interface.
TPM03	2.60	Groundwater was encountered at a sand and gravel interface.
TPM04	2.90	Groundwater was encountered with the gravel. Water was standing at 3.50m on completion of the excavation.
TPM05	3.80	Groundwater was encountered within the gravel at the base of the trial pit.

5.6.2 Groundwater Monitoring

Groundwater monitoring was undertaken on 6 occasions over between 26th September 2016 and 16th November 2016. The response zones were generally within the alluvium deposits encountered on site. The results of this monitoring are tabulated in Table 5.6 below and indicate a high groundwater table.

Table 5.6 – Summary of groundwater monitoring

Borehole	Depth of installation (mbgl)	Water level on visit shown (mbgl)					
		1st visit	2nd visit	3rd visit	4th visit	5th visit	6th visit
BHM01	6.00-12.00	1.18	1.48	0.88	1.21	0.91	0.85
BHM02	2.00-3.50	3.09	3.41	2.92	2.58	2.75	2.69
BHM03	2.50-3.50	1.84	2.69	NR*	1.29	2.20	NR*
BHM04	2.50-6.50	2.64	2.72	2.40	1.93	2.42	2.26
BHM05	3.00-7.50	2.99	3.03	2.81	2.71	2.88	2.80
BHR01	2.00-13.00	1.81	1.92	1.73	1.64	1.81	1.69
BHR02	3.50-4.50	1.75	2.38	1.63	2.08	1.74	1.62
BHR03	0.50-2.00	0.52	0.63	0.21	0.30	0.36	0
BHR04A	27.00-38.00	2.10	2.47	1.92	2.26	1.99	1.87
BHR05	2.50-12.00	1.94	1.98	0.87	1.62	1.92	1.77

Borehole	Depth of installation (mbgl)	Water level on visit shown (mbgl)					
		1st visit	2nd visit	3rd visit	4th visit	5th visit	6th visit
BHS01	1.50-6.00	2.51	2.54	2.42	2.38	2.47	2.46
BHS02	2.00-4.50	2.58	2.62	2.40	2.30	2.42	2.34
BHS03	2.50-6.00	2.39	2.56	2.27	2.37	2.30	2.26
BHS04	2.00-6.00	2.53	2.57	2.43	2.36	2.46	2.40
BHS05	2.50-5.50	2.60	2.64	2.45	2.39	2.50	2.42
BHS06	2.00-4.50	2.10	2.20	1.90	1.83	1.93	1.84
BHS07	0.50-1.50	DRY	DRY	DRY	DRY	DRY	1.09
BHS08	2.00-7.00	2.12	NR	1.91	1.81	1.91	1.91
BHS09	3.00-5.00	2.01	2.02	1.77	1.70	1.88	2.07
BHS10	1.50-2.50	1.66	1.74	1.58	1.38	1.53	1.42
BHS11	9.00-14.00	1.89	2.29	1.88	1.60	1.83	1.64
BHS12	1.30-3.50	1.03	1.14	0.84	1.05	0.98	0.81
BHS13	2.00-5.50	1.07	1.09	0.74	1.01	0.88	0.81

NR = Groundwater level not recorded. No reason given.

NR* = Groundwater level not recorded. Borehole under large pool of water.

5.7 Evidence of Contamination

There was no olfactory evidence of contamination noted in any of the exploratory holes during the investigation. Vapour headspace testing in each borehole did not record the presence of any vapours.

Made ground was encountered in all exploratory holes. It should be noted that the made ground was frequently found to contain man-made materials including brick, concrete and tarmacadam. Occasional fragments of mortar and clinker and rare fragments of wood, ceramic, plastic and metal were also noted in some of the exploratory holes.

6 Geotechnical Assessment

6.1 Proposed Development

The proposed development comprises the construction of a new Energy from Waste Combined Heat and Power (EfW CHP) facility, with MVV also taking over the existing DERL Recycling Centre and carrying out ancillary works as part of the proposals, **Figure 2**. These additional areas have also considered as part of the investigation, as requested by MVV. The proposals for the EfW CHP and associated areas are described below.

- **Energy from Waste Combined Heat and Power Facility (Area A) -** A new EfW CHP facility is proposed to be constructed. A plan of the proposed development is shown in **Figure 3**, with an illustration of the proposed development (courtesy of MVV Umwelt) shown in **Image 1**. As shown, in addition to paved and car parking areas, it is envisaged that the development will comprise of a number of buildings, namely: storage areas; tipping hall; bunker; boiler house, administration building; ash bunker; machine house; chimney stacks; reactor and flue gas cleaning building. At the time of writing the proposals are still under development, however it is anticipated that finished floor levels will be 29mAOD.

- **DERL facility (Area E)** - As part of the proposal, MVV will take on the management of the existing DERL facility in addition to the operation of the new EfW plant. Whilst no major construction works are proposed in this area, as part of this study, MVV want to understand and quantify risks associated with potential contamination on the existing DERL site in addition to the proposed development site and the need for any further investigations to characterise geo-environmental risks further. A plan demarking these areas is shown in **Figure 2**.

- **Contractor's Compound and Car Park (Area D)** - As part of the works, MVV are proposing to construct a contractor's compound and car park to the west of the existing DERL facility and proposed EfW CHP facility. As part of this study, investigation to understand shallow ground conditions and geo-environmental constraints in this area has been undertaken.

- **New Pipeline** - The proposals also include the construction of a new pipeline between the existing DERL facility and the neighbouring Michelin factory to the east of the site. As part of this study investigation to determine ground conditions and geo-environmental constraints in this area have also been undertaken.

6.2 Ground and Groundwater Conditions

The results of the 2016 ground investigation are considered to be generally consistent with the findings of the desk study, with the strata generally comprising variable made ground overlying generally very soft cohesive then granular alluvium with medium dense fluvioglacial sands and gravels at depth. Sandstone

bedrock interbedded with siltstone and mudstone was encountered beneath the fluvioglacial deposits.

The thickest accumulations of alluvium were generally encountered in the west of the site, in Area A: proposed EfW CHP site, Area D: the proposed contractor's compound and Area E: the existing DERL site. The proven thickness ranged from 3.50m to 19.40m. The results of the investigation indicated that alluvium deposits generally get thinner or are not encountered in the north and the east of the site, in particular along the route of the proposed pipe line.

Peat was encountered in eight exploratory holes across Area A and Area E of the site, ranging in thickness from 0.05m and 1.60m. The peat was variable in nature, with plastic, spongy fibrous, pseudo-fibrous and amorphous peat all recorded on the logs.

Groundwater was encountered in all exploratory holes during the ground investigation works between 0.60mbgl and 12.00mbgl and was generally associated with water perched within granular deposits encountered within the alluvium.

Longer term groundwater monitoring was undertaken across the site over a period of approximately nine weeks between September and November 2016. Groundwater was generally recorded at shallow depth in most installations during the monitoring period. Groundwater levels were recorded between surface level and 3.41mbgl. The majority of the readings indicate the groundwater level across the site to be present between 2.00 and 3.00m depth.

6.3 Foundation Recommendation

The nature of the proposed development varies across the site. Considerations for each area of the site is described in Sections 6.3.1.1 to 6.3.1.4 below.

The sections below should be reviewed following development and confirmation of the nature of the proposed development and the associated foundation loads.

6.3.1.1 Area A; Proposed EfW CHP facility

At the time of writing, it is understood that piled foundations are proposed for the EfW CHP facility. Drawings provided by MVV in January 2016 indicate that the preliminary pile design comprises 23m length, 800mm diameter piles carrying vertical loads of 1600kN. This pile design was completed prior to this ground investigation.

The results of the ground investigation indicate that Area A is underlain by made ground and thick deposits of alluvium. These deposits are variable in nature and in areas have been determined to be of low strength and high compressibility. This confirms that piled foundations will be required for the proposed EfW CHP facility.

Bedrock was encountered at depths between 18.20 and 25.90mbgl in Area A during the ground investigation.

The preliminary pile design provided in January 2016 should be reviewed in light of the results of the ground investigation. Based on the results of the investigation, it is considered that the preliminary pile design will be founded in the alluvium deposits. It is anticipated that the piles will need to be rock socketed to achieve the required capacities.. The potential of negative skin friction within the alluvium deposits should also be accounted for in any review of the provisional pile design.

The bunker areas of an EfW CHP typically require excavation below existing ground levels for storage of the waste materials. At the time of writing, it was understood that the bunker excavation will be between 6.00 and 8.00m below finished ground levels. The results of the ground investigation has indicated that the alluvium underlying Area A is typically of low strength and that high groundwater is also present in this area. An embedded retaining wall solution and tension piles to resist uplifting groundwater pressures in the bunker area are likely to be required.

It is anticipated that bunker areas will be required to be water-tight in accordance with BS8102:2009 and therefore appropriate provisions for consideration of longer term drainage measures to deal with the shallow groundwater control across the area will be required. All foundations should include allowance for appropriate gas protection measures for Characteristic Situation 2 in accordance with CIRIA C665.

The exact nature and layout of any foundations are likely to be governed by the tolerances to differential settlement for the mechanical equipment within the plant (e.g. moving cranes, boilers). The tolerances for design should be confirmed prior to the design of the facility and should be accounted for appropriately in the design.

6.3.1.2 Area D: Proposed construction compound

The ground investigation has indicated that alluvium is present underlying Area D of the site. The weak nature of these deposits and shallow groundwater encountered across the overall investigation area means it is considered deep foundations may be required for even lightly loaded structures. The exact nature of the foundation solution should be determined following confirmation of the nature of the proposed construction compound and founding loads from any buildings in this area.

The alluvium deposits across the site have typically been variable in nature and could be expected to have variable strength and compressibility. Although it is considered unlikely that development in this area would have tight settlement requirements, the foundation design should consider the impact of these characteristics on the settlement of any proposed buildings, including tolerances of differential settlement for the proposed compound.

6.3.1.3 Area E: Existing DERL Facility

It is understood that no development of the existing DERL facility is proposed at the time of writing. No recommendations on foundations are therefore provided in this report.

6.3.1.4 Route of the proposed pipeline

The area of the proposed pipeline typically encountered made ground directly overlying fluvioglacial deposits, with localised areas of alluvium deposits.

No information on the proposed levels or nature of this pipeline was available at the time of writing. Prior to the design of the pipeline, the anticipated loads from the pipeline and the tolerances on differential settlement required in the design should be confirmed.

It is considered that the fluvioglacial deposits could be a suitable stratum for shallow foundations depending on the nature of the pipeline and the associated foundation loads. Given the variable nature of the made ground, it is recommended that it could be considered as founding material only for flexible pipe materials due to the higher potential for differential settlement. The use of shallow foundations will also depend on the inspection of proposed formation levels, with contingency for replacement of softer materials with suitably compacted granular fill in localised areas.

6.4 Earthworks and Excavations

At the time of writing no details on the likely nature of any earthworks associated with the proposed development was available.

It is considered that the variable nature of the alluvium deposits and shallow groundwater across the site may produce difficult conditions in excavations. The generally weak nature of some of the alluvium deposits will mean that sizeable excavations will require support measures and groundwater control measures.

The variable and often high compressibility of the alluvium deposits encountered in the ground investigation means that large settlements may result in areas of filling. An assessment of the likely movements should be made during the design of the proposed development.

It is anticipated that the made ground and alluvium deposits are likely to be unsuitable for re-use on account of their variable nature and the shallow groundwater encountered across the site.

6.5 Concrete

During laboratory analysis, thirty five soil samples were analysed for pH and sulphate in the form of 2:1 water/soil extract. The results are summarised below. The characteristic values have been calculated as set out in BRE Special Digest [5].

Determinand	Units	No. of tests	Maximum value	Minimum value	Characteristic value.
Made Ground					
2:1 sulphate	mg/l	15	310	<10	200
pH		15	10.2	7.3	7.4

Determinand	Units	No. of tests	Maximum value	Minimum value	Characteristic value.
Alluvium Deposits					
2:1 sulphate	mg/l	14	760	<10	450
pH		14	9.1	5.6	6.6
Fluvioglacial Deposits					
2:1 sulphate	mg/l	8	17	<10	10
pH		8	9.2	7.8	7.9
Bedrock					
2:1 sulphate	mg/l	8	<10	<10	10
pH		8	9.0	8.9	8.9

Assuming the site is natural ground with mobile groundwater, this would be indicative of a site wide Design Sulphate Class of DS-1 for all materials. The results of a single test result on a sample of peat indicates that a Design Sulphate Class of DS-2 should be considered in localised areas. The ACEC class for the majority of the site is AC-1 and the ACEC class for area where peat is encountered is AC-2.

Requirements for the design of concrete in the scheme should be reviewed following confirmation of the proposed earthworks and foundation solutions required for the development, including confirmation of the design life of any concrete specified.

6.6 Site Infrastructure

The proposed EfW CHP development will require access roads and associated site infrastructure. It is anticipated that finished ground levels will be approximately 29mOD and will require filling to raise site levels of no more than 1m.

In-situ CBR values interpreted from dynamic probes in the area of the proposed EfW CHP facility recorded values between 7% and 440% within the made ground. The variability of the values reflects the variable nature of the made ground in the area.

Laboratory CBR testing on remoulded soil samples from the area of the proposed contractor's compound recorded lower CBR values between 0.49% on a sample of the alluvium and 2.5% on a sample of the made ground.

The made ground across the overall investigation area is typically of low to intermediate plasticity, in accordance with Table 5.1 of IAN 74/06 '*Design Guidance for Road Pavement Foundations'*, this could correlate to CBR values between 3 and 6%.

At the time of writing, it is understood that finished levels for the access roads of the EfW CHP facility are anticipated to be approximately 29mAOD. This would require the placement of sub-base materials of no more than 1m thickness directly on to the made ground.

Based on the results of the ground investigation, a design CBR value for the made ground of 3% is considered appropriate for pavement design. This should be reassessed if revised formation levels requiring an excavation depth in excess of 1m are proposed.

Detailed pavement design should be undertaken in accordance with relevant design codes and documents, following confirmation of road levels and the CBR values in the relevant areas.

6.7 Drainage (SUDS)

In accordance with current best practice and in compliance with Sewers for Scotland 2nd Edition, the development will require to be served by separate foul and surface water drainage systems. To comply with The Water Environment (Controlled Activities) (Scotland) Regulations, surface water from the development must be treated by a Sustainable Drainage System (SuDS) before being discharged into the environment.

In some situations, it may be possible to connect into an existing drainage system. Whether this is possible or not will depend on available capacity, which is generally established through the Development Impact Assessment process with Scottish Water.

During the site investigation, four in-situ soakaway tests were undertaken in TP06, TP07 and TP08 within the made ground to assess the suitability for using SUDS at the site. The soil infiltration rate was calculated to range between 2.2 x 10^{-5}m/s and 4.1 x 10^{-6}m/s indicating a relatively high permeability however the high water table suggests the site is poorly drained.

The results indicate that attenuation systems of drainage such as basins or ponds are likely to be a more suitable drainage solution compared to infiltration systems.

7 Contamination Assessment

7.1 Introduction

The results of the chemical testing on the soils and groundwater samples described in Section 4 have been assessed to determine the potential significance of the levels of determinands recorded. This has been through an approach of comparing the results to appropriate screening values, intended to be protective of health, the wider environment and building materials.

7.2 Rationale for Assessment

7.2.1 Soils

The potential risks posed by soil concentrations have been considered in terms of:

- Risk to human Health (site occupiers and users)
- Risk to human health (Construction and maintenance workers)
- Risk to human health (adjacent site users)
- Risk to flora (landscaped areas)
- Risk to buried concrete and services (potable water pipes)
- Risk to the water environment (surface water and groundwater)

The basis for the above assessments are discussed below. The rationale behind the assessment criteria adopted for this project are presented within **Appendix A** and the results of the chemical testing are presented in **Appendix B to E** as appropriate.

7.3 Assessment Findings

7.3.1 Assessment of Risk to Human Health

The results of the comparison of the soil test results to the generic assessment criteria are designed to be protective of human health for a commercial end-use. The assessment is summarised in Table 7.1 below, with the full screening assessment presented in **Appendix B**. The generic assessment criteria have assumed a 1% soil organic matter. The results have been assessed for the following areas; Area A – proposed EfW CHP, Area E – existing DERL site, Area of proposed pipeline.

Table 7.1: Assessment of Risk to Human Health in Area A – proposed EfW CHP

Determinand	Units	Generic Assessment Criteria	Made Ground				Natural			
			No. of Samples	Range	No.> GAC	Loc >GAC	No. of Samples	Range	No.> GAC	Loc >GAC
Arsenic	mg/kg	635	18	<1 - 12	0		23	3.9 – 36	0	
Antimony	mg/kg	7350	18	<1 – 3.9	0		23	<1 – 4.1	0	
Beryllium	mg/kg	11.7	18	0.42 – 1.4	0		23	0.5 – 1.4	0	
Cadmium	mg/kg	190	18	<0.2 – 0.4	0		23	<0.2 – 0.4	0	
Chromium	mg/kg	8570	18	18 – 89	0		23	11 – 100	0	
Hexavalent Chromium	mg/kg	32.8	18	<4	0		23	<4	0	
Copper	mg/kg	68300	18	19 – 89	0		23	33 – 99	0	
Lead	mg/kg	2300	18	8 – 200	0		23	1.3 – 29	0	
Mercury	mg/kg	15.4	18	<0.3 – 0.6	0		23	<0.3 – 1.2	0	
Nickel	mg/kg	983	18	18 – 60	0		23	20 – 76	0	
Selenium	mg/kg	12261	18	<1 – 4.1	0		23	<1 – 3.7	0	
Zinc	mg/kg	730000	18	50 – 140	0		23	18 – 120	0	
Boron (water soluble)	mg/kg	236000	18	0.8 – 6.8	0		23	<0.2 – 6.2	0	
Vanadium	mg/kg	6360	18	28 – 99	0		23	4.4 – 100	0	
Total Cyanide	mg/kg	168	18	<1	0		23	<1	0	
pH	Units	<5.5 or >9.5	18	7.4 – 11.6	10	TP2, 7(x2), 8, TPD2, 3, BHR01, R04, R05,BHS10	23	5.6 – 8.8	0	
Asbestos	Presence	Presence	25	Not detected - detected	6	TP4, TP6, TPD2,BHR01, BHR02, BHR05	0	-	-	
Asbestos quantification	%	-	6	<0.001%			0	-	-	
BTEX										
Benzene	ug/kg	27000	17	<1	0		23	<1	0	
Toluene	ug/kg	56294000	17	<1	0		23	<1	0	
Ethylbenzene	ug/kg	5706000	17	<1	0		23	<1	0	
m/p Xylene	ug/kg	5923000	17	<1	0		23	<1	0	
o Xylene	ug/kg	6603000	17	<1	0		23	<1	0	
MTBE	ug/kg	-	17	<1	0		23	<1	0	
Total Petroleum Hydrocarbons										
Aliphatic > C5-6	mg/kg	3190	17	<0.1	0		23	<0.1	0	
Aliphatic > C6-8	mg/kg	7780	17	<0.1	0		23	<0.1	0	
Aliphatic > C8-10	mg/kg	2000	17	<0.1	0		23	<0.1	0	
Aliphatic > C10-12	mg/kg	9690	17	<1 – 1.5	0		23	<1	0	
Aliphatic > C12-16	mg/kg	58800	17	<2 – 14	0		23	<2	0	
Aliphatic > C16-21	mg/kg	648000	17	<8 – 57	0		23	<8 - 15	0	

Determinand	Units	Generic Assessment Criteria	Made Ground				Natural			
			No. of Samples	Range	No.> GAC	Loc >GAC	No. of Samples	Range	No.> GAC	Loc >GAC
Aliphatic > C21-35	mg/kg		17	<8 – 950	0		23	<8 - 81	0	
Aliphatic > C35-C44	mg/kg	648000	17	<8.4 - 750	0		23	<8.4 - 50	0	
Aromatic > C6-C7	mg/kg	27	17	<0.1	0		23	<0.1	0	
Aromatic > C7-8	mg/kg	56294	17	<0.1	0		23	<0.1	0	
Aromatic > C8-10	mg/kg	3460	17	<0.1	0		23	<0.1	0	
Aromatic > C10-12	mg/kg	16200	17	<1 – 3.2	0		23	<1	0	
Aromatic > C12-16	mg/kg	36200	17	<2 -33	0		23	<2 – 3.7	0	
Aromatic > C16-21	mg/kg	26600	17	<10 – 200	0		23	<10	0	
Aromatic > C21-35	mg/kg	28400	17	<10 – 2600	0		23	<10 – 140	0	
Aromatic > C36-40	mg/kg		17	<8.4 - 3600	0		23	<8.4 - 170	0	
Polyaromatic Hydrocarbons (sVOC suite)										
Naphthalene	mg/kg	193	18	<0.05 – 1.6	0		23	<0.05	0	
Acenaphthylene	mg/kg	83200	18	<0.1 – 0.11	0		23	<0.1	0	
Acenaphthene	mg/kg	83700	18	<0.1 – 3.4	0		23	<0.1	0	
Fluorene	mg/kg	63000	18	<0.1 – 2.9	0		23	<0.1	0	
Phenanthrene	mg/kg	21900	18	<0.1 – 21	0		23	<0.1 – 0.22	0	
Anthracene	mg/kg	523000	18	<0.1 – 5.8	0		23	<0.1	0	
Fluoranthene	mg/kg	22600	18	<0.1 – 24	0		23	<0.1 – 0.33	0	
Pyrene	mg/kg	54200	18	<0.1 – 20	0		23	<0.1 – 0.33	0	
Benzo(a)anthracene	mg/kg	167	18	<0.1 – 11	0		23	<0.1 – 0.13	0	
Chrysene	mg/kg	346	18	<0.05 – 8.3	0		23	<0.05 – 0.08	0	
Benzo(b)fluoranthene	mg/kg	44.3	18	<0.1 – 9.2	0		23	<0.1	0	
Benzo(k)fluoranthene	mg/kg	1170	18	<0.1 – 3.4	0		23	<0.1	0	
Benzo-a-pyrene	mg/kg	35.2	18	<0.1 – 7.8	0		23	<0.1	0	
Indeno (123 cd)pyrene	mg/kg	501	18	<0.1 – 2.7	0		23	<0.1	0	
Dibenzo(ah)anthracene	mg/kg	3.53	18	<0.1 – 0.79	0		23	<0.1	0	
Benzo(ghi)perylene	mg/kg	3930	18	<0.05 – 2.5	0		23	<0.05	0	
Other organic compounds										
Total PCBs	mg/kg	-	8	<0.012 – 0.013			6	<0.01	-	
Total Phenol	mg/kg	440	18	<1	0		23	<1 – 1.1	0	
1,2,4 Trimethyl Benzene	ug/kg	-	18	<1 – 8.3	-		23	<MDL	0	
Dibenzofuran	ug/kg	-	18	<0.2 – 2.1	-		23	<MDL	0	
Carbazole	ug/kg	-	18	<0.3 – 1.5	-		23	<MDL	0	
Other VOCs	ug/kg	-	18	<1			23	All <1	0	
Other sVOCs (except PAHs)	ug/kg	-	18	<MDL			23	All <MDL	0	

Table 7.2: Assessment of Risk to Human Health in Area D Contractors Compound

Determinand	Units	Generic Assessment Criteria	Made Ground				Natural			
			No. of Samples	Range	No.> GAC	Loc >GAC	No. of Samples	Range	No.> GAC	Loc >GAC
Arsenic	mg/kg	635	2	<1 – 6.4	0		0	-	-	
Antimony	mg/kg	7350	2	3.2 – 6.4	0		0	-	-	
Beryllium	mg/kg	11.7	2	0.69 – 0.9	0		0	-	-	
Cadmium	mg/kg	190	2	<0.2	0		0	-	-	
Chromium	mg/kg	8570	2	25 – 46	0		0	-	-	
Hexavalent Chromium	mg/kg	32.8	2	<4	0		0	-	-	
Copper	mg/kg	68300	2	37 – 49	0		0	-	-	
Lead	mg/kg	2300	2	37 – 60	0		0	-	-	
Mercury	mg/kg	15.4	2	<0.3	0		0	-	-	
Nickel	mg/kg	983	2	37 – 40	0		0	-	-	
Selenium	mg/kg	12261	2	<1	0		0	-	-	
Zinc	mg/kg	730000	2	66 – 120	0		0	-	-	
Boron (water soluble)	mg/kg	236000	2	1 – 1.4	0		0	-	-	
Vanadium	mg/kg	6360	2	36 – 61	0		0	-	-	
Total Cyanide	mg/kg	168	2	<1	0		0	-	-	
pH	Units	<5.5 or >9.5	2	8 – 10.5	1	BHS13	0	-	-	
Asbestos	Presence	Presence	2	None detected	0		0	-	-	
BTEX										
Benzene	ug/kg	27000	2	<1	0		0	-	-	
Toluene	ug/kg	56294000	2	<1	0		0	-	-	
Ethylbenzene	ug/kg	5706000	2	<1	0		0	-	-	
m/p Xylene	ug/kg	5923000	2	<1	0		0	-	-	
o Xylene	ug/kg	6603000	2	<1	0		0	-	-	
MTBE	ug/kg	-	2	<1	0		0	-	-	
Total Petroleum Hydrocarbons										
Aliphatic > C5-6	mg/kg	3190	2	<0.1	0		0	-	-	
Aliphatic > C6-8	mg/kg	7780	2	<0.1	0		0	-	-	
Aliphatic > C8-10	mg/kg	2000	2	<0.1	0		0	-	-	
Aliphatic > C10-12	mg/kg	9690	2	<1	0		0	-	-	
Aliphatic > C12-16	mg/kg	58800	2	<2	0		0	-	-	
Aliphatic > C16-21	mg/kg	648000	2	<8	0		0	-	-	
Aliphatic > C21-35	mg/kg		2	<8	0		0	-	-	
Aliphatic > C35-C44	mg/kg	648000	2	<8.4	0		0	-	-	
Aromatic > C6-C7	mg/kg	27	2	<8.4	0		0	-	-	

Determinand	Units	Generic Assessment Criteria	Made Ground				Natural			
			No. of Samples	Range	No.> GAC	Loc >GAC	No. of Samples	Range	No.> GAC	Loc >GAC
Aromatic > C7-8	mg/kg	56294	2	<0.1	0		0	-	-	
Aromatic > C8-10	mg/kg	3460	2	<0.1	0		0	-	-	
Aromatic > C10-12	mg/kg	16200	2	<1	0		0	-	-	
Aromatic > C12-16	mg/kg	36200	2	<2	0		0	-	-	
Aromatic > C16-21	mg/kg	26600	2	<10	0		0	-	-	
Aromatic > C21-35	mg/kg	28400	2	<10 – 27	0		0	-	-	
Aromatic > C36-40	mg/kg		2	<8.4 - 25	0		0	-	-	
Polyaromatic Hydrocarbons (sVOC suite)										
Naphthalene	mg/kg	193	2	<0.05	0		0	-	-	
Acenaphthylene	mg/kg	83200	2	<0.1	0		0	-	-	
Acenaphthene	mg/kg	83700	2	<0.1	0		0	-	-	
Fluorene	mg/kg	63000	2	<0.1	0		0	-	-	
Phenanthrene	mg/kg	21900	2	<0.1	0		0	-	-	
Anthracene	mg/kg	523000	2	<0.1	0		0	-	-	
Fluoranthene	mg/kg	22600	2	<0.1	0		0	-	-	
Pyrene	mg/kg	54200	2	<0.1	0		0	-	-	
Benzo(a)anthracene	mg/kg	167	2	<0.1	0		0	-	-	
Chrysene	mg/kg	346	2	<0.05	0		0	-	-	
Benzo(b)fluoranthene	mg/kg	44.3	2	<0.1	0		0	-	-	
Benzo(k)fluoranthene	mg/kg	1170	2	<0.1	0		0	-	-	
Benzo-a-pyrene	mg/kg	35.2	2	<0.1	0		0	-	-	
Indeno (123 cd)pyrene	mg/kg	501	2	<0.1	0		0	-	-	
Dibenzo(ah)anthracene	mg/kg	3.53	2	<0.1	0		0	-	-	
Benzo(ghi)perylene	mg/kg	3930	2	<0.05	0		0	-	-	
Other organic compounds										
PCBs	ug/kg	-	0	-			0	-	-	
Total Phenol	mg/kg	440	2	<1	0		0	-	-	
Phenols (VOC suite)	ug/kg	440	2	<0.2	0		0	-	-	
Other VOCs	ug/kg	-	2	<1			0	-	-	
Other sVOCs	ug/kg	-	2	All <MDL			0	-	-	

Table 7.3: Assessment of Risk to Human Health in Area E – Existing DERL site

Determinand	Units	Generic Assessment Criteria	Made Ground				Natural			
			No. of samples	Range	No.> GAC	Loc >GAC	No. of Samples	Range	No.> GAC	Loc >GAC
Arsenic	mg/kg	635	8	3.7 – 16	0		6	9.3 – 28	0	
Antimony	mg/kg	7350	8	<1 – 7.6	0		6	<1 – 3.5	0	
Beryllium	mg/kg	11.7	8	0.52 – 1.5	0		6	0.71 – 1.7	0	
Cadmium	mg/kg	190	8	<0.2 – 0.7	0		6	<0.2 – 0.5	0	
Chromium	mg/kg	8570	8	24 – 90	0		6	57 – 100	0	
Hexavalent Chromium	mg/kg	32.8	8	<4	0		6	<4	0	
Copper	mg/kg	68300	8	19 – 140	0		6	29 – 150	0	
Lead	mg/kg	2300	8	4.5 – 37	0		6	5.4 – 8.5	0	
Mercury	mg/kg	15.4	8	<0.3	0		6	<0.3	0	
Nickel	mg/kg	983	8	25 – 57	0		6	47 – 65	0	
Selenium	mg/kg	12261	8	<1 – 2.9	0		6	<1 – 3.2	0	
Zinc	mg/kg	730000	8	55 – 170	0		6	57 – 120	0	
Boron (water soluble)	mg/kg	236000	8	<0.2 – 3.5	0		6	<0.2 – 1.4	0	
Vanadium	mg/kg	6360	8	38 – 100	0		6	70 -130	0	
Total Cyanide	mg/kg	168	8	<1	0		6	<1	0	
pH	Units	<5.5 or >9.5	8	7.1 – 10.1	3	BHS01, S02, S04	6	6.8 – 8.7	0	
Asbestos	Presence	Presence	8	Not detected - detected	1	BHS05	0	-	-	
Asbestos Quantification	%	-	1	<0.001	-		0	-	-	
BTEX										
Benzene	ug/kg	27000	8	<1	0		6	<1	0	
Toluene	ug/kg	56294000	8	<1	0		6	<1	0	
Ethylbenzene	ug/kg	5706000	8	<1	0		6	<1	0	
m/p Xylene	ug/kg	5923000	8	<1	0		6	<1	0	
o Xylene	ug/kg	6603000	8	<1	0		6	<1	0	
MTBE	ug/kg	-	8	<1	0		6	<1	0	
Total Petroleum Hydrocarbons										
Aliphatic > C5-6	mg/kg	3190	8	<0.1	0		6	<0.01	0	
Aliphatic > C6-8	mg/kg	7780	8	<0.1	0		6	<0.01	0	
Aliphatic > C8-10	mg/kg	2000	8	<0.1	0		6	<0.01	0	
Aliphatic > C10-12	mg/kg	9690	8	<1	0		6	<1	0	
Aliphatic > C12-16	mg/kg	58800	8	<2 – 3.4	0		6	<2	0	
Aliphatic > C16-21	mg/kg	648000	8	<8	0		6	<8	0	
Aliphatic > C21-35	mg/kg		8	<8 - 540	0		6	<8	0	

Determinand	Units	Generic Assessment Criteria	Made Ground				Natural			
			No. of samples	Range	No.> GAC	Loc >GAC	No. of Samples	Range	No.> GAC	Loc >GAC
Aliphatic > C35-C44	mg/kg	648000	8	<8.4 – 740	0		6	<8.4	0	
Aromatic > C6-C7	mg/kg	27	8	<0.1	0		6	<0.1	0	
Aromatic > C7-8	mg/kg	56294	8	<0.1	0		6	<0.1	0	
Aromatic > C8-10	mg/kg	3460	8	<0.1	0		6	<0.1	0	
Aromatic > C10-12	mg/kg	16200	8	<1	0		6	<1	0	
Aromatic > C12-16	mg/kg	36200	8	<2	0		6	<2	0	
Aromatic > C16-21	mg/kg	26600	8	<10-12	0		6	<10	0	
Aromatic > C21-35	mg/kg	28400	8	<10 – 770	0		6	<10	0	
Aromatic > C36-40	mg/kg		8	<8.4 - 1200	0		6	<8.4	0	
Polyaromatic Hydrocarbons (sVOC suite)										
Naphthalene	mg/kg	193	8	<0.05	0		6	<0.05	0	
Acenaphthylene	mg/kg	83200	8	<0.1	0		6	<0.1	0	
Acenaphthene	mg/kg	83700	8	<0.1	0		6	<0.1	0	
Fluorene	mg/kg	63000	8	<0.1	0		6	<0.1	0	
Phenanthrene	mg/kg	21900	8	<0.1	0		6	<0.1	0	
Anthracene	mg/kg	523000	8	<0.1	0		6	<0.1	0	
Fluoranthene	mg/kg	22600	8	<0.1	0		6	<0.1	0	
Pyrene	mg/kg	54200	8	<0.1	0		6	<0.1	0	
Benzo(a)anthracene	mg/kg	167	8	<0.1	0		6	<0.1	0	
Chrysene	mg/kg	346	8	<0.05	0		6	<0.05	0	
Benzo(b)fluoranthene	mg/kg	44.3	8	<0.1	0		6	<0.1	0	
Benzo(k)fluoranthene	mg/kg	1170	8	<0.1	0		6	<0.1	0	
Benzo-a-pyrene	mg/kg	35.2	8	<0.1	0		6	<0.1	0	
Indeno (123 cd)pyrene	mg/kg	501	8	<0.1	0		6	<0.1	0	
Dibenzo(ah)anthracene	mg/kg	3.53	8	<0.1	0		6	<0.1	0	
Benzo(ghi)perylene	mg/kg	3930	8	<0.05	0		6	<0.05	0	
Other organic compounds										
PCBs	ug/kg	-	3	<0.001			2	<0.001	0	
Total Phenol	mg/kg	440	8	<1	0		6	<1	0	
Phenols (SVOC suite)	ug/kg	-	8	<0.2	0		6	<0.2	0	
Other VOCs	ug/kg		8	All <1			6	All <1		
Other sVOCs	ug/kg		8	All < MDL			6	All <MDL		

Table 7.4: Assessment of Risk to Human Health in area of proposed pipeline

Determinand	Units	Generic Assessment Criteria	Made Ground				Natural			
			No. of Samples	Range	No.> GAC	Loc >GAC	No. of Samples	Range	No.> GAC	Loc >GAC
Arsenic	mg/kg	635	7	2.2 – 21	0		7	2.5 – 12	0	
Antimony	mg/kg	7350	7	<1 – 4.7	0		7	<1 – 4.6	0	
Beryllium	mg/kg	11.7	7	0.16 – 1.5	0		7	<0.06 – 1.1	0	
Cadmium	mg/kg	190	7	<0.2	0		7	<0.2	0	
Chromium	mg/kg	8570	7	50 – 97	0		7	43 – 69	0	
Hexavalent Chromium	mg/kg	32.8	7	<4	0		7	<4	0	
Copper	mg/kg	68300	7	23 – 75	0		7	41 – 54	0	
Lead	mg/kg	2300	7	4 – 18	0		7	4.4 – 22	0	
Mercury	mg/kg	15.4	7	<0.3 – 1.0	0		7	<0.3	0	
Nickel	mg/kg	983	7	36 – 60	0		7	36 – 61	0	
Selenium	mg/kg	12261	7	<1 – 5.1	0		7	<1 – 1.7	0	
Zinc	mg/kg	730000	7	62 – 75	0		7	44 – 92	0	
Boron (water soluble)	mg/kg	236000	7	<0.2 – 1.5	0		7	<0.2 – 0.8	0	
Vanadium	mg/kg	6360	7	59 – 140	0		7	52 – 93	0	
Total Cyanide	mg/kg	168	7	<1	0		7	<1	0	
pH	Units	<5.5 or >9.5	7	7.1 – 8.7	0		7	6.9 – 8.9	0	
Asbestos	Presence	Presence	7	Not detected	0		7	-	-	
BTEX										
Benzene	ug/kg	27000	7	<1	0		7	<1	0	
Toluene	ug/kg	56294000	7	<1	0		7	<1	0	
Ethylbenzene	ug/kg	5706000	7	<1	0		7	<1	0	
m/p Xylene	ug/kg	5923000	7	<1	0		7	<1	0	
o Xylene	ug/kg	6603000	7	<1	0		7	<1	0	
MTBE	ug/kg	-	7	<1	0		7	<1	0	
Total Petroleum Hydrocarbons										
Aliphatic > C5-6	mg/kg	3190	7	<0.1	0		7	<0.1	0	
Aliphatic > C6-8	mg/kg	7780	7	<0.1	0		7	<0.1	0	
Aliphatic > C8-10	mg/kg	2000	7	<0.1	0		7	<0.1	0	
Aliphatic > C10-12	mg/kg	9690	7	<1	0		7	<1	0	
Aliphatic > C12-16	mg/kg	58800	7	<2	0		7	<2	0	
Aliphatic > C16-21	mg/kg	648000	7	<8	0		7	<8	0	
Aliphatic > C21-35	mg/kg		7	<8 - 12	0		7	<8	0	
Aliphatic > C35-C44	mg/kg	648000	7	<8.4	0		7	<8.4	0	
Aromatic > C6-C7	mg/kg	27	7	<0.1	0		7	<0.1	0	

Determinand	Units	Generic Assessment Criteria	Made Ground				Natural			
			No. of Samples	Range	No.> GAC	Loc >GAC	No. of Samples	Range	No.> GAC	Loc >GAC
Aromatic > C7-8	mg/kg	56294	7	<0.1	0		7	<0.1	0	
Aromatic > C8-10	mg/kg	3460	7	<0.1	0		7	<0.1	0	
Aromatic > C10-12	mg/kg	16200	7	<1	0		7	<1	0	
Aromatic > C12-16	mg/kg	36200	7	<2	0		7	<2	0	
Aromatic > C16-21	mg/kg	26600	7	<10	0		7	<10	0	
Aromatic > C21-35	mg/kg	28400	7	<10	0		7	<10	0	
Aromatic > C36-40	mg/kg		7	<8.4	0		7	<8.4	0	
Polyaromatic Hydrocarbons (sVOC suite)										
Naphthalene	mg/kg	193	7	<0.05	0		7	<0.05	0	
Acenaphthylene	mg/kg	83200	7	<0.1	0		7	<0.1	0	
Acenaphthene	mg/kg	83700	7	<0.1	0		7	<0.1	0	
Fluorene	mg/kg	63000	7	<0.1	0		7	<0.1	0	
Phenanthrene	mg/kg	21900	7	<0.1	0		7	<0.1	0	
Anthracene	mg/kg	523000	7	<0.1	0		7	<0.1	0	
Fluoranthene	mg/kg	22600	7	<0.1	0		7	<0.1	0	
Pyrene	mg/kg	54200	7	<0.1	0		7	<0.1	0	
Benzo(a)anthracene	mg/kg	167	7	<0.1	0		7	<0.1	0	
Chrysene	mg/kg	346	7	<0.05	0		7	<0.05	0	
Benzo(b)fluoranthene	mg/kg	44.3	7	<0.1	0		7	<0.1	0	
Benzo(k)fluoranthene	mg/kg	1170	7	<0.1	0		7	<0.1	0	
Benzo-a-pyrene	mg/kg	35.2	7	<0.1	0		7	<0.1	0	
Indeno (123 cd)pyrene	mg/kg	501	7	<0.1	0		7	<0.1	0	
Dibenzo(ah)anthracene	mg/kg	3.53	7	<0.1	0		7	<0.1	0	
Benzo(ghi)perylene	mg/kg	3930	7	<0.05	0		7	<0.05	0	
Other organic compounds										
PCBs	ug/kg	-	0	-			0	-	-	
Total Phenol	mg/kg	440	7	<1	0		7	<1	0	
Phenols (sVOC suite)	ug/kg	440	7	<0.2	0		7	<0.2	0	
Other VOCs	ug/kg		7	<1			7	<1	-	
Other sVOCs	ug/kg		7	All <MDL			7	All <MDL	-	

The results of the chemical soils analysis indicate generally very low levels of all contaminants. Concentrations for most contaminants are below the GAC values for commercial end-use in all of the areas for both the made ground and natural samples, with the exception of:

- **pH** - Either slightly high or slightly low pH values have been recorded in 10 samples in area A, 1 sample in area D and 3 samples in area E. These are considered unlikely to present a risk to human health.
- **Asbestos -** Asbestos containing materials were identified at six locations, TP4, TP6, TPD2, BHR01, BHR02 and BHR05 within Area A (EfW CHP). Subsequent asbestos quantification tests positively identified asbestos in samples from all of these exploratory holes and in BHS05 in Area E (DERL). Testing indicates all of the asbestos to be chrysotile, however the quantity of the ACMs was recorded as <0.001%. The presence of asbestos containing materials, may pose a risk to the health of the proposed end-users and construction and maintenance workers.

7.3.2 Assessment of Risk to Water Environment

7.3.2.1 Assessment of leachate results

Soil leachability tests were undertaken in 2016. The results of the comparison of the soil leachability test results to the assessment criteria designed to be protective of water quality are summarised in Table 7.5 below. The full screening assessment is provided in **Appendix C**.

Table 7.5: Summary of Leachate Test Results

Determinand	Units	Assessment Criteria	Area A – Proposed EfW CHP				Area E – Existing DERL site				Area of proposed pipeline			
			No. Samples	Range	No.> Assess Criteria	Loc > Assess Criteria	No. Samples	Range	No.> Assess Criteria	Loc > Assess Criteria	No. Samples	Range	No.> Assess Criteria	Loc > Assess Criteria
Arsenic	ug/l	10	11	<1.1 - 18	6	BHR02, BHR03, BHR05, BHS09, BHS10	4	4.6 - 24	1	BHS01	4	<1.1 – 1.8	0	
Cadmium	ug/	5	11	<0.08	0		4	<0.08	0		4	<0.08	0	
Chromium	ug/l	50	11	0.5 – 2.3	0		4	3.8 – 5.7	0		4	0.8 - 8	0	
Copper	ug/l	1500	11	<0.7 - 26	0		4	7.4- 23	0		4	3 - 12	0	
Nickel	ug/l	20	11	1.8 – 5.5	0		4	2.6 – 4.3	0		4	2.3 – 4.8	0	
Lead	ug/l	10	11	<1 – 5.6	0		4	1.1 – 5.9	0		4	<1 – 1.8	0	
Selenium	ug/l	10	11	<4 - 24	3	TP04, BHR02, BHS09	4	<4	0		4	<4	0	
Zinc	ug/l	11.9	11	1.9 – 8.6	0		4	8.8 - 13	1	BHS08	4	1.7 - 11	0	
Mercury	ug/l	1	11	<0.007 – 0.026	0		4	0.011 – 0.014	0		4	<0.007 – 0.013	0	
Polyaromatic Hydrocarbons														
Benzo(a)pyrene	ug/l	0.01	11	<0.01	0		4	<0.01	0		4	<0.01	0	
Sum of 4 PAHs	ug/l	0.1	11	<0.04	0		4	<0.04	0		4	<0.04	0	

The results of the leachate testing indicate generally low levels of leachable contamination, with the majority of analytes recorded below the assessment criteria. The following exceedances were however recorded, which may suggest that potential contaminants are in a mobile condition:

Area A – Proposed EfW CHP

- Six out of the eleven samples tested recorded elevated concentrations of **Arsenic.**
- Three out of eleven samples recorded elevated concentrations of **Selenium.**

Area E – Existing DERL

- One out of the four samples tested recorded an elevated concentration of arsenic.
- One out of the four samples tested recorded an elevated concentration of zinc.

Area of proposed pipeline

- No elevated concentrations recorded in this area.

There was no visual evidence of contamination within these materials to suggest what may have caused these slightly elevated levels. The most accurate way to assess the risk to the water environment, is to assess the results of the groundwater and surface water testing. (See sections 7.3.2.2 and 7.3.2.3).

7.3.2.2 Groundwater Assessment

Groundwater samples were collected from 20 standpipes in September 2016. A second set of samples was collected from 10 standpipes in October 2016. The results were compared to assessment criteria designed to be protective of water quality. All of the results are summarised in Table 7.6 below, with the assessment presented in **Appendix D** and the full results presented in Contractor's Factual Report.

Table 7.6: Summary of groundwater test results for Area A – Proposed EfW CHP

Determinand	Units	ISL	Round 1				Round 2			
			No samples	Range	No. > Assess Criteria	Loc <Assess Criteria	No samples	Range	No. > Assess Criteria	Loc <Assess Criteria
Antimony	µg/l	5	7	<0.4 – 2	0		3	<0.4 – 1.4	0	
Arsenic	µg/l	10	7	0.84 – 7.62	0		3	1.79 – 6.83	0	
Beryllium	ug/l	4	7	<0.1	0		3	<0.1	0	
Boron	ug/l	1000	7	5.6 - 320	0		3	8 - 360	0	
Cadmium	µg/l	5	7	<0.02 – 0.04	0		3	<0.02 – 0.05	0	
Chromium	µg/l	50	7	0.2 – 0.9	0		3	<0.2 – 1.6	0	
Hexavalent Chromium	µg/l	3.4	7	<5	0		3	<5	0	
Copper	µg/l	1500	7	<0.5 – 5.7	0		3	<0.5 – 16	0	
Lead	µg/l	10	7	<0.2 – 0.6	0		3	<0.2 – 2.4	0	
Mercury	µg/l	1	7	<0.05 – 0.42	0		3	<0.05 – 0.08	0	
Nickel	µg/l	20	7	<0.5 – 7.6	0		3	<0.5 – 8.2	0	
Selenium	µg/l	10	7	<0.6 - 14	1	BH4A	3	<0.6 – 1.9	0	
Vanadium	µg/l	20	7	0.3 – 5.8	0		3	<0.2 - 12	0	
Zinc	µg/l	11.9	7	0.6 – 9.7	0		3	2.6 – 9.6	0	
pH	pH	<5.5->9.5	7	7 – 8.6	0		3	6.9 – 7.8	0	
Total cyanide	ug/l	50	7	<1	0		3	2 – 13	0	
Phenol	µg/l	7.7	7	<1 – 5.9	0		3	<1 – 1.1	0	
Total Petroleum Hydrocarbons										
Aliphatic >C5-C6	µg/l	15000	7	<10	0		3	<10	0	
Aliphatic >C6-C8	µg/l	15000	7	<10	0		3	<10	0	
Aliphatic >C8-C10	µg/l	300	7	<10	0		3	<10	0	
Aliphatic >C10-C12	µg/l	300	7	<10	0		3	<10	0	
Aliphatic >C12-C16	µg/l	300	7	<10	0		3	<10	0	
Aliphatic >C16-C21	µg/l	300	7	<10	0		3	<10	0	
Aliphatic >C21-C35	µg/l	300	7	<10	0		3	<10	0	
Aromatic >C6-C7	µg/l	10	7	<10	0		3	<10	0	
Aromatic >C7-C8	ug/l	300	7	<10	0		3	<10	0	
Aromatic >C8-C10	µg/l	300	7	<10	0		3	<10	0	
Aromatic >C10-C12	µg/l	100	7	<10	0		3	<10	0	
Aromatic >C12-C16	µg/l	100	7	<10	0		3	<10	0	
Aromatic >C16-C21	µg/l	90	7	<10	0		3	<10	0	
Aromatic >C21-C35	µg/l	90	7	<10	0		3	<10	0	
Total PAHs (sVOC suite)										
Benzo(a)pyrene	µg/l	0.01	7	<0.01	0		3	<0.01	0	
Sum of 4 PAHs	µg/l	0.1	7	<0.04	0		3	<0.04	0	
BTEX (VOC Suite)										
Benzene	µg/l	1	7	<1	0		3	<1	0	
Toluene	µg/l	700	7	<1	0		3	<1	0	
Ethylbenzene	µg/l	300	7	<1	0		3	<1	0	
M & P-Xylene	µg/l	500	7	<1	0		3	<1	0	
O-Xylene	µg/l	500	7	<1	0		3	<1	0	
Trichloromethane	µg/l	75	7	<1- 11.8	0		3	<1	0	
Other VOCs	µg/l	DL	7	All <MDL	-		3	All <MDL	-	
sVOCs	µg/l	DL	7	All <MDL	-		3	All <MDL	-	
General Properties										
BOD	mg O2/l	7	7	<1 – 10	1	BH4A	3	<1 – 2.5	0	
COD	mg O2/l	40	7	84 – 6900	7	R01, R02, R03, R04A, R05, S9, S11	3	9.8 – 410	2	R03, R05
Chloride	mg/l	250	7	20 – 590	3	R03, R05, S11	3	64 – 550	1	R05
Ammoniacal nitrogen	ug/l	500	7	72 – 1700	5	R02, R03, R05, S09, S11	3	73 – 1500	2	R03, R05
Sulphate	mg/l	400	7	48.5 – 246	0		3	30 -220	0	
Hardness	mg$CaCO_3$/l	-	7	48.4 – 818	-		3	211 - 495	-	

Table 7.7: Summary of groundwater test results for Area E – Existing DERL

Determinand	Units	ISL	Round 1				Round 2			
			No samples	Range	No. > Assess Criteria	Loc <Assess Criteria	No samples	Range	No. > Assess Criteria	Loc <Assess Criteria
Antimony	µg/l	5	5	<0.4 – 3	0		3	<0.4 – 2.5	0	
Arsenic	µg/l	10	5	<0.15 – 6.15	0		3	0.41 – 27.2	1	S08
Beryllium	µg/l	4	5	<0.1 – 1.4	0		3	<0.1	0	
Boron	µg/l	1000	5	22 - 96	0		3	30 - 93	0	
Cadmium	µg/l	5	5	<0.02 – 0.04	0		3	<0.02 – 0.05	0	
Chromium	µg/l	50	5	0.3 – 7.1	0		3	0.6 – 0.9	0	
Hexavalent Chromium	µg/l	3.4	5	<5	0		3	<5	0	
Copper	µg/l	2000	5	2.2 – 6.6	0		3	3.5 – 5	0	
Mercury	µg/l	1	5	<0.05 – 0.15	0		3	<0.05	0	
Nickel	µg/l	20	5	1.3 – 17	0		3	1.2 – 2.0	0	
Lead	µg/l	10	5	<0.2 – 1.9	0		3	<0.2 – 1	0	
Selenium	µg/l	10	5	<0.6 – 3.2	0		3	0.9 – 2.6	0	
Vanadium	µg/l	20	5	0.5 - 200	2	S03,S08	3	0.6 - 17	0	
Zinc	µg/l	11.9	5	1 – 7.2	0		3	2.2 – 4.4	0	
pH	pH	<5.5->9.5	5	7.2 - 10.8	0		3	7.4 – 8.2	0	
Total cyanide	µg/l	50	5	<1	0		3	1.6 – 5	0	
Phenol	µg/l	7.7	5	<1 – 4.1	0		3	<1	0	
Total Petroleum Hydrocarbons										
Aliphatic >C6-C8	µg/l	15000	5	<10	0		3	<10	0	
Aliphatic >C8-C10	µg/l	300	5	<10	0		3	<10	0	
Aliphatic >C10-C12	µg/l	300	5	<10	0		3	<10	0	
Aliphatic >C12-C16	µg/l	300	5	<10	0		3	<10	0	
Aliphatic >C16-C21	µg/l	300	5	<10	0		3	<10	0	
Aliphatic >C21-C35	µg/l	300	5	<10	0		3	<10	0	
Aromatic >C5-C7	µg/l	10	5	<10	0		3	<10	0	
Aromatic >C7-C8	ug/l	300	5	<10	0		3	<10	0	
Aromatic >C8-C10	µg/l	300	5	<10	0		3	<10	0	
Aromatic >C10-C12	µg/l	100	5	<10	0		3	<10	0	
Aromatic >C12-C16	µg/l	100	5	<10	0		3	<10	0	
Aromatic >C16-C21	µg/l	90	5	<10	0		3	<10	0	
Aromatic >C21-C35	µg/l	90	5	<10	0		3	<10	0	
Total PAHs (sVOC suite)										
Benzo(a)pyrene	µg/l	0.01	5	<0.01	0		3	<0.01	0	
Sum of 4 PAHs	µg/l	0.1	5	<0.04	0		3	<0.04	0	
BTEX (VOC Suite)										
Benzene	µg/l	1	5	<1	0		3	<1	0	
Toluene	µg/l	700	5	<1	0		3	<1	0	
Ethylbenzene	µg/l	300	5	<1	0		3	<1	0	
M & P-Xylene	µg/l	500	5	<1	0		3	<1	0	
O-Xylene	µg/l	500	5	<1	0		3	<1	0	
Other VOCs	µg/l	DL	5	All <MDL	-		3	All <MDL	-	
sVOCs	µg/l	DL	5	All <MDL	-		3	All<MDL	-	
General Properties										
BOD	mg O2/l	7	5	<1 – 4.1	0		3	<1 – 2.3	0	0
COD	mg O2/l	40	5	300 – 18000	5	S01, S02, S03, S04, S08	3	160 – 620	3	S01, S02, S03
Chloride	mg/l	250	5	68 - 130	0		3	44 – 500	1	S03
Ammoniacal nitrogen	ug/l	500	5	<15 - 1100	1	S03	3	<15 - 270	0	
Hardness	ug/l	-	5	65.4 - 243	-		3	54.3 – 332	-	
Sulphate	mg/l	400	5	15 - 170	0		3	18 – 160	0	

Table 7.8: Summary of groundwater test results for Area D – Proposed Compound Area

Determinand	Units	ISL	Round 1				Round 2			
			No samples	Range	No. > Assess Criteria	Loc <Assess Criteria	No samples	Range	No. > Assess Criteria	Loc <Assess Criteria
Antimony	µg/l	5	2	<0.4 – 0.5	0		1	<0.4	0	
Arsenic	µg/l	10	2	1.04 – 1.07	0		1	1.43	0	
Beryllium	µg/l	4	2	<0.1	0		1	<0.1	0	
Boron	µg/l	1000	2	85 - 110	0		1	120	0	
Cadmium	µg/l	5	2	<0.02 – 0.02	0		1	<0.02	0	
Chromium	µg/l	50	2	<0.02	0		1	<0.2	0	
Hexavalent Chromium	µg/l	3.4	2	<5	0		1	<5	0	
Copper	µg/l	2000	2	<0.5 – 0.5	0		1	<0.2	0	
Lead	µg/l	10	2	<0.2 – 0.2	0		1	<0.2	0	
Mercury	µg/l	1	2	<0.05	0		1	<0.05	0	
Nickel	µg/l	20	2	1.2 – 2.2	0		1	0.9	0	
Selenium	µg/l	10	2	<0.6	0		1	1.4	0	
Vanadium	µg/l	20	2	<0.2 – 1.7	0		1	1.6	0	
Zinc	µg/l	11.9	2	1.7 – 3.3	0		1	1.1	0	
pH	pH	<5.5->9.5	2	6.9	0		1	7	0	
Total cyanide	ug/l	50	2	<1	0		1	<1	0	
Phenol	µg/l	7.7	2	<1	0		1	<1	0	
Total Petroleum Hydrocarbons										
Aliphatic >C6-C8	µg/l	15000	2	<10	0		1	<10	0	
Aliphatic >C8-C10	µg/l	300	2	<10	0		1	<10	0	
Aliphatic >C10-C12	µg/l	300	2	<10	0		1	<10	0	
Aliphatic >C12-C16	µg/l	300	2	<10	0		1	<10	0	
Aliphatic >C16-C21	µg/l	300	2	<10	0		1	<10	0	
Aliphatic >C21-C35	µg/l	300	2	<10	0		1	<10	0	
Aromatic >C5-C7	µg/l	10	2	<10	0		1	<10	0	
Aromatic >C7-C8	ug/l	300	2	<10	0		1	<10	0	
Aromatic >C8-C10	µg/l	300	2	<10	0		1	<10	0	
Aromatic >C10-C12	µg/l	100	2	<10	0		1	<10	0	
Aromatic >C12-C16	µg/l	100	2	<10	0		1	<10	0	
Aromatic >C16-C21	µg/l	90	2	<10	0		1	<10	0	
Aromatic >C21-C35	µg/l	90	2	<10	0		1	<10	0	
Total PAHs (sVOC suite)										
Benzo(a)pyrene	µg/l	0.01	2	<0.01	0		1	<0.01	0	
Sum of 4 PAHs	µg/l	0.1	2	<0.04	0		1	<0.04	0	
BTEX (VOC Suite)										
Benzene	µg/l	1	2	<1	0		1	<1	0	
Toluene	µg/l	700	2	<1	0		1	<1	0	
Ethylbenzene	µg/l	300	2	<1	0		1	<1	0	
M & P-Xylene	µg/l	500	2	<1	0		1	<1	0	
O-Xylene	µg/l	500	2	<1	0		1	<1	0	
Other VOCs	µg/l	DL	2	<1	All <MDL		1	<1	All <MDL	
sVOCs	µg/l	DL	2	<1	All <MDL		1	<1	All <MDL	
General Properties										
BOD	mg O2/l	7	2	<1	0		1	<1	0	
COD	mg O2/l	40	2	2500 – 6500	2	S12, S13	1	1300	1	S12
Chloride	mg/l	250	2	40 – 64	0		1	54	0	
Ammoniacal nitrogen	ug/l	500	2	220 – 310	0		1	120	0	
Hardness	mgCaCO$_3$/l	-	2	268 – 330	-		1	355	-	
Sulphate	Mg/l	400		58 - 140	0		1	160	0	

Table 7.9: Summary of groundwater test results for area of proposed pipeline

Determinand	Units	ISL	Round 1				Round 2			
			No samples	Range	No. > Assess Criteria	Loc <Assess Criteria	No samples	Range	No. > Assess Criteria	Loc <Assess Criteria
Arsenic	µg/l	10	4	0.81 – 1.23	0		3	0.63 – 1.7	0	
Cadmium	µg/l	5	4	0.02 – 0.05	0		3	<0.02 – 0.08	0	
Chromium	µg/l	50	4	0.6 – 2.1	0		3	<0.2	0	
Hexavalent Chromium	µg/l	3.4	4	<5	0		3	<5	0	
Copper	µg/l	1500	4	0.6 – 3.3	0		3	0.9 – 2.2	0	
Nickel	µg/l	20	4	1.2 – 6.7	0		3	<0.5 – 2.4	0	
Lead	µg/l	10	4	<0.2 – 0.3	0		3	<0.2	0	
Antimony	µg/l	5	4	<0.4 – 1.8	0		3	<0.4	0	
Selenium	µg/l	10	4	1.5 – 8.9	0		3	<0.6 – 0.8	0	
Zinc	µg/l	11.9	4	1.4 – 8.2	0		3	1.0 – 2.1	0	
Mercury	µg/l	1	4	0.14 – 1.03	1	M03	3	<0.05	0	
pH	pH	<5.5->9.5	4	7.8 – 8.1	0		3	7.5 – 8	0	
Total cyanide	ug/l	50	4	<1	0		3	<1	0	
Phenol	µg/l	7.7	4	<1	0		3	<1	0	
Total Petroleum Hydrocarbons										
Aliphatic >C6-C8	µg/l	15000	4	<10	0		3	<10	0	
Aliphatic >C8-C10	µg/l	300	4	<10	0		3	<10	0	
Aliphatic >C10-C12	µg/l	300	4	<10	0		3	<10	0	
Aliphatic >C12-C16	µg/l	300	4	<10	0		3	<10	0	
Aliphatic >C16-C21	µg/l	300	4	<10	0		3	<10	0	
Aliphatic >C21-C35	µg/l	300	4	<10	0		3	<10	0	
Aromatic >C5-C7	µg/l	10	4	<10	0		3	<10	0	
Aromatic >C7-C8	ug/l	300	4	<10	0		3	<10	0	
Aromatic >C8-C10	µg/l	300	4	<10	0		3	<10	0	
Aromatic >C10-C12	µg/l	100	4	<10	0		3	<10	0	
Aromatic >C12-C16	µg/l	100	4	<10	0		3	<10	0	
Aromatic >C16-C21	µg/l	90	4	<10	0		3	<10	0	
Aromatic >C21-C35	µg/l	90	4	<10	0		3	<10	0	
Total PAHs (sVOC suite)										
Benzo(a)pyrene	µg/l	0.01	4	<0.01	0		3	<0.01	0	
Sum of 4 PAHs	µg/l	0.1	4	<0.04	0		3	<0.04	0	
BTEX (VOC Suite)										
Benzene	µg/l	1	4	<1	0		3	<1	0	
Toluene	µg/l	700	4	<1	0		3	<1	0	
Ethylbenzene	µg/l	300	4	<1	0		3	<1	0	
M & P-Xylene	µg/l	500	4	<1	0		3	<1	0	
O-Xylene	µg/l	500	4	<1	0		3	<1	0	
Trichloromethane	µg/l	75	4	<1 – 6.1	0		3	<1	0	
Other VOCs	µg/l	DL	4	All < MDL	0		3	All < MDL	0	
sVOCs	µg/l	DL	4	All <MDL	0		3	All <MDL	0	
General Properties										
BOD	mg O2/l	7	4	<1 – 61	2	M03, M04	3	<1 – 2.1	0	
COD	mg O2/l	40	4	520 – 11000	4	M01, M02, M03, M04	3	250 – 2400	3	M01, M03, M05
Chloride	mg/l	250	4	18 – 81	0		3	34 – 69	0	
Ammoniacal nitrogen	ug/l	500	4	<15 – 160	0		3	18 – 60	0	
Hardness	mgCaCO$_3$/l	-	4	90.5 – 171	-		3	145 – 300	0	
Sulphate	mg/l	400	4	21 – 66	0		3	16 - 33	0	

The results of the groundwater testing indicate generally low levels of groundwater contamination, with the majority of the analytes recorded below their assessment criteria. However some exceedances have been recorded and these are discussed below based on the site areas.

Area A – Proposed EfW CHP

- One elevated concentration of **Selenium** was recorded in the sample recorded from borehole R04A during the first round of monitoring but the sample collected during the second round of monitoring recorded selenium below the method detection limit.
- Three elevated concentrations of **Chloride** during the first round of monitoring, with one of those samples also recording an elevated concentration in round 2.
- Five elevated concentrations of **ammoniacal nitrogen** during the first round of monitoring and two elevated concentrations in round 2.
- All of the samples tested during the first round of monitoring recorded elevated concentrations of **Chemical Oxygen Demand**, with 2 samples for round 2 also elevated. Chemical Oxygen Demand is an indicator of the presence of some organic material within the water. In light of the very low levels of hydrocarbons recorded, it is possible that this may reflect naturally occurring organic matter.

Area D – Proposed Compound Area

- All of the samples tested during the first and second round of monitoring recorded elevated concentrations of **Chemical Oxygen Demand.**

Area E – Existing DERL site

- Two elevated concentration of **Vanadium** were recorded in the samples collected from borehole S03 and S08 during the first round of monitoring but the samples collected during the second round of monitoring recorded vanadium below the assessment criteria.
- One elevated concentration of **Chloride** during the second round of monitoring.
- One elevated concentration of **ammoniacal nitrogen** during the first round of monitoring.
- All of the samples tested during the first and second round of monitoring recorded elevated concentrations of **Chemical Oxygen Demand.**

Area of proposed pipeline

- One elevated concentration of **Mercury** within borehole M03 during the first round of monitoring, but the sample collected and tested from this standpipe in round 2 recorded mercury below the method detection limit.

- Two elevated concentrations of **Biological Oxygen Demand** during the first round of monitoring.
- All of the samples tested during the first and second round of monitoring recorded elevated concentrations of **Chemical Oxygen Demand.**

7.3.2.3 Surface Water Testing

Surface water samples were collected from three points along the Dighty Water, upstream, midstream and downstream of the proposed development area as shown on **Figure 5.**

The results of the comparison of the surface water test results to assessment criteria designed to be protective of water quality are summarised in Table 7.10 below. The full assessment results area presented in **Appendix E.**

Table 7.10: Summary of surface water results

Determinand	Units	ISL	November 2016			
			No samples	Range	No. > Assess Criteria	Loc <Assess Criteria
Antimony	µg/l	5	3	0.8	0	
Arsenic	µg/l	50	3	0.49 – 0.59	0	
Beryllium	ug/l	4	3	<0.1 – 0.7	0	
Boron	ug/l	2000	3	36	0	
Cadmium	µg/l	0.08	3	<0.02	0	
Chromium	µg/l	4.7	3	0.4 – 0.5	0	
Hexavalent Chromium	µg/l	3.4	3	<5	*	
Copper	µg/l	1	3	11-14	3	SW1-3
Lead	µg/l	1.2	3	<0.2	0	
Mercury	µg/l	0.07	3	<0.05	0	
Nickel	µg/l	4	3	0.7 – 1.0	0	
Selenium	µg/l	10	3	<0.6	0	
Vanadium	ug/l	20	3	0.7 – 0.8	0	
Zinc	µg/l	11.9	3	2.4 – 2.9	0	
pH	pH	<5.5->9.5	3	8.1	0	
Total cyanide	mg/l	1	3	<1	0	
Phenol	µg/l	7.7	3	2.4 – 4.3	0	
Total Petroleum Hydrocarbons						
Aliphatic >C5-C6	µg/l	10	3	<10	0	
Aliphatic >C6-C8	µg/l	10	3	<10	0	
Aliphatic >C8-C10	µg/l	10	3	<10	0	
Aliphatic >C10-C12	µg/l	10	3	<10	0	
Aliphatic >C12-C16	µg/l	10	3	<10	0	
Aliphatic >C16-C21	µg/l	10	3	<10	0	
Aliphatic >C21-C35	µg/l	10	3	<10	0	
Aromatic >C6-C7	µg/l	10	3	<10	0	
Aromatic >C7-C8	ug/l	10	3	<10	0	
Aromatic >C8-C10	µg/l	10	3	<10	0	
Aromatic >C10-C12	µg/l	10	3	<10	0	
Aromatic >C12-C16	µg/l	10	3	<10	0	
Aromatic >C16-C21	µg/l	10	3	<10	0	
Aromatic >C21-C35	µg/l	10	3	<10	0	
Total PAHs (sVOC suite)						
Naphthalene	µg/l	2	3	<0.01	0	
Anthracene	µg/l	0.1	3	<0.01	0	
Fluoranthene	µg/l	0.0063	3	<0.01	*	
Benzo(a)pyrene	µg/l	0.00017	3	<0.01	*	
BTEX (VOC Suite)						
Benzene	µg/l	10	3	<1	0	
Toluene	µg/l	74	3	<1	0	
Ethylbenzene	µg/l	20	3	<1	0	
M & P-Xylene	µg/l	30	3	<1	0	
O-Xylene	µg/l	30	3	<1	0	
Other VOCs	µg/l	DL	3	<1	-	
sVOCs	µg/l	DL	3	<MDL	-	
General Properties						
Chloride	mg/l	250	3	140 – 150	0	
Ammoniacal nitrogen	ug/l	500	3	32- 140	0	
Sulphate	mg/l	400	3	17.1 – 17.5	0	
Hardness	ug/l	-	3	117 - 122	-	
Polychlorinated Biphenyls	ug/l	-	3	<0.02	0	

*Method Detection Limit > than assessment criteria

The results of the surface water testing has also indicated very low levels of contamination within the Dighty Water, with the majority of the analytes being below the screening criteria. The only parameter that was found to exceed the assessment criteria was **Copper.** However it should be noted that the value for copper is actually for bioavailable copper within the sample and not the total dissolved copper concentration that has been determined in the lab.

This data suggests that the site is not adversely impacting on the quality of the Dighty Water.

7.3.3 Ground Gas Assessment

7.3.4 Potential Sources and Pathways

The problems associated with ground gas generation and migration are varied. Methane is flammable in air at concentrations between 5% and 15% by volume, where carbon dioxide is an asphxyiant when present in confined spaces at levels of 1.5% by volume and greater.

Any material having an organic or biodegradable content, eg pits backfilled with degradable materials or naturally organic rich deposits such as peat or silts, will have the potential to produce landfill gases including methane, carbon dioxide and hydrogen sulphide and for the depletion of oxygen, with associated hazards of explosion or asphyxiation.

The desk study considered that there was the potential for localised made ground to be present at the site. The source and nature of the made ground is unknown and therefore may have the potential to contain organic or biodegradable material.

The desk study has identified that the site is not located in an area affected by radon gas and therefore Stage 1 radon protection measures are not required.

7.3.4.1 Potential Receptors

The principal receptors from potential gas migration and accumulation are future occupiers/users of the proposed development and construction/maintenance workers.

7.3.4.2 Gas Monitoring Data

Gas monitoring has been undertaken as part of the recent ground investigation, with all of the standpipes being monitored on six occasions over a two month period. As the proposed development is restricted to Area A only, the assessment below only presents the results of gas monitoring from standpipes in this area.

The gas results are summarised in Table 7.11 below, with the full results presented in the Contractor's factual report.

Table 7.11: Assessment of gas results with Area A – Proposed EfW CHP

BH	No visits	Methane		Carbon Dioxide			Oxygen		Gas Flow (l/h)
		Range %v/v	No >1% v/v	Range %v/v	No exceed		Range %v/v	No below 18% v/v	
					1.5% v/v	5% v/v			
Shallow Standpipes – Made Ground									
BH R03 *	6	0 – 1.4	1	0 – 0.7	0	0	19.1 – 21.5	0	-0.1 – 0.1
BH S10	6	0.7 – 49.4	6	0 – 1.5	0	0	0.7 – 21.4	6	-0.3 – 1.2 **
Shallow Standpipes – Natural Deposits									
BH R01	6	0	0	0 – 0.7	0	0	15.6 – 20.7	3	-1.5 – 1.5
BH R02	6	0 – 0.3	0	0 – 1.3	0	0	8.7 – 21.2	2	-0.3 – 2.7
BH R05	6	0 – 0.1	0	0 – 0.7	0	0	20.4 – 21.8	0	-0.2 – 0.1
BH S09	6	0	0	0 – 0.5	0	0	20.3 – 21.3	0	-0.3 – 0.2
BH S11	6	0 – 1.9	1	0 – 0.7	0	0	17.8 – 21.8	1	0 – 4.4 ***
Deep Standpipe - Bedrock									
BH R04A	6	0.1 - 5	4	0	0	0	9.5 – 21.1	5	-0.4 - 0

*water upsurge recorded in BH R03 on three occasions during pumping therefore monitoring stopped

**initial flow reading on 9/11/16 recorded 6 l/hr

***initial flow reading on 21.9l/hr dropping to 4.4 l/hr

Shallow Standpipes – Made Ground

Very high methane concentrations were consistently recorded in borehole S10. The response zone at this location is within the made ground. On one of the monitoring locations, an initial high flow rate was observed at the start of the monitoring at 6l/hr but this dropped to around 1.2l/hr. The borehole log does not indicate the presence of biodegradable material that would explain these high readings. The other standpipe located within the made ground recorded elevated methane on only one occasion.

The shallow standpipes within the made ground did not record any elevated concentrations of carbon dioxide, however evidence of depleted oxygen was noted in BH S10 during all of the monitoring visits.

The groundwater levels taken during the monitoring visit suggest that the water level is sitting higher than the response zone. When the water level is above the response it prevents soil gas from entering the standpipe and therefore the readings recorded may readings than are lower than what is actually present.

Shallow Standpipes – Natural Deposits

Elevated methane was recorded in borehole S11 on one occasion. Carbon dioxide was not found to be elevated in any of the standpipes with depleted oxygen noted in 3 of the standpipes.

Low flow rates were normally observed in the standpipes, however flows of up to 1.5 l/hr were observed in R01, with up to 2.7 l/hr observed in R02. Borehole S11 initially observed a very high flow rate of 21.9 l/hr, however this dropped to a steady flow of 4.4l/hr.

The groundwater levels taken during the monitoring visit suggest that the water level is sitting higher than the response zone in all of the standpipes. It should be noted that this can influence the gas monitoring results.

Deep Standpipes – Bedrock

There was only one standpipe installed in the bedrock. This recorded elevated concentrations of methane up to 5% on at least 4 out of the 6 monitoring visits. No elevated concentrations of carbon dioxide were observed in this standpipe, however depleted oxygen was observed on 5 occasions.

No positive flow was observed in this standpipe.

The groundwater levels taken during the monitoring visit suggest that the water level is sitting higher than the response zone in the standpipe. It should be noted that this can influence the gas monitoring results.

BS8485 [6] and CIRIA C665 [7] provide guidance on the assessment of gas risk by developing a characteristic gas situation through site characterisation. A method widely used by regulators and consultants to assess the risk posed by gases was developed by Wilson and Card (1999) and is the basis for the gas assessment described in CIRIA guidance C665 – Assessing risks posed by hazardous ground gases to buildings and in BS8485 – Code of Practice for the characterisation and remediation from ground gas in affected developments.

Both gas concentrations and borehole flow rates measured in the field are used to calculate the limiting borehole gas volume flow, or Gas Screening Value (GSV) for gases presenting high risks. The GSV is equal to the maximum borehole flow rate (l/h) multiplied by the maximum gas concentrations (%v/v). The calculated GSV is then compared to the classification system described n C665 to determine the characteristic situation defining the general scope of gas protection measures required.

Shallow Standpipes – Made Ground

The maximum concentration of methane within the made ground was recorded at 49.4%, with the maximum carbon dioxide recorded at 1.5%, with a maximum steady flow rate of 1.2 l/hr.

Table 7.12: Calculation of GSV within made ground.

Gas	Max Conc (%)	Gas Screening Value (GSV) l/hr
Methane	49.4	0.59
Carbon Dioxide	1.5	0.018

In accordance with CIRIA C665, the gas screening value places this part of the site within Characteristic Situation 2.

Shallow Standpipes – Natural Soils

The maximum concentration of methane within the made ground was recorded at 1.9%, with the maximum carbon dioxide recorded at 1.3%, with a maximum steady flow rate of 4.4 l/hr.

Table 7.13: Calculation of GSV within made ground.

Gas	Max Conc (%)	Gas Screening Value (GSV) l/hr
Methane	1.9	0.08
Carbon Dioxide	1.3	0.06

In accordance with CIRIA C665, the gas screening value places this part of the site within Characteristic Situation 2.

Deep Standpipes – Bedrock

The maximum concentration of methane within the made ground was recorded at 5%, with no carbon dioxide detected and a maximum steady flow rate of 0.4 l/hr.

Table 7.14: Calculation of GSV within made ground.

Gas	Max Conc (%)	Gas Screening Value (GSV) l/hr
Methane	5	0.02

In accordance with CIRIA C665, the gas screening value places this part of the site within Characteristic Situation 1.

Summary

The above results suggest that the site would be classified as Characteristic Situation 2. However if the highest flow is applied to the highest methane concentration, it would place the site is Characteristic Situation 3. It is therefore recommended that gas protection measures for **Characteristic Situation 3** be designed in accordance with the recommendations of CIRIA C665 and BS 8485, which will enable the nature and use of the proposed development and inherent protection within the building structure to be taken account of in the design. Specific gas remedial measures over and above those provided by the building structure are likely to be required in buildings with small internal spaces. The protection measures required will need to be determined once more information in known on the detailed design of the proposed buildings.

The radon report obtained from the British Geological Survey has confirmed that the site is not located in a radon affected area. Stage 1 radon protection measures are therefore not required within the buildings to prevent radon gas entering the properties.

8 Revised Conceptual Site Model

8.1 Introduction

The preliminary conceptual site model, section 4, has been reviewed in light of the findings of the current site investigation. At the current time, development is only proposed for Area A and therefore the revised CSM relates to Area A only.

8.2 Sources

The findings of the ground investigation generally indicate very low levels of contamination to be present across the site, both within the soils and groundwater. The recorded levels of contamination were generally consistent with the very limited visual or olfactory evidence of contamination noted during the investigation. The contaminants of concern identified by the investigations are summarised below.

Soils	**Slightly alkaline soil conditions.**
	Asbestos containing materials in TP4, TP6, BH R01, BH R02 and BH R05.
	Localised elevated concentrations of leachable arsenic and selenium.
Groundwater	Widespread elevations of ammoniacal nitrogen.
	Localised elevated concentrations of chloride.
	Localised elevated concentrations of trichloromethane.
	Localised elevated concentrations of selenium.
Surface Water	None.
Soil Gas	Elevated methane and carbon dioxide along with reasonably high flows.

The results of the investigation indicate that, despite the contaminants identified above, there is a low likelihood of significant widespread contamination being present on the site. It is, however, possible that localised areas of further contamination could be present locally, over and above those identified by the investigation to date.

8.3 Receptors

The ground investigation has not resulted in any potential additional receptors being identified or others discounted. The receptors are therefore considered to remain:

- Construction and maintenance workers;
- Site Users (Staff and Visitors)
- Adjacent Site Users (off site)
- Surface Water (via groundwater); and
- Structures and services.

8.4 Pathways

The ground investigation has not resulted in the identification of any further potential pathways than those identified within the Preliminary CSM. Further information on the ground conditions has, however, been obtained which may help to further assess the likelihood of different pollutant linkages being realised.

8.5 Pollutant Linkages

The Source-Pathway-Receptor relationships identified by the revised CSM are summarised in Table 7.1 below. The potential risks associated with each of these pollutant linkages have been evaluated in accordance with the guidance provided in CIRIA C552 *"Contaminated Land Risk Assessment – A Guide to Good Practice"* [8]. Key pollutant linkages are discussed in more detail in Sections 8.5.1 to 8.5.4.

Table 8.1: Revised Conceptual Model and Risk Estimation Summary

Potential Receptor	Source	Potential Pathway	Consequence of Risk	Probability of Risk	Risk Classification	Potential Mitigation Measures	Potential Risk Post Mitigation
Construction Workers	Low levels of general soil contamination	Dermal contact, inhalation and ingestion of soils, dust and groundwater	Minor	Likely	Low Risk	- Further investigation and assessment of possible Asbestos containing materials by suitable qualified specialist, with assessment identification of appropriate mitigation measures in line with the requirements of the Control of Asbestos Regulations 2012 (CAR 2012) - Development and adherence to an appropriate Code of Construction Practice (CoCP), including appropriate site controls, personal protective measures, hygiene facilities, confined spaces best practice, dust suppression, sheeting and wheel washing of lorries as appropriate - Vigilance during works for any "unexpected" contamination	Very Low Risk
	Asbestos contamination of soils	Inhalation of dust and fibres	Medium	Likely	Moderate		TBC subject to specialist assessment
	Soil gas including methane and carbon dioxide	Accumulation in confined spaces and inhalation.	Medium/ Severe	Low Likelihood	Moderate/Low to Moderate Risk		Low Risk
Adjacent Site Users (Construction Phase)	Soil contamination (excluding asbestos)	Inhalation and ingestion of dust	Mild	Low Likelihood	Low Risk		Very Low Risk
	Asbestos contamination of soils	Inhalation of dust and fibres	Medium	Unlikely / Low Likelihood	Low Risk / Moderate/Low Risk		TBC subject to specialist assessment
Adjacent Site Users (Operation Phase)	Soil contamination (excluding asbestos)	Inhalation and ingestion of dust	Mild	Unlikely	Very Low Risk	- Any measures required to address risks to site end-users, such as removal or capping of significantly contaminated materials, are likely to adequately address risks	Very Low Risk
	Asbestos contamination of soils	Inhalation of dust and fibres	Medium	Unlikely	Low Risk		Very Low Risk

Potential Receptor	Source	Potential Pathway	Consequence of Risk	Probability of Risk	Risk Classification	Potential Mitigation Measures	Potential Risk Post Mitigation
Site End-Users	Low levels of general soil contamination	Dermal contact, inhalation and ingestion of soils, dust and groundwater	Minor	Low Likelihood	Very Low Risk	- Further assessment of distribution and nature of asbestos containing materials by suitable qualified specialist - Localised remediation of any materials identified to present an unacceptable risk, such as removal, treatment or provision of appropriate clean cover/capping. - Recording of any residual contamination risks (such as asbestos at depth) that may remain following construction within the Health and Safety File to ensure maintenance workers can take appropriate precautions.	Very Low Risk
	Asbestos contamination of soils	Inhalation of dust and fibres	Medium	Low Likelihood	Moderate/Low Risk		TBC subject to specialist assessment
	Soil gas including methane and carbon dioxide	Accumulation in confined spaces and inhalation.	Medium	Low Likelihood	Moderate Risk	- Adoption of appropriate soil gas protection measures as part of the development.	Low Risk
Water Environment – Surface Waters	Low levels of general soil and groundwater contamination	Leaching of soil contamination and lateral and vertical migration of contaminated water to surface water courses. Surface water runoff	Minor	Likely	Low Risk	- Localised remediation of any materials identified to present an unacceptable risk, such as removal or treatment.	Low Risk

Potential Receptor	Source	Potential Pathway	Consequence of Risk	Probability of Risk	Risk Classification	Potential Mitigation Measures	Potential Risk Post Mitigation
Water Environment – Aquifer	Low levels of general soil and groundwater contamination	Leaching of soil contamination and vertical migration of contaminated water to aquifer. Preferential migration of contaminants along piles.	Minor	Low Likelihood	Very Low Risk	- Localised remediation of any materials identified to present an unacceptable risk, such as removal or treatment. - Completion of detailed Foundation Risk assessment and adoption of appropriate piling techniques accordingly.	Very Low Risk
Building Materials – Buried Concrete	Aggressive contaminants in soil and groundwater	Direct contact with contaminated soils, leachate and groundwater	Minor	Likely	Low Risk	- Design of buried concrete in line with BRE Special Digest 1	Very Low Risk
Building Materials – Water Supply Pipes	Aggressive contaminants in soil and groundwater		Mild	Likely	Moderate/Low Risk	- Design of water supply pipes in accordance with UKWIR and other relevant guidance - Liaison with local Water Authority	Very Low Risk

8.5.1 Human Health

Based on the results of the ground investigation, the general levels of contamination indicated to be present across the site are low and are likely to present a low to low risk to human health, including construction workers, adjacent site users and site end-users.

Asbestos Containing Materials were, however, identified locally within the area of the proposed development. Due to the potential serious consequences of exposure to asbestos, the risks posed by these materials could potentially present a moderate risk. It is recommended that an appropriately experienced asbestos specialist undertake further works to determine the extent and nature of asbestos, complete appropriate risk assessments and develop an appropriate risk mitigation strategy accordingly. Such works should be carried out in accordance with the requirements of the Control of Asbestos Regulations (2012) and other industry guidance such as CAR-SOIL.

The greatest risks to human health are considered to exist during the earthworks phase of the project, where large quantities of soils are likely to be disturbed, and there is a high potential for the generation of dust and direct contact for construction workers with contaminated materials.

8.5.2 Water Environment

Based on the results of the ground investigation, the general levels of contamination indicated to be present across the site are low. It is considered that, even taking into account the slightly elevated levels of contamination identified in areas, the concentrations of contaminants present in the soils are unlikely to present a significant risk to either surface waters or the environment.

The greatest risks to surface water posed by such localised contamination are considered to exist during and immediately after the earthworks operations on the site. Disturbance of soils may result in increased mobility of any contaminants they contain, with surface run-off presenting a risk of any contaminated sediments to enter the Dighty Water to the south of the site. Vigilance during the site works, should enable areas that could present such a risk to be appropriately identified and remedial requirements, if necessary, to be designed accordingly.

The aquifer beneath the site is understood to be relatively low sensitivity to contamination, due to the limited likely productivity and lack of abstractions in the immediate vicinity of the site. Should piling be required, it is possible the contaminant migration pathways could be generated directly to the underlying aquifer. Through appropriate foundation risk assessment, selection of appropriate piling techniques, high quality construction standards and localised treatment of any grossly contaminated materials that are encountered, it is considered that it should be possible to reduce this potential risk to acceptable levels.

8.5.3 Building Materials

Based on the results of the ground investigation, the general levels of potentially aggressive conditions to buried concrete are very low, and are unlikely to present a significant risk. Localised accumulations of peat, up to 1.60m thick, will present more aggressive conditions for deeper foundation solutions.

It should be possible to mitigate any risks posed by the general levels of contamination and any local hotspots encountered to building materials, through appropriate design of buried concrete and water supply pipes.

9 Conclusions and Recommendations

9.1 Introduction

An Energy from Waste and Combined Heat and Power Facility (EfW CHP) has been proposed in Baldovie, Dundee.

Arup have been appointed by MVV Environment Services Ltd to undertake a geotechnical and geo-environmental intrusive investigation of the site.

9.2 Ground and Groundwater Conditions

The results of the ground investigation indicate that the majority of the site is underlain by variable alluvium overlying fluvioglacial deposits with bedrock at depth.

At the time of writing, it is understood that the proposed development involves the construction of an EfW CHP facility in Area A, a construction compound in Area D, and a pipeline to the north east of the EfW CHP facility.

Based on the results of the ground investigation, the EfW CHP facility will require piled foundations and significant excavations below existing ground levels will require an embedded retaining wall solution. It is considered that the exact nature of the foundation will be dependent on the magnitude of the foundation loads and the tolerances on differential settlement of the mechanical equipment within the facility. At the time of writing, it is anticipated that piles will need to be rock socketed to achieve the required capacities.

A shallow foundation solution may be feasible for the proposed pipeline following confirmation of the nature and founding levels of the pipeline. The foundation solution is likely to be dependent on the differential settlement tolerances of the proposed pipeline material.

The geotechnical assessment outlined in Section 6 should be reviewed following confirmation of the nature of the proposed development. Following confirmation of these details, as assessment on the adequacy of the ground investigation available should be made and consideration should be given to carrying out further investigation where necessary.

9.3 Contamination Assessment and Mitigation Measures

Based on the findings of the desk study and ground investigation, it is considered that the risk posed by contamination to the proposed EfW CHP plant is generally **very low** to **low**. A number of more significant risks have, however, been identified associated with the following critical pollutant linkages:

- Localised asbestos contamination:

  - inhalation by Construction Workers (moderate/low risk)

- inhalation by Adjacent Site Users (low to moderate/low risk)
- inhalation by Site End-Users (moderate/low risk)

- Elevated concentrations of methane and carbon dioxide:
  - inhalation by Construction Workers (moderate/low risk)
  - inhalation by Adjacent Site Users (low to very low risk)
  - inhalation by Site End-Users (moderate risk)

The above pollutant linkages are considered to require further consideration as part of the enabling works and, if appropriate, suitable remedial measures designed. The actual risks posed will be dependent on the actual form and extent of any contamination present across the site, and how these will interface with the proposed development layout.

It is considered, however, that it should be possible for the above risks to be mitigated to acceptable levels through the adoption of appropriate measures such as further investigation, appropriate design of the earthworks strategy, foundations, gas protection measures and buried structures and services, localised remedial works if necessary and development and adoption of a detailed Code of Construction Practice (CoCP) for the development by the contractors. As per best practice, the CoCP should include:

- Detailed plans and method statements for the handling and control of excavation arisings, groundwater and run-off, controlling airborne dust and ensuring the health and safety of site operatives. This should include consideration of appropriate personal protective equipment, hygiene facilities, dust suppression and confined spaces best practice.
- Method statements for the management and remediation of asbestos and any other contamination identified during further phases of investigation. Assessment and specification of mitigation measures for asbestos should be carried out by an appropriately experienced specialist in line with the requirements of CAR 2012.
- A strategy for a watching brief to identify any areas of “unexpected” contamination, including a developed strategy for the segregation, further testing and risk assessment of the materials.

Based on the adoption of the above, it is considered that contamination is unlikely to present a significant constraint to the development of the site.

Further risk assessments should be carried out, as appropriate, for other future proposed developments on the site, such as the proposed pipeline.

10 References

[1] Arup (2016). *Proposed Energy from Waste Plant, Dundee – Geotechnical and Geo-environmental Desk Study Report.* Ref: 245510-06. 4 April 2016.

[2] Geotechnical Engineering Ltd. (2016). *EFW Dundee and Angus: Factual Report on Ground Investigation.* FINAL. Ref: 32229.

[3] Stroud M., 1989. *Standard Penetration Test – Its Application and Interpretation.*

[4] Norbury D. R., 1986. *The Point Load Test. Engineering Geology Special Publications 1986, v. 2; p.325-329.* Geological Society of London.

[5] BRE Construction Division, 2005. Concrete in Aggressive Ground, BRE Special Digest 1:2005 Third Edition. BRE Press, Bracknell.

[6] British Standards Institute, 2015. *BS 8485: Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for new buildings*. London, HMRC

[7] CIRIA, 2007. *C665 – Assessing Risks Posed by Hazardous Ground Gases to Buildings.* CIRIA.

[8] CIRIA, 2001. C552: Contaminated Land Risk Assessment – A Guide to Good Practice.

Figures

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MVV Environment

ARUP

Proposed Energy from Waste Plant, Dundee

Geotechnical and Geo-environmental Interpretative Report

Title : Site Location

Job No: 245510-06 Figure: 1

Created using CADplot http://www.onsys-software.com/cadplot/

A3

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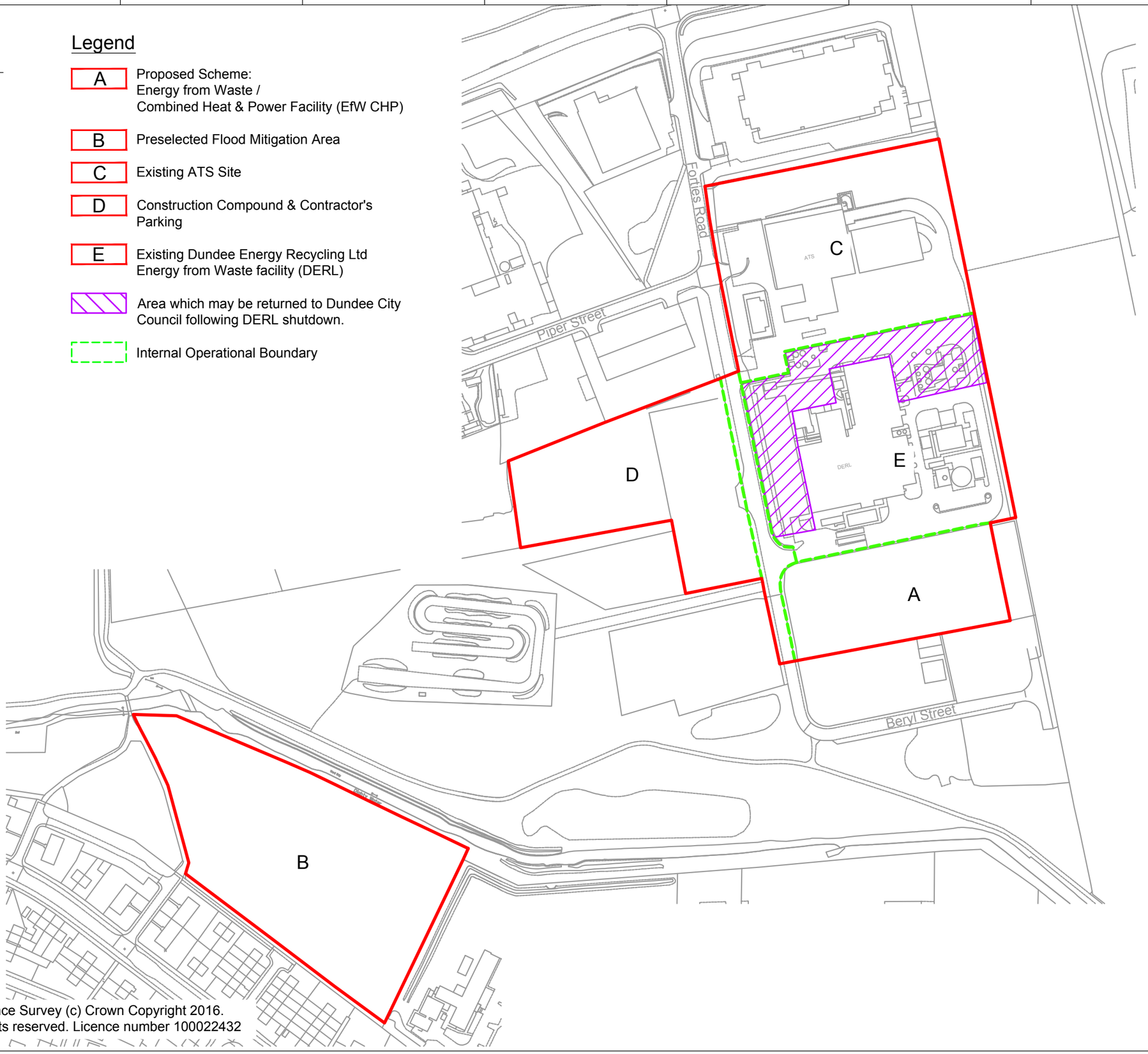
Legend

- A — Proposed Scheme: Energy from Waste / Combined Heat & Power Facility (EfW CHP)
- B — Preselected Flood Mitigation Area
- C — Existing ATS Site
- D — Construction Compound & Contractor's Parking
- E — Existing Dundee Energy Recycling Ltd Energy from Waste facility (DERL)
- Area which may be returned to Dundee City Council following DERL shutdown.
- Internal Operational Boundary



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Client
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Project Title
Proposed Energy from Water Plant Dundee
Geotechnical and Geo-environmental Interpretative Report

Drawing Title
Site Layout Plan

Scale at A3 1:2500

Role Geotechnical

Suitability **Issue**

Arup Job No **245510-06** | Rev **I1**

Name

Figure 02

Do not scale

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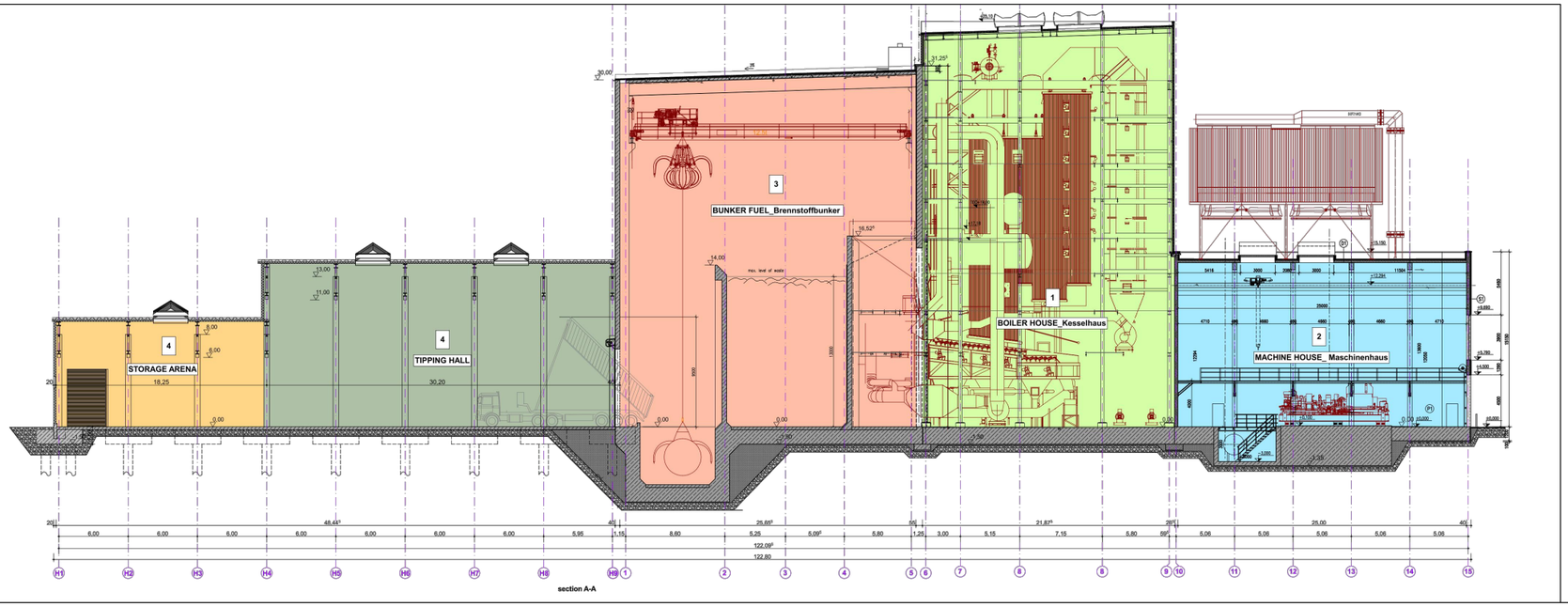

Note

1. Figure extracted from drawings "300-00-100 Axis Plan" &"300-00-120 Section A-A". Received from Ingenieurburo Neubau / sanierung Schneider. Dated: 09.02.2016.

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Proposed Energy from Waste Plant, Dundee
Geotechnical and Geo-environmental Interpretative Report

Drawing Title
Proposed Site Layout Plan

Scale at A3 1:500

Role Geotechnical

Suitability **Issue Report**

Arup Job No **245510-06**

Rev **I1**

Name
Figure 3

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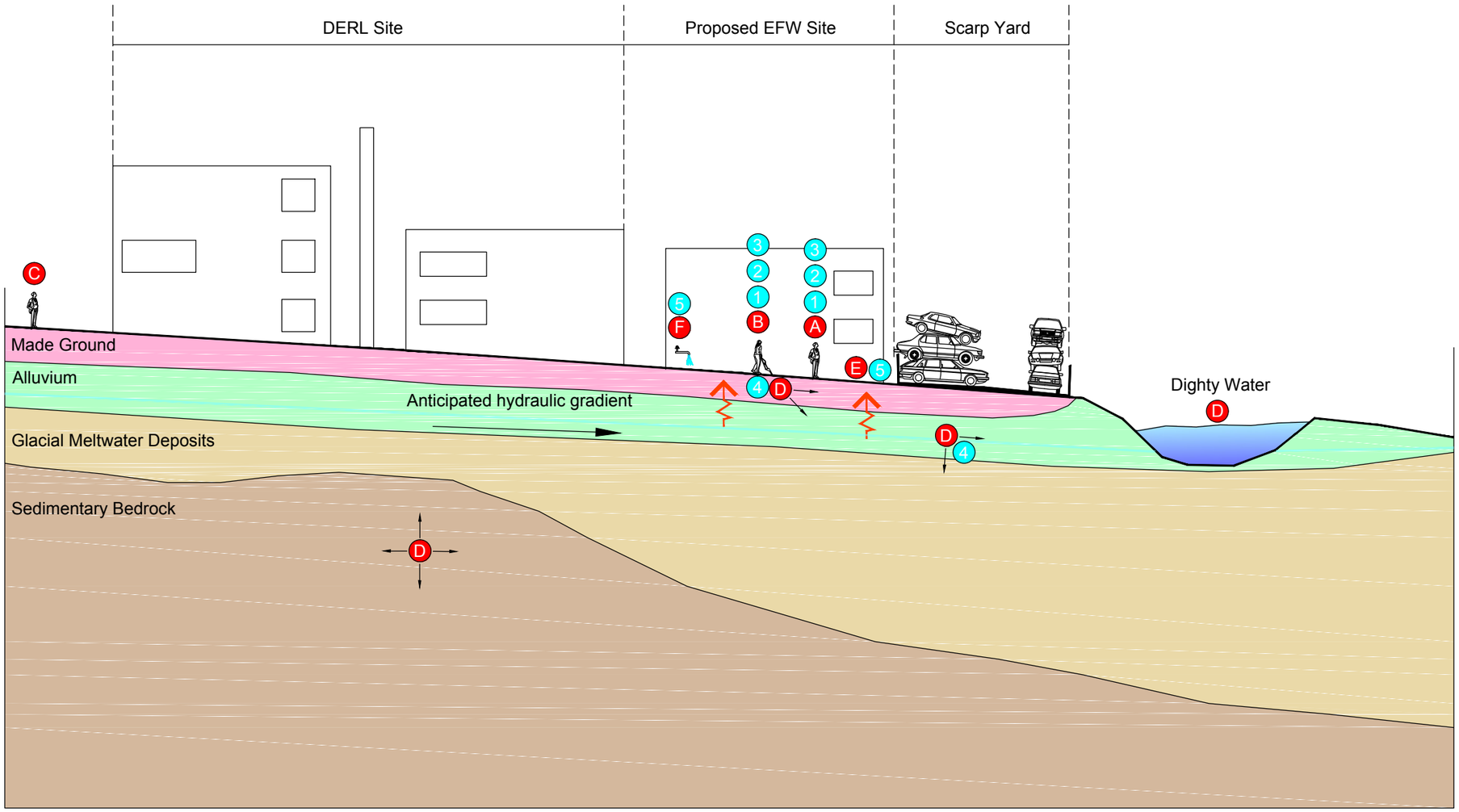

Sources of Contamination

- Potential for made ground at site to contain asbestos.
- Potential for contaminants in the underlying sails and groundwater within the vicinity of EFW site.
- Potential for contaminants to be present beneath exiting DERL site.
- Elevated ground gases in peat beneath site.

Receptors

A Humans on-site (staff / visitors).
B Humans on-site (construction / maintenance workers).
C Humans off-site.
D Surface water (Dighty water) via groundwater
E Building materials
F Potable water pipes

Pollutant - Linkages

1 Dermal contact
2 Inhalation
3 Ingestion
4 Leaching/migration
5 Chemical attack

Mitigation Measures

- To be finalised following completion of additional investigation.

Legend

Made Ground
Alluvium
Glacial Meltwater Deposits
Sedimentary Bedrock
Ground Gas
Groundwater

Rev	Date	By	Chkd	Appd
I1	09/12/16	ML	MC	JG
Issue Report				

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Project Title
Proposed Energy from Waste Plant, Dundee
Geotechnical and Geo-environmental Interpretative Report

Client
MVV Environment Services Ltd

Drawing Title
Preliminary Conceptual Site Model

Scale at A3 N.T.S
Role Geotechnical
Suitability **Issue Report**
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Rev **I1**
Name
Figure 4

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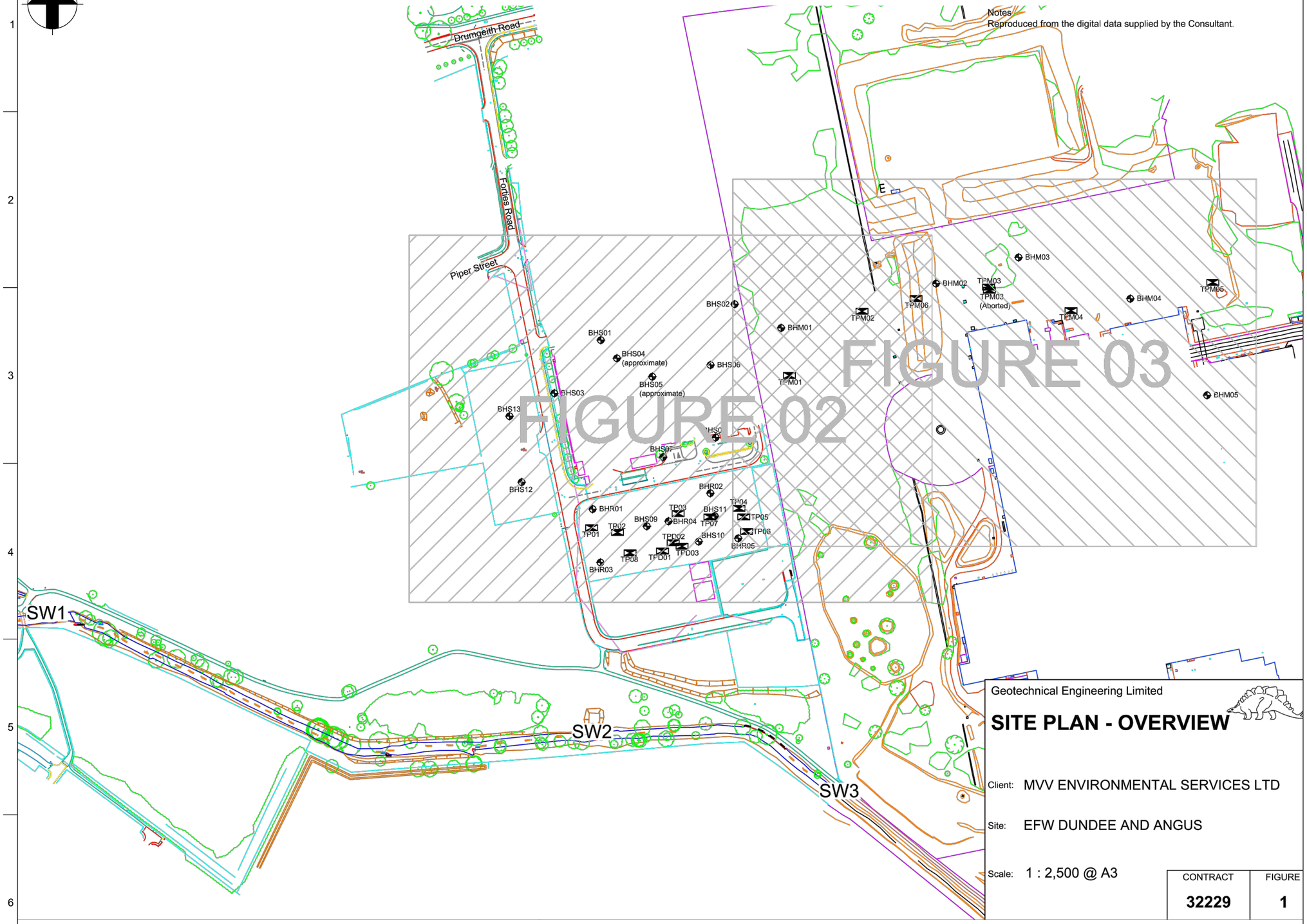

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Client
MVV Environment Services Ltd.

Project Title
Proposed Energy from Water Plant
Dundee
Geotechnical and Geo-environmental
Interpretative Report

Drawing Title
Exploratory Hole Plan

Geotechnical Engineering Limited

SITE PLAN - OVERVIEW

Client: MVV ENVIRONMENTAL SERVICES LTD

Site: EFW DUNDEE AND ANGUS

Scale: 1 : 2,500 @ A3

CONTRACT	FIGURE
32229	1

Scale at A3 N.T.S.

Role Geotechnical

Suitability **Issue Report**

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Figure 05

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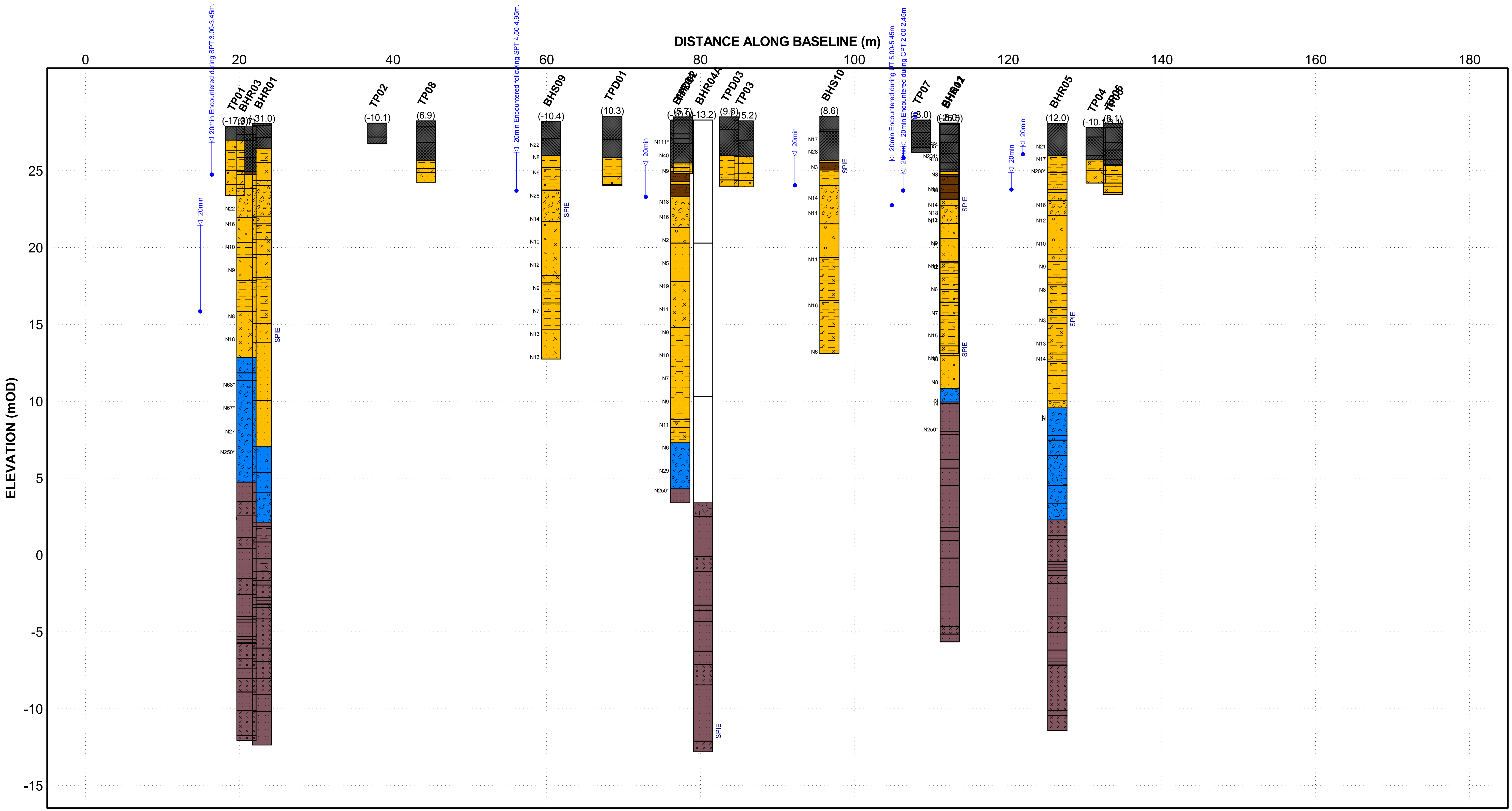


SCALE 1:250V 1:500H @ A3-L

LEGEND

Hole offset is +ve to the RIGHT of the baseline

HoleID

(Offset)

SPT N value, * denotes N extrapolated by gINT:
* from main blows
** from seating blows

N20*

Water strikes during boring / excavation

Time for reported water rise and flow rate remarks

20min. Steady flow

Level that water rose to

Level of water strike

Piezometer readings

Range of water levels recorded

Piezo response zone

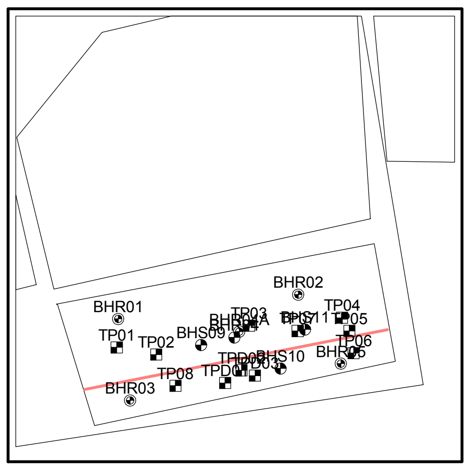
Tip depth

Type of piezometer

SPIE

Key to piezo types:
SPIE Standpipe piezometer

PLAN



COLOUR LEGEND

OPEN HOLE [OH]

OLD RED SANDSTONE [ORS]

MADE GROUND [MADE GROUND]

ALLUVIUM [ALV]

PEAT [Pt]

FLUVIOGLACIAL DEPOSITS [GG]

MATERIALS

Made Ground - FILL

Silty Clay

Clayey PEAT

Sandy GRAVEL

Gravelly SAND

SAND

Silty SAND

Clayey SAND

Gravelly CLAY

SANDSTONE

Sandy CLAY

PEAT

Sandy SILT

Organic CLAY

Organic SAND

SILTSTONE

MUDSTONE

GRAVEL

COBBLES and BOULDERS

Clayey GRAVEL

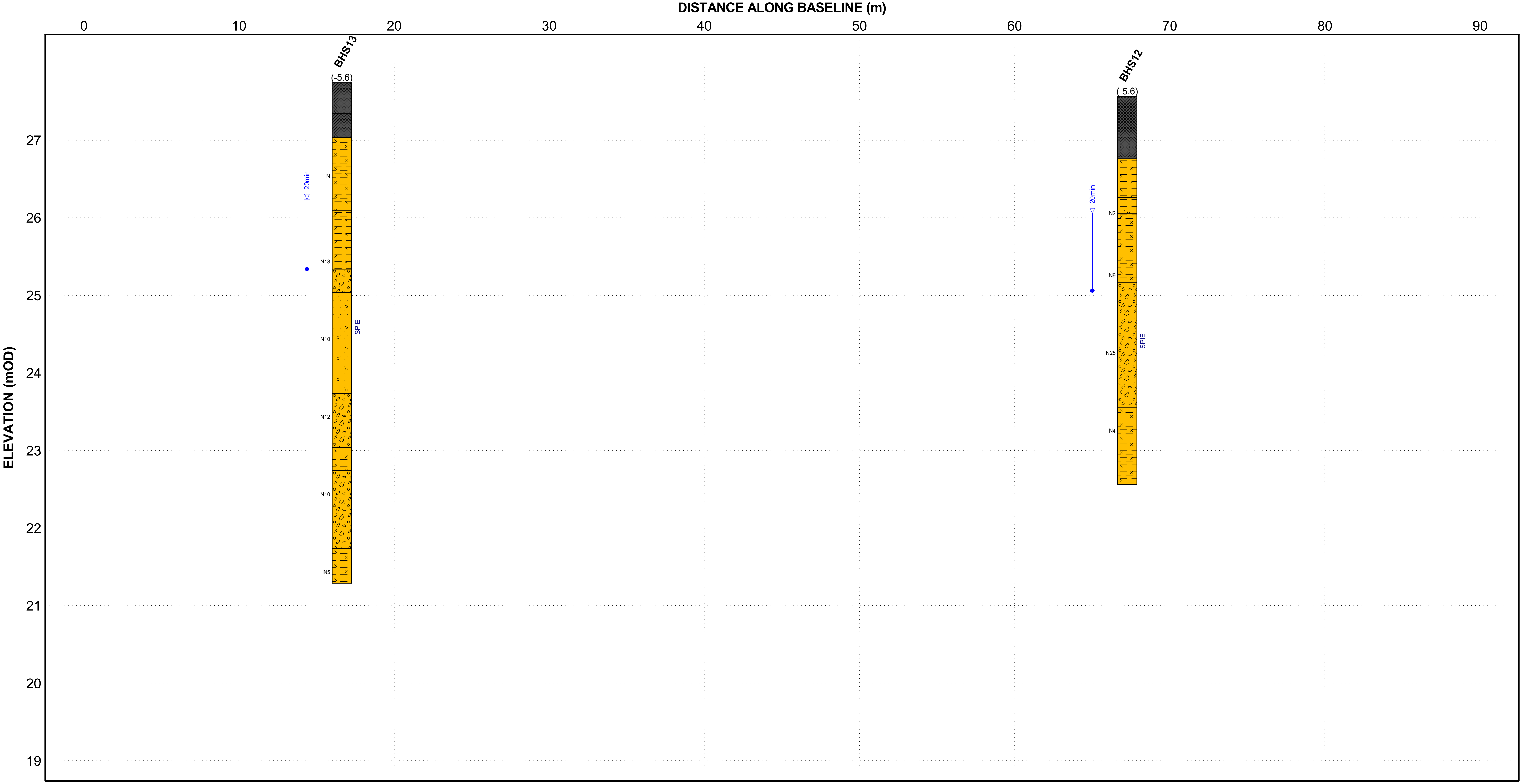
PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
GEOLOGICAL CROSS SECTION
AREA A: PROPOSED EFW SITE

245510-00

FIGURE 6

ARUP gINT v8.30.003
Made by Philip Todd on 8-Dec-16

Library: arup_uklib_4-0-001-36, Report: 2.1.01 SECTION WITH WATER & SPT (A3)
Database: g:\geotechnics\jobs\mv\ efw\mv_final_draft.gpj RevP1.1 (S2 - Fit for information)



SCALE 1:50V 1:250H @ A3-L

LEGEND

Hole offset is +ve to the RIGHT of the baseline

HoleID

(Offset)

N20*

SPT N value, * denotes N extrapolated by gINT:
* from main blows
** from seating blows

Water strikes during boring / excavation

Time for reported water rise and flow rate remarks

20min. Steady flow

Level that water rose to

Level of water strike

Piezometer readings

Range of water levels recorded

Piezo response zone

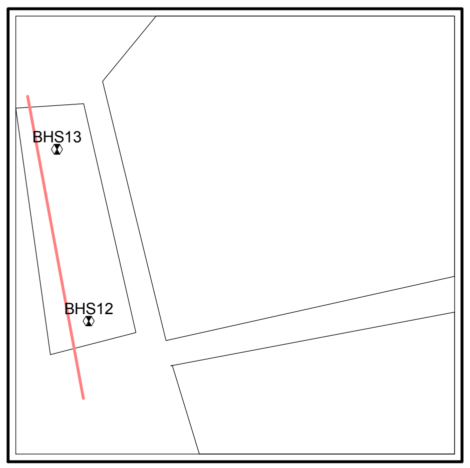
Tip depth

Type of piezometer

SPIE

Key to piezo types:
SPIE Standpipe piezometer

PLAN



COLOUR LEGEND

MADE GROUND [MADE GROUND]

ALLUVIUM [ALV]

MATERIALS

Made Ground - FILL

Silty Clay

Organic CLAY

Sandy GRAVEL

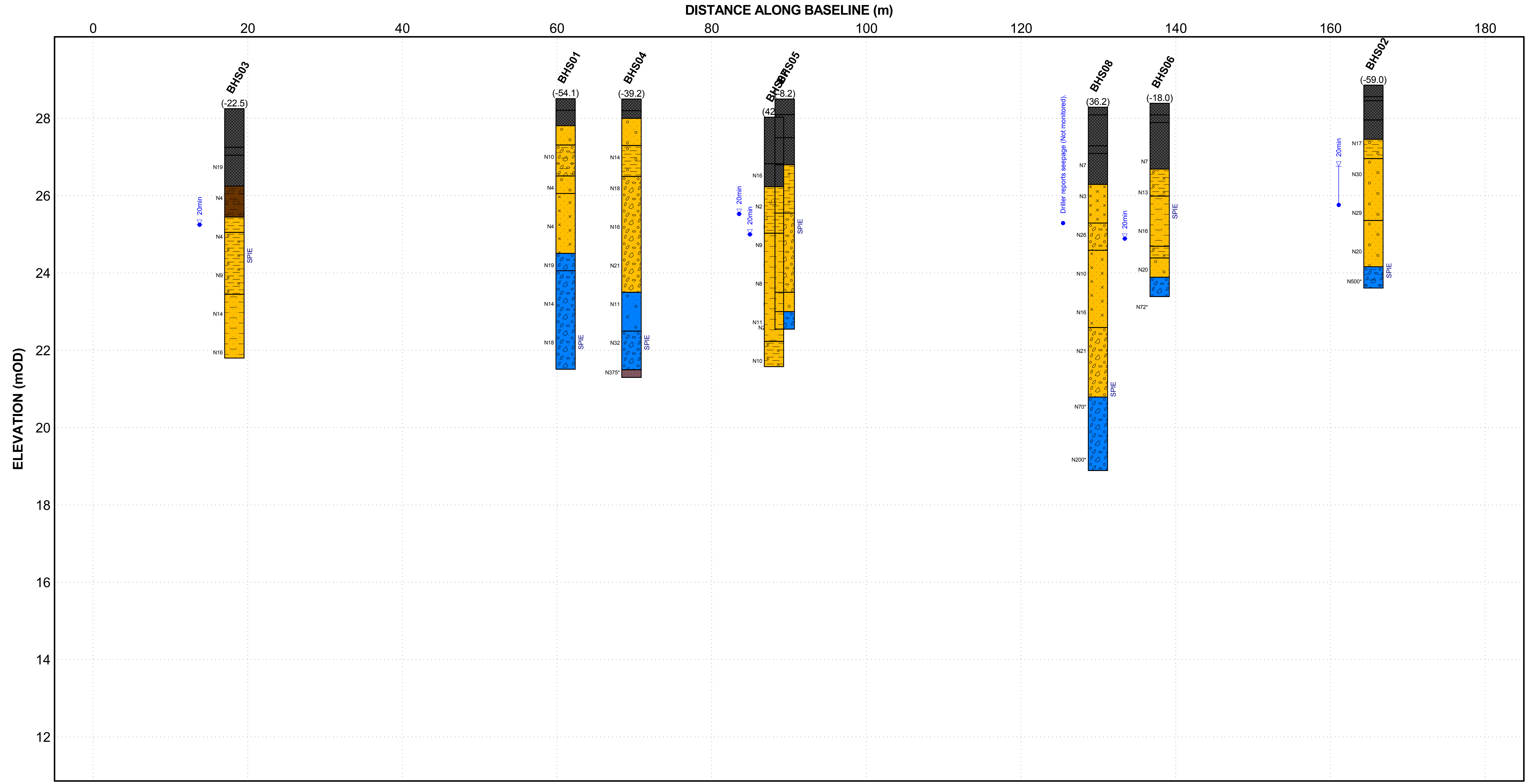
Gravelly SAND

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE GEOLOGICAL CROSS SECTION AREA D: CONSTRUCTION COMPOUND

245510-00

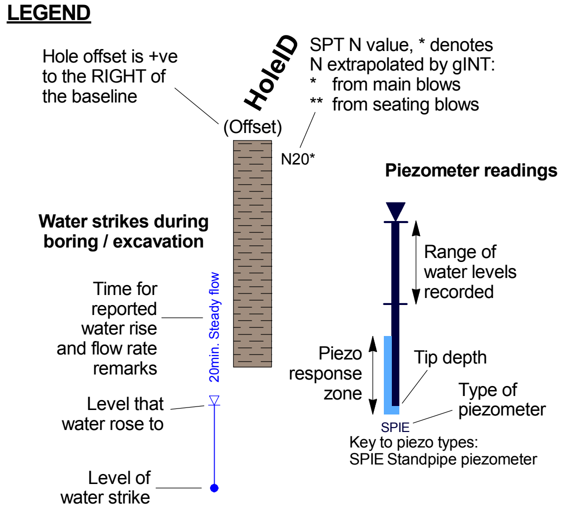
FIGURE 7

ARUP gINT v8.30.003
Made by Philip Todd on 8-Dec-16

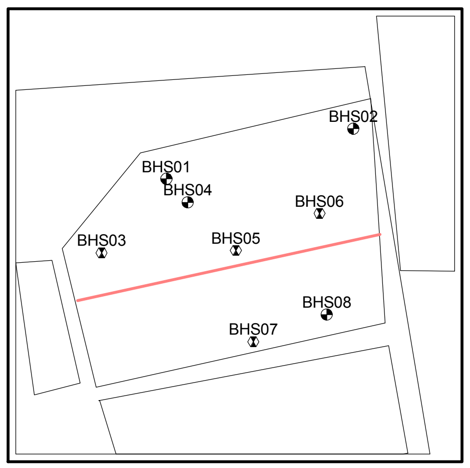


SCALE 1:100V 1:500H @ A3-L

LEGEND



PLAN



COLOUR LEGEND

- OLD RED SANDSTONE [ORS]
- MADE GROUND [MADE GROUND]
- ALLUVIUM [ALV]
- PEAT [Pt]
- FLUVIOGLACIAL DEPOSITS [GG]

MATERIALS

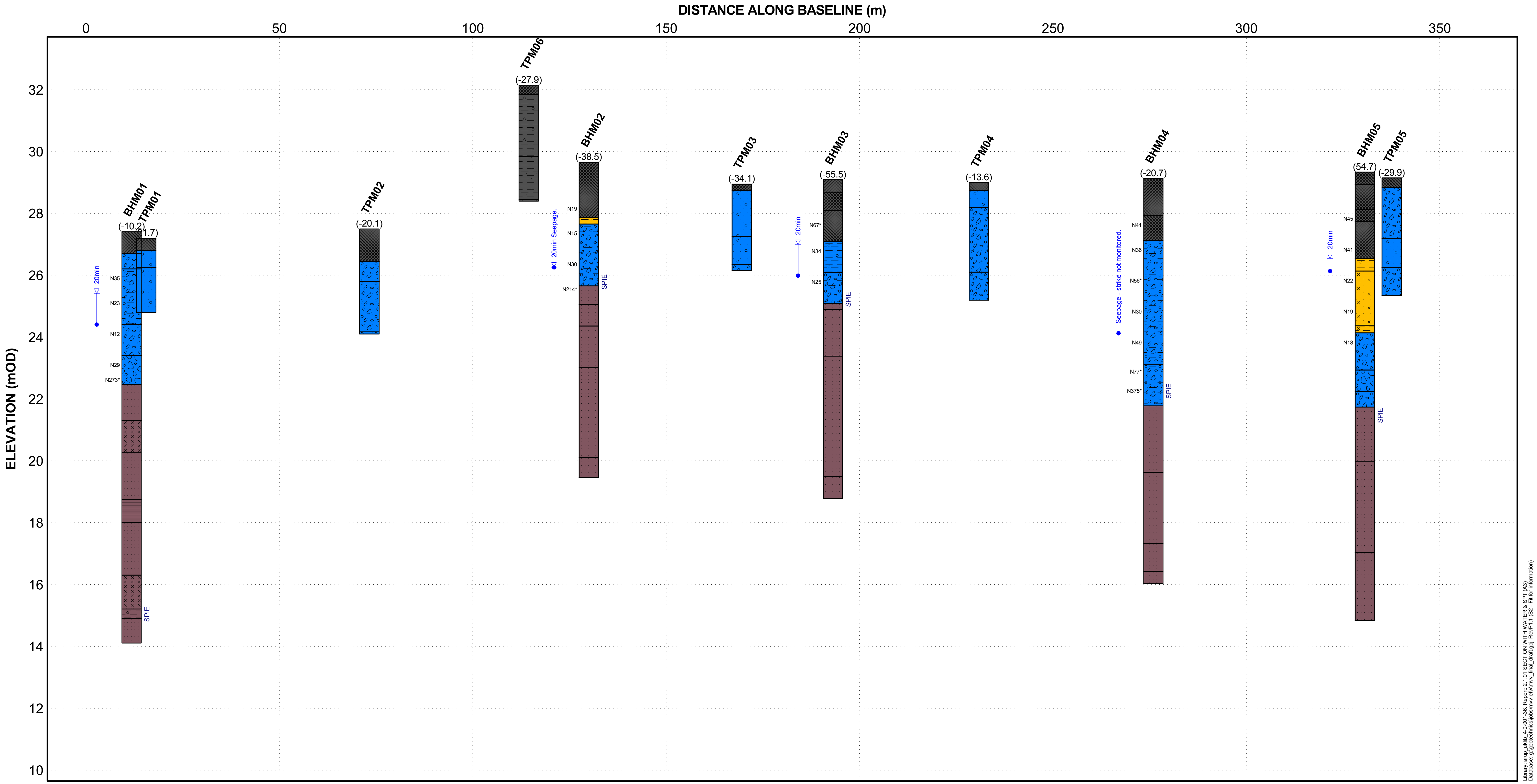
- Made Ground - FILL
- Gravelly SAND
- Clayey GRAVEL
- Silty SAND
- Sandy GRAVEL
- Gravelly CLAY
- SANDSTONE
- Sandy SILT
- Clayey PEAT
- Sandy CLAY
- Silty Clay
- Clayey SAND
- Organic CLAY

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
GEOLOGICAL CROSS SECTION
AREA E: EXISTING DERL SITE

245510-00

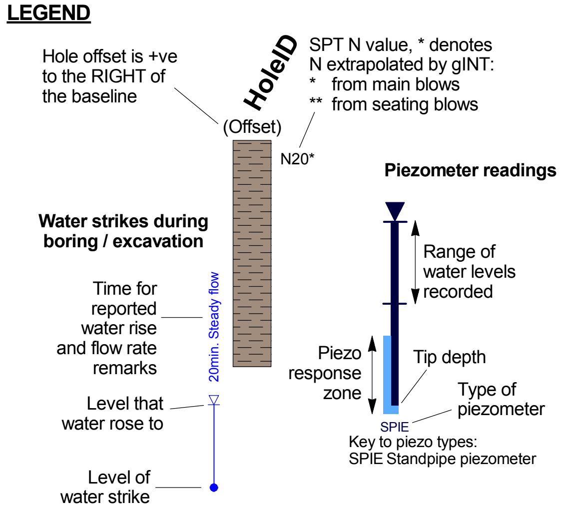
FIGURE 8

ARUP gINT v8.30.003
Made by Philip Todd on 8-Dec-16

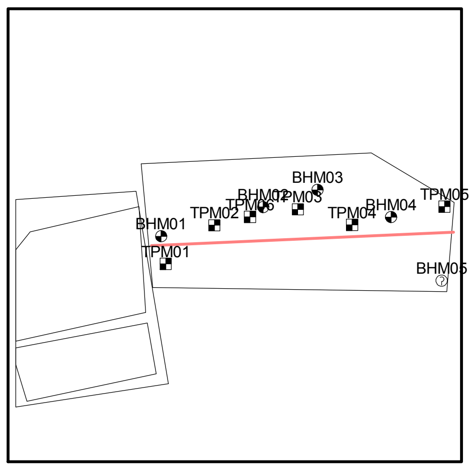


SCALE 1:125V 1:1000H @ A3-L

LEGEND



PLAN



COLOUR LEGEND

- OLD RED SANDSTONE [ORS]
- MADE GROUND [MADE GROUND]
- ALLUVIUM [ALV]
- FLUVIOGLACIAL DEPOSITS [GG]

MATERIALS

- Made Ground - FILL
- Sandy GRAVEL
- Clayey GRAVEL
- COBBLES and BOULDERS
- SANDSTONE
- SILTSTONE
- MUDSTONE
- Gravelly CLAY
- Sandy CLAY
- Gravelly SAND
- SILT
- Silty SAND
- Silty Clay
- GRAVEL

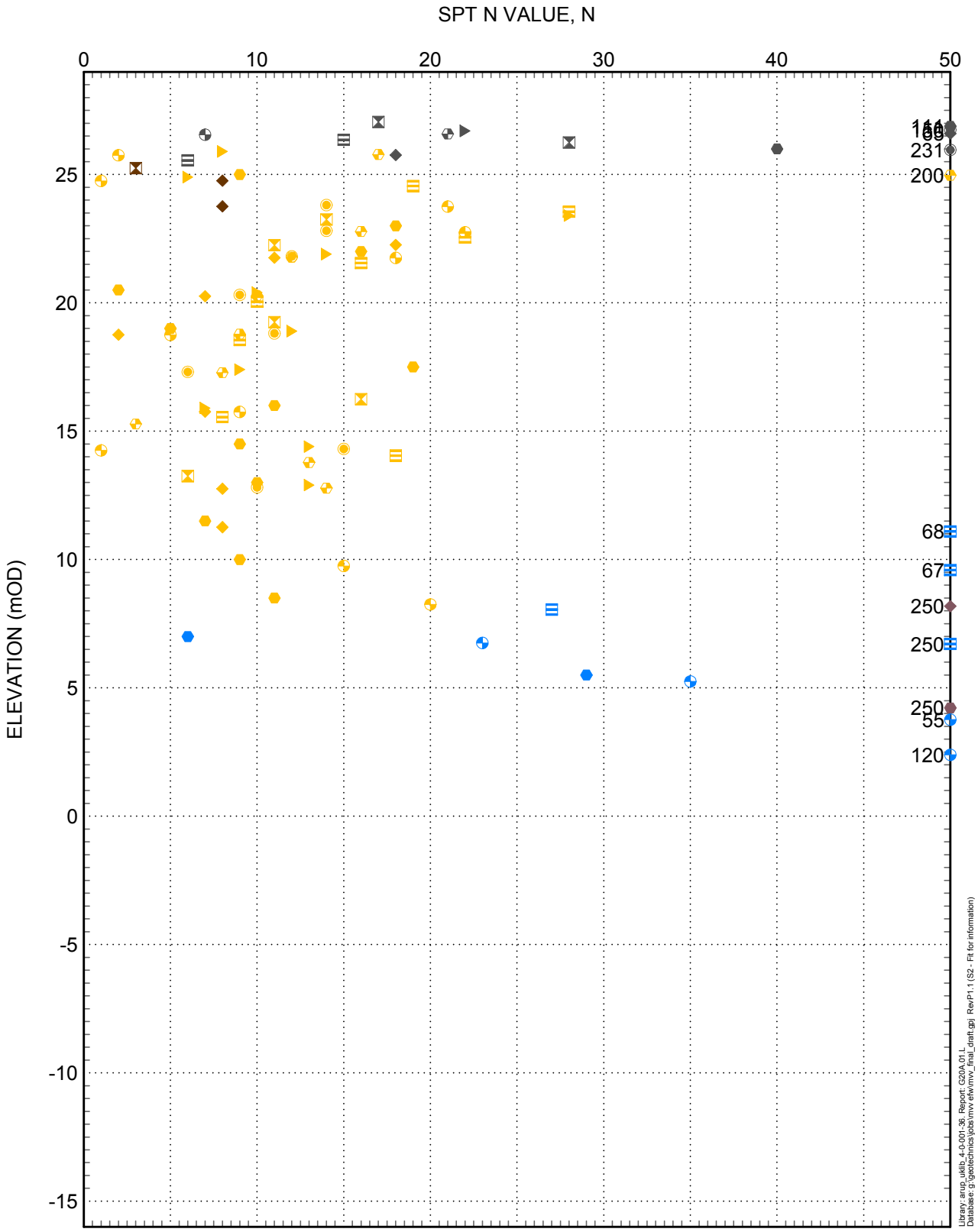
PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
GEOLOGICAL CROSS SECTION ROUTE OF PROPOSED PIPELINE

245510-00

FIGURE 9

ARUP gINT v8.30.003
Made by Philip Todd on 8-Dec-16

Library: arup_uklib_4-0-001-36, Report: 2.1.01 SECTION WITH WATER & SPT (A3)
Database: g:\geotechnics\jobs\mv efw\mv_final_draft.gpj RevP1.1 (S2 - Fit for information)



OLD RED SANDSTONE (ORS)
MADE GROUND (MADE GROUND)
ALLUVIUM (ALV)
PEAT (Pt)
FLUVIOGLACIAL DEPOSITS (GG)

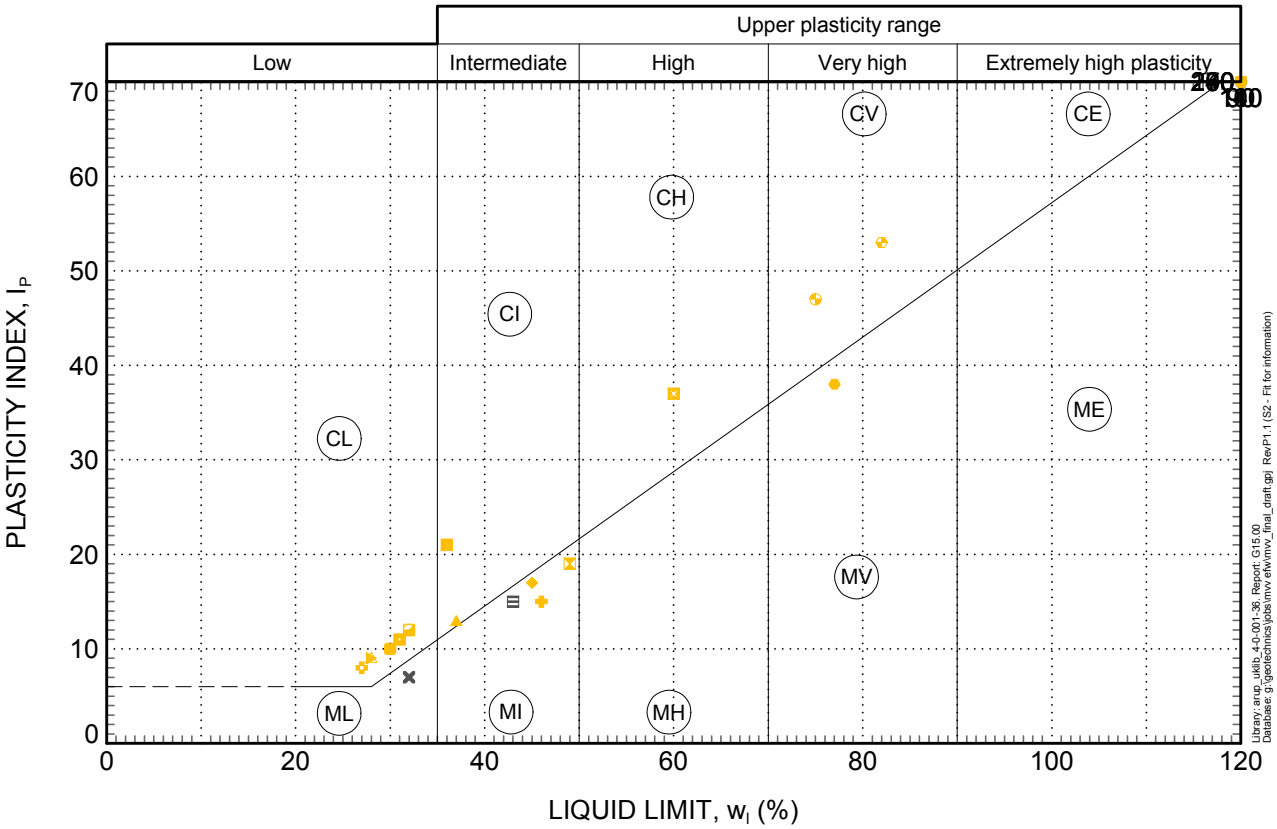
BHR04
BHS09
BHS10
BHS11
BHR01
BHR02
BHR03
BHR05

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
STANDARD PENETRATION TESTS
AREA A: PROPOSED EFW SITE

245510-00

FIGURE 10



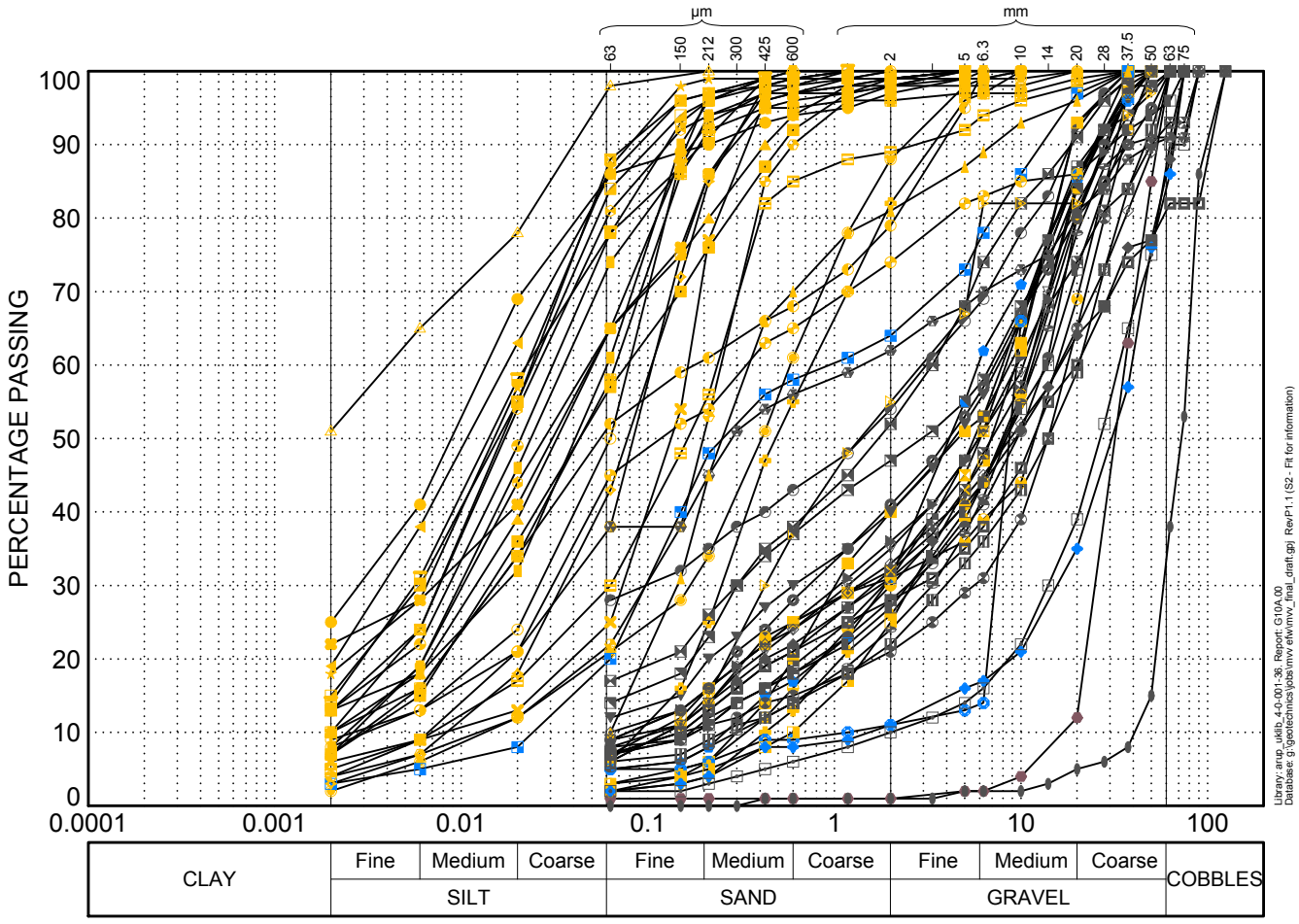
- MADE GROUND (MADE GROUND)
- ALLUVIUM (ALV)
- PEAT (Pt)
- BHR04, 23.8mOD
- BHR04, 8.8mOD
- BHS09, 17.7mOD
- BHS09, 16.2mOD
- BHS10, 25.7mOD
- BHS10, 25.1mOD
- BHS10, 19.6mOD
- BHS10, 16.6mOD
- BHS11, 24.6mOD
- BHS11, 14.6mOD
- BHR01, 26.1mOD
- BHR01, 20.6mOD
- BHR01, 17.1mOD
- BHR02, 19.1mOD
- BHR03, 26.7mOD
- BHR03, 22.0mOD
- BHR03, 20.0mOD
- BHR03, 16.9mOD
- BHR05, 25.0mOD
- BHR05, 16.0mOD
- BHR05, 14.1mOD
- BHR05, 13.1mOD
- TP06, 28.0mOD

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
PLASTICITY CHART
AREA A: PROPOSED EFW SITE

245510-00

FIGURE 11

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16



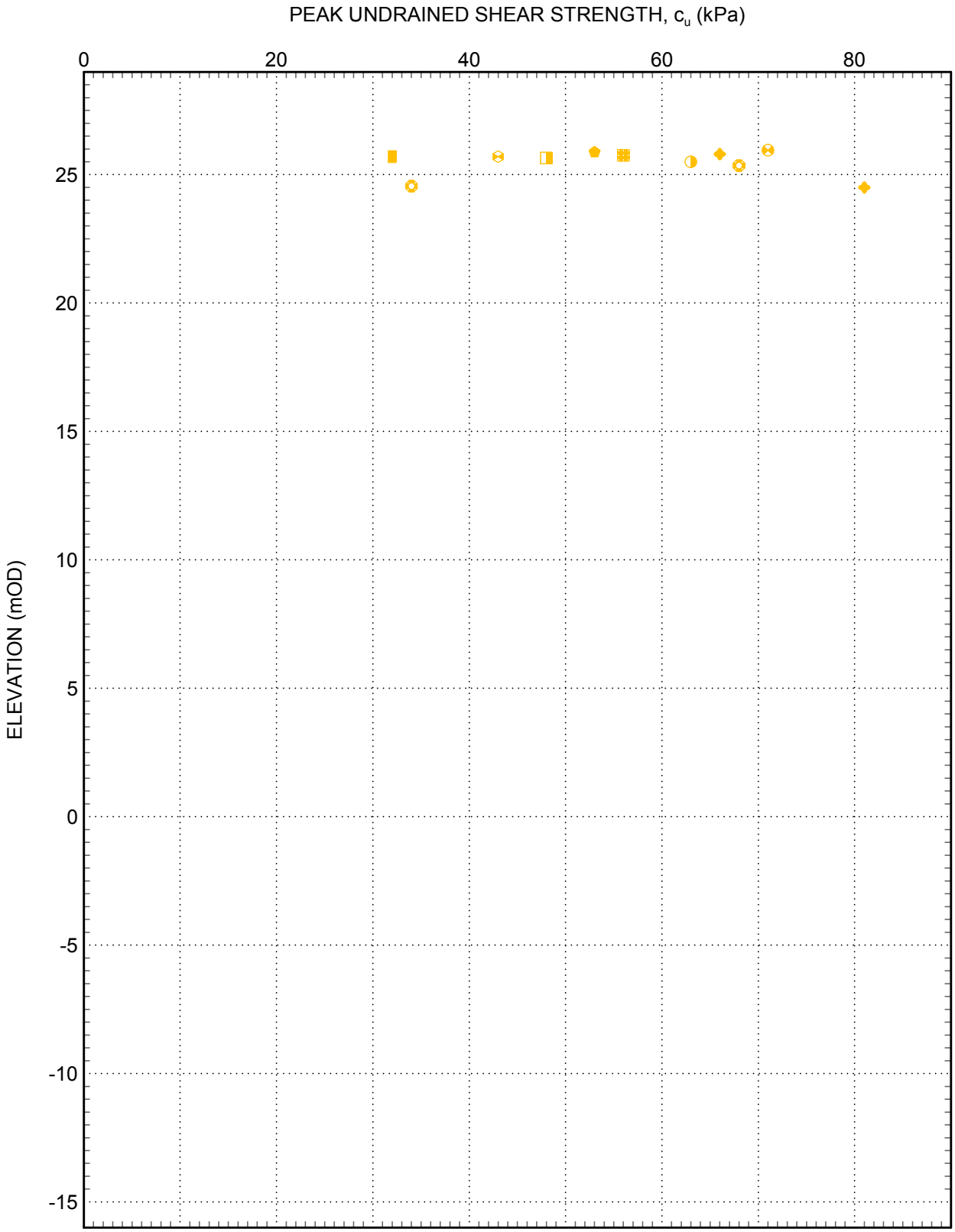
- OLD RED SANDSTONE (ORS)
- MADE GROUND (MADE GROUND)
- ALLUVIUM (ALV)
- PEAT (Pt)
- FLUVIOGLACIAL DEPOSITS (GG)
- BHR04, 24.3mOD
- BHR04, 22.3mOD
- BHR04, 15.3mOD
- BHR04, 9.3mOD
- BHR04, 3.8mOD
- BHS09, 27.7mOD
- BHS09, 22.2mOD
- BHS09, 17.7mOD
- BHS09, 13.7mOD
- BHS10, 28.3mOD
- BHS10, 24.1mOD
- BHS10, 19.6mOD
- BHS10, 16.6mOD
- BHS11, 27.6mOD
- BHS11, 24.1mOD
- BHS11, 20.6mOD
- BHS11, 18.1mOD
- BHS11, 14.1mOD
- BHR01, 27.6mOD
- BHR01, 26.1mOD
- BHR01, 23.1mOD
- BHR01, 18.1mOD
- BHR01, 13.1mOD
- BHR01, 4.1mOD
- BHR02, 27.8mOD
- BHR02, 22.6mOD
- BHR02, 18.6mOD
- BHR02, 12.6mOD
- BHR02, 10.1mOD
- BHR03, 27.0mOD
- BHR03, 23.9mOD
- BHR03, 21.9mOD
- BHR03, 15.9mOD
- BHR03, 10.9mOD
- BHR05, 27.1mOD
- BHR05, 26.1mOD
- BHR05, 23.1mOD
- BHR05, 17.6mOD
- BHR05, 14.6mOD
- BHR05, 11.6mOD
- BHR05, 9.6mOD
- TP01, 27.4mOD
- TP01, 24.9mOD
- TP02, 27.1mOD
- TP03, 26.8mOD
- TP04, 25.7mOD
- TP04, 24.8mOD
- TP05, 27.3mOD
- TP05, 26.8mOD
- TP05, 24.8mOD
- TP06, 27.1mOD
- TP06, 24.6mOD
- TP07, 27.3mOD
- TP07, 26.3mOD
- TP08, 27.3mOD
- TP08, 26.8mOD
- TP08, 24.9mOD
- TPD01, 28.1mOD
- TPD01, 26.6mOD

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
PARTICLE SIZE DISTRIBUTION
AREA A: PROPOSED EFW SITE

245510-00

FIGURE 12

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16



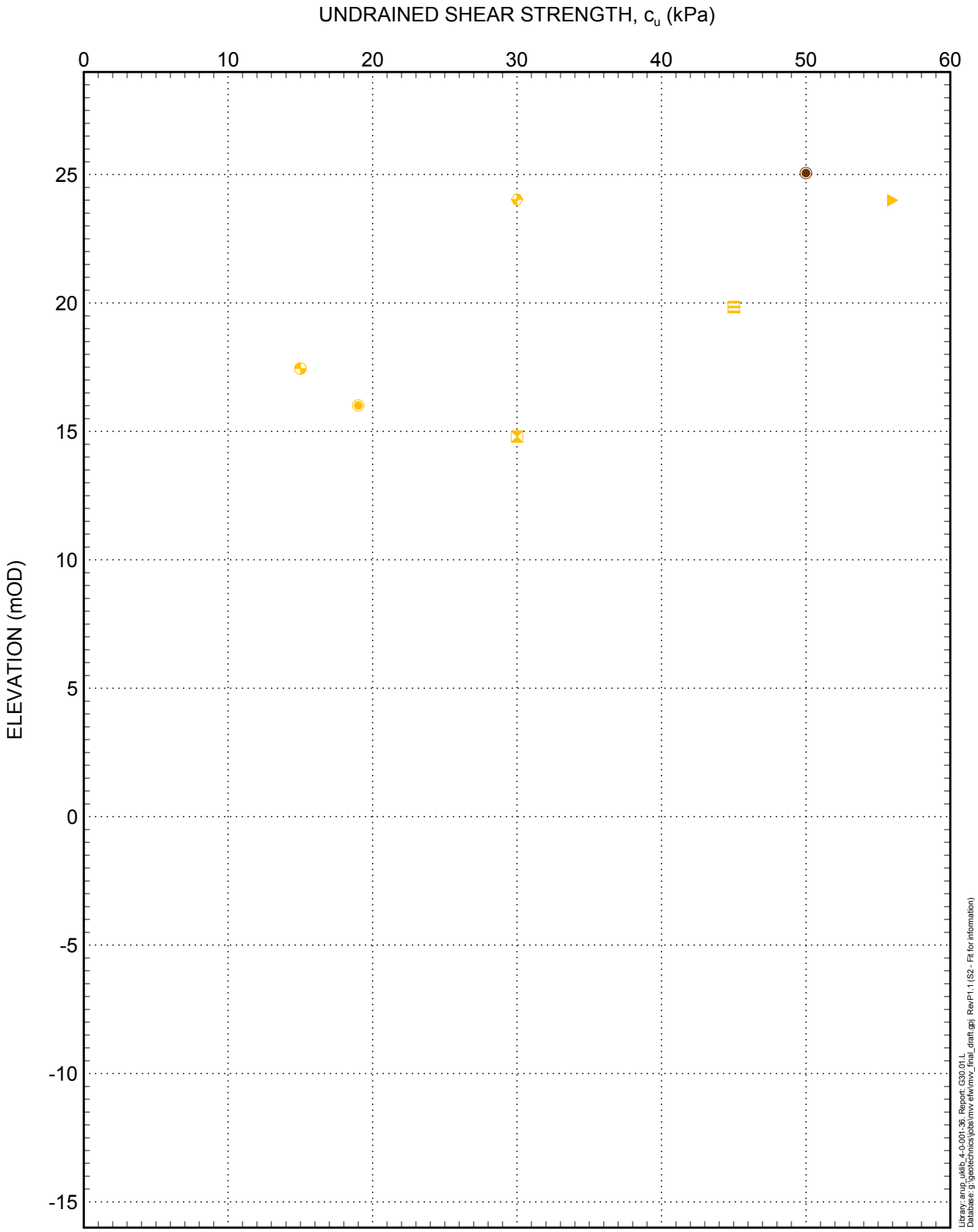
- MADE GROUND (MADE GROUND)
- ALLUVIUM (ALV)
- TP01
- TP03
- TP04
- TP05
- TP06
- TP08
- TPD01
- TPD02
- TPD03

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
UNDRAINED SHEAR STRENGTH FROM HAND VANE
AREA A: PROPOSED EFW SITE

245510-00

FIGURE 13



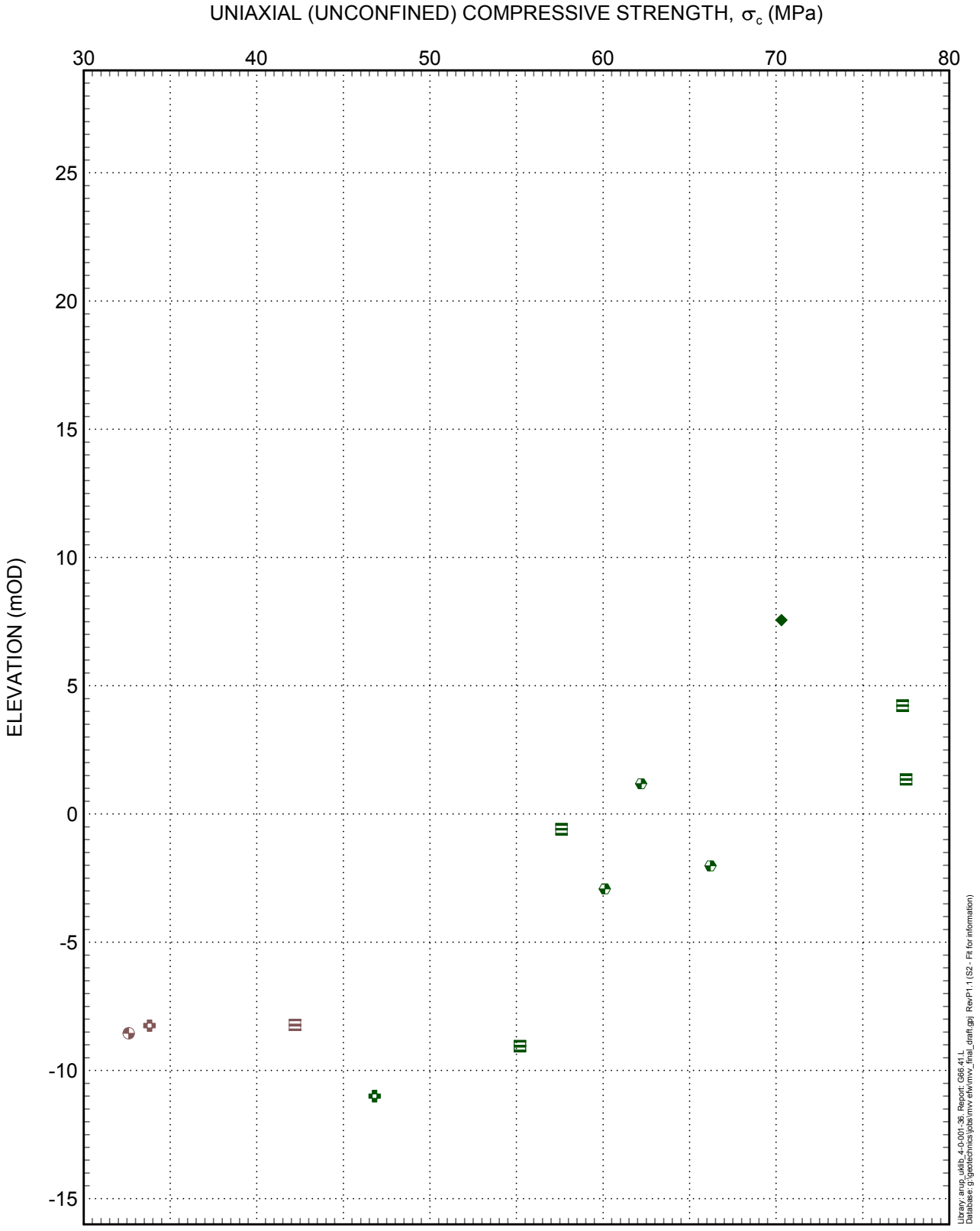
- ALLUVIUM (ALV)
- PEAT (Pt)
- BHS09
- BHS10
- BHS11
- BHR01
- BHR03
- BHR05

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
TRIAXIAL UNDRAINED SHEAR STRENGTH
AREA A: PROPOSED EFW SITE

245510-00

FIGURE 14

ARUP_gINT-v8.30.003
Made by Philip Todd on 8-Dec-16



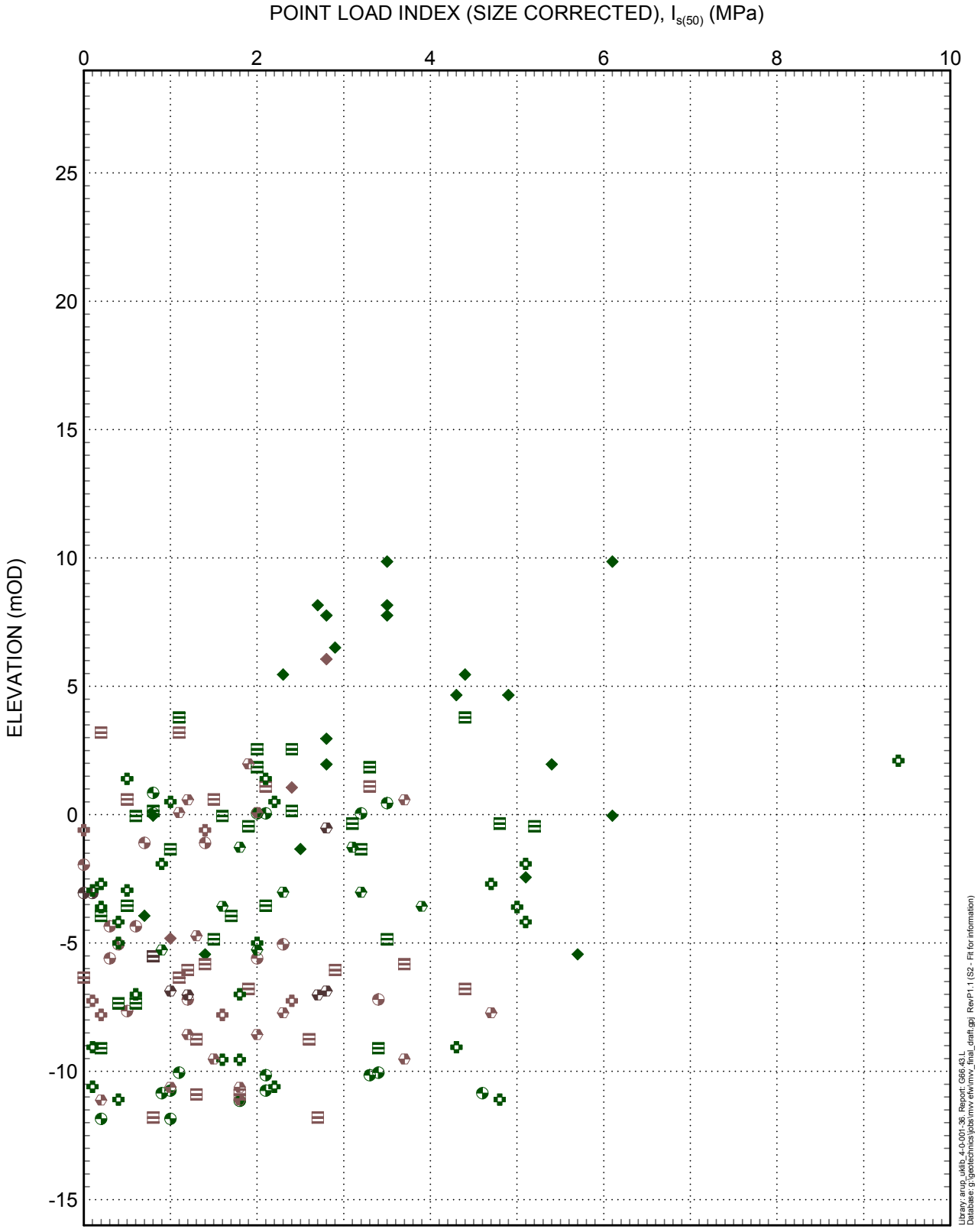
- OLD RED SANDSTONE - SANDSTONE (SS)
- OLD RED SANDSTONE - SILTSTONE (Slst)
- BHR01
- BHR02
- BHR03
- BHR04A
- BHR05

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
UNIAXIAL COMPRESSIVE STRENGTH
AREA A: PROPOSED EFW SITE

245510-00

FIGURE 15

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16



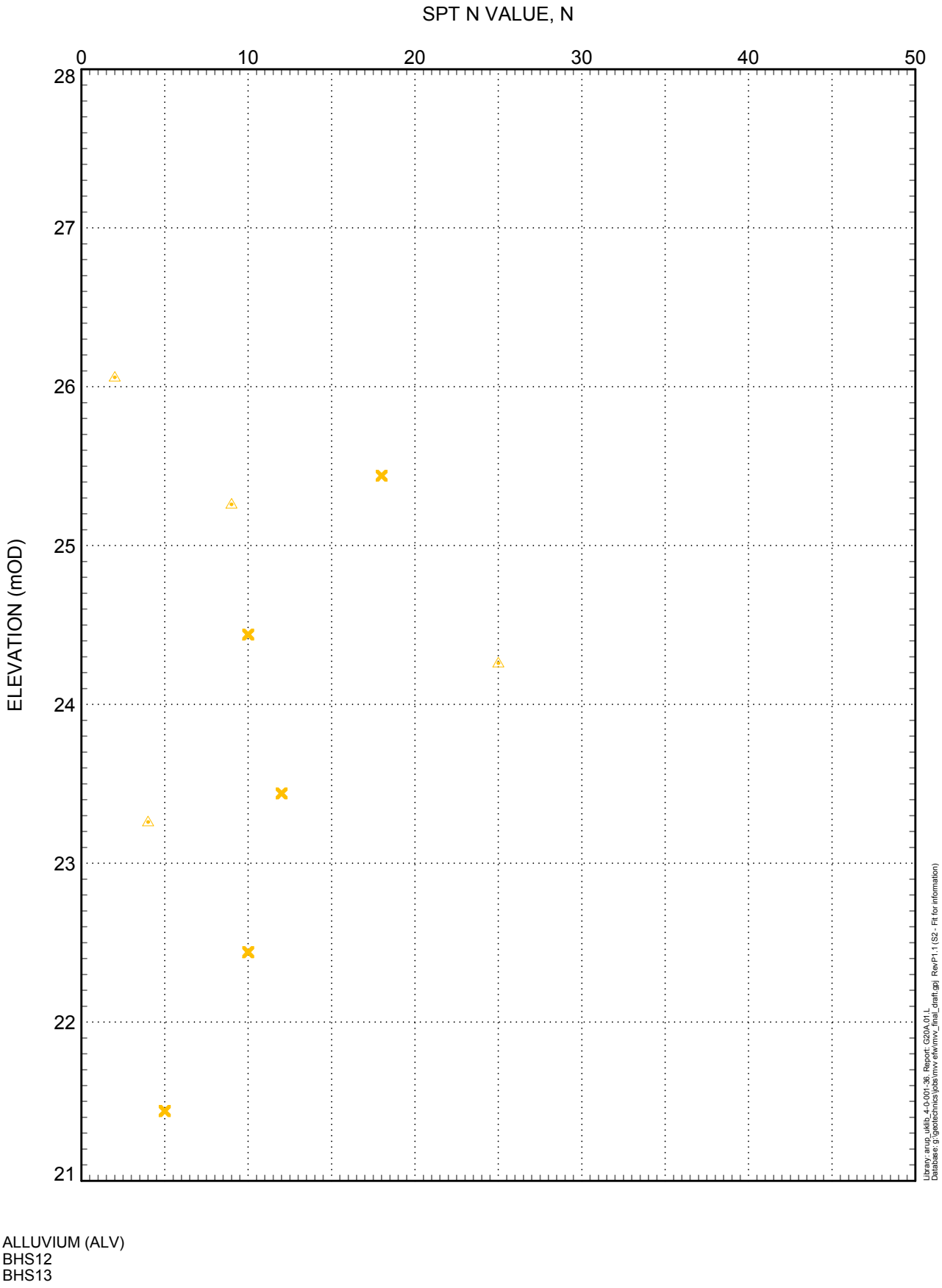
- OLD RED SANDSTONE - SANDSTONE (SS)
- OLD RED SANDSTONE - SILTSTONE (Slst)
- OLD RED SANDTONE - MUDSTONE (Mud)
- BHR01
- BHR02
- BHR03
- BHR04A
- BHR05

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
POINT LOAD INDEX (SIZE CORRECTED)
AREA A: PROPOSED EFW SITE

245510-00

FIGURE 16

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16



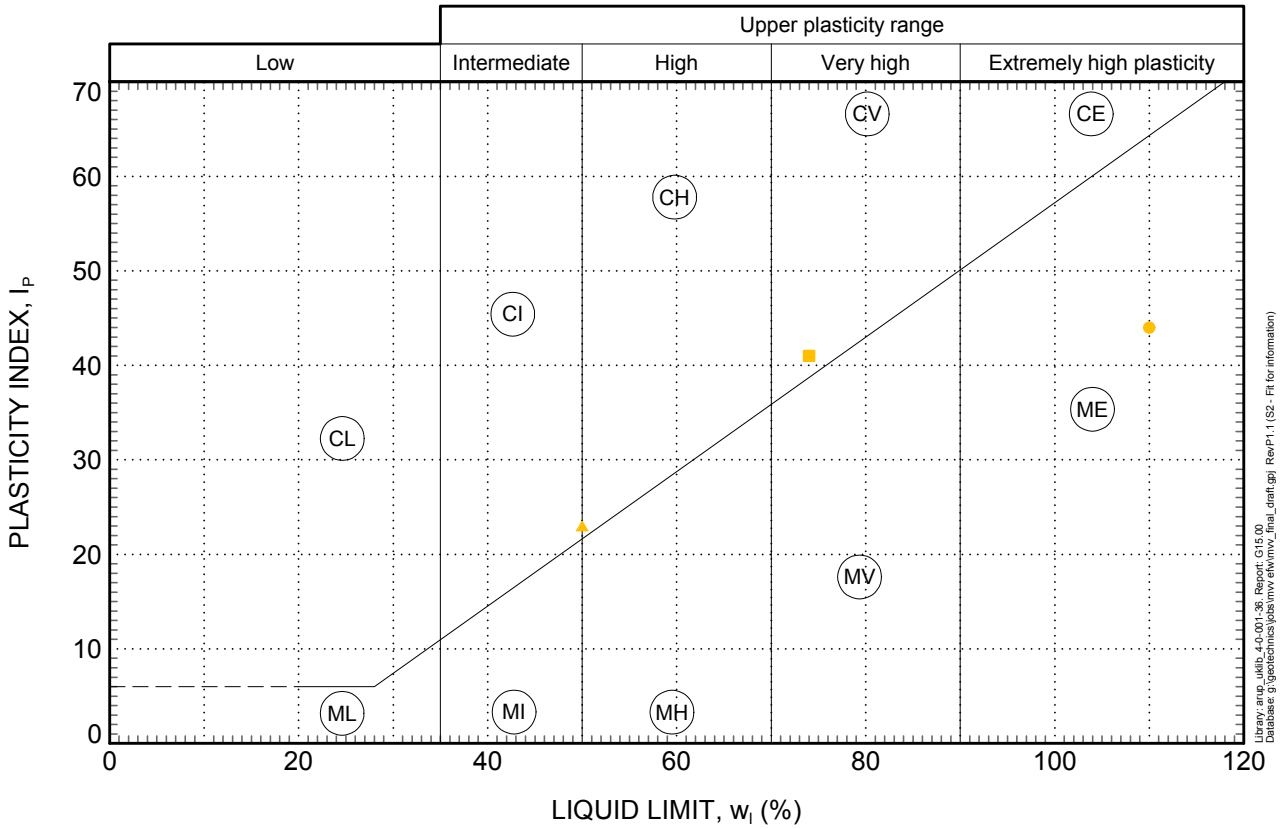
ALLUVIUM (ALV)
BHS12
BHS13

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
STANDARD PENETRATION TESTS
AREA D: PROPOSED CONSTRUCTION COMPOUND

245510-00

FIGURE 17

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16

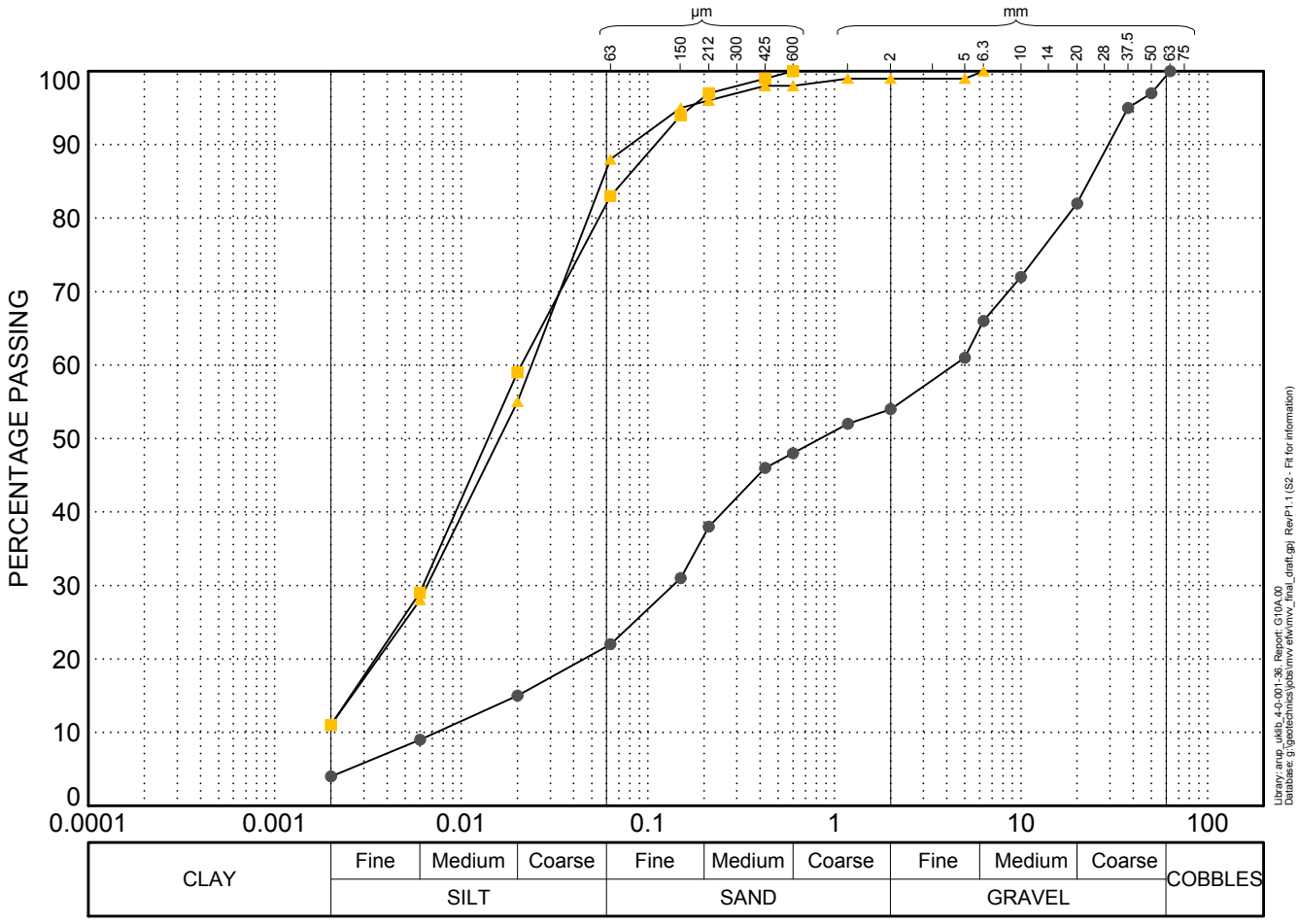


ALLUVIUM (ALV)
BHS12, 26.4mOD
BHS13, 26.5mOD
BHS13, 25.7mOD

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
PLASTICITY CHART
AREA D: PROPOSED CONSTRUCTION COMPOUND

245510-00 **FIGURE 18**

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16

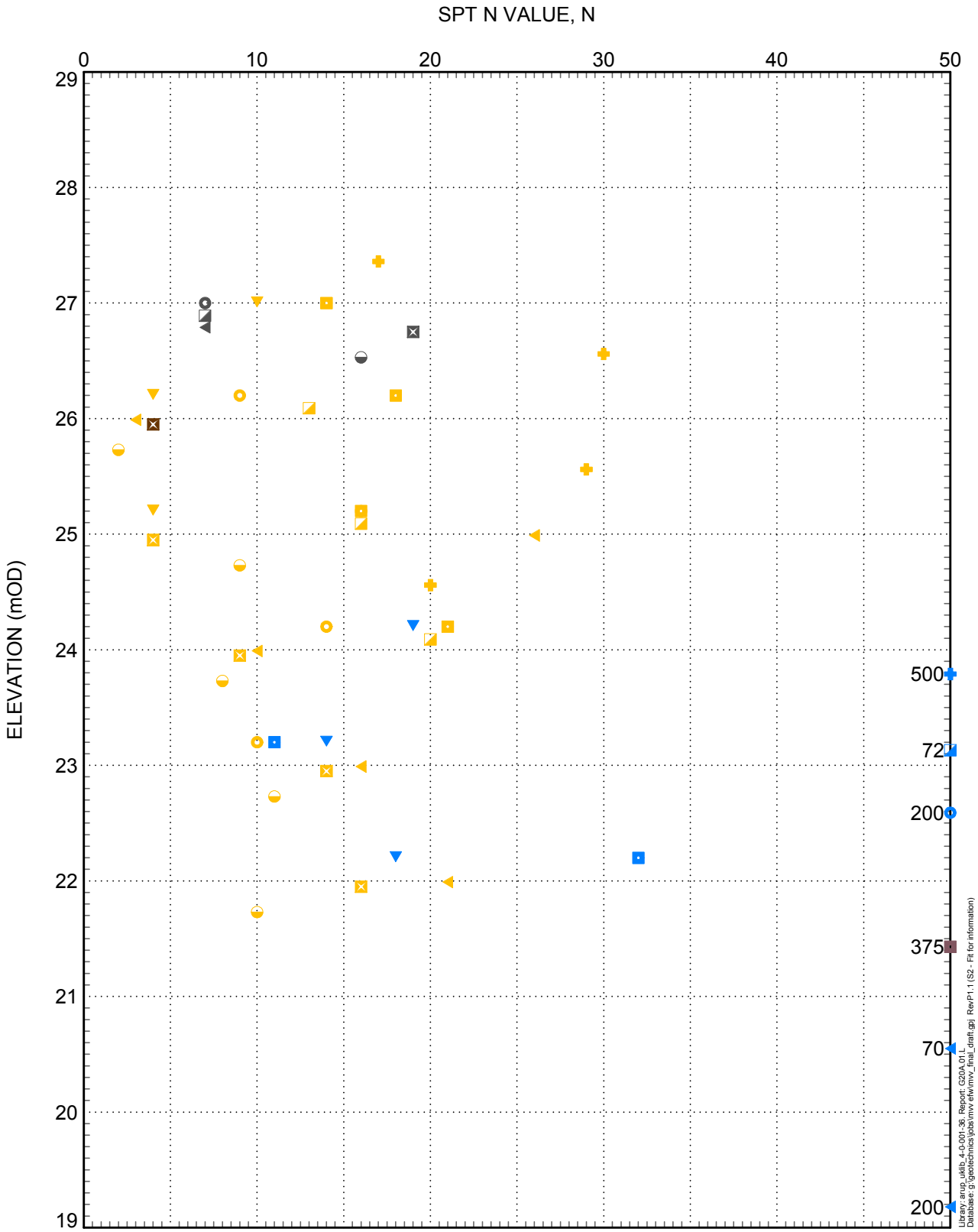


PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
PARTICLE SIZE DISTRIBUTION
AREA D: PROPOSED CONSTRUCTION COMPOUND

245510-00

FIGURE 19

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16



- OLD RED SANDSTONE (ORS)
- MADE GROUND (MADE GROUND)
- ALLUVIUM (ALV)
- PEAT (Pt)
- FLUVIOGLACIAL DEPOSITS (GG)

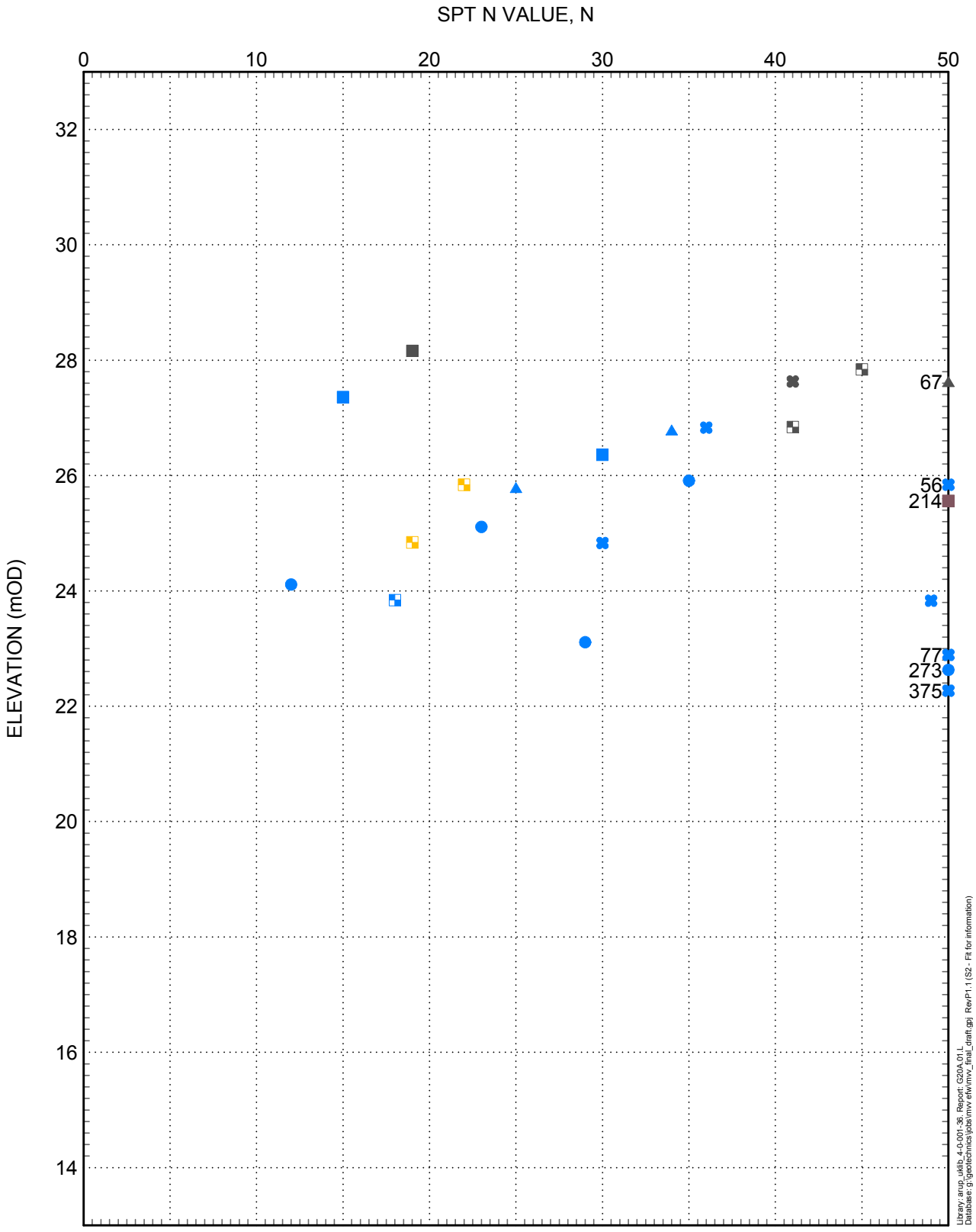
- BHS01
- BHS02
- BHS04
- BHS08
- BHS03
- BHS05
- BHS06
- BHS07

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
STANDARD PENETRATION TESTS
AREA E: EXISTING DERL SITE

245510-00

FIGURE 20



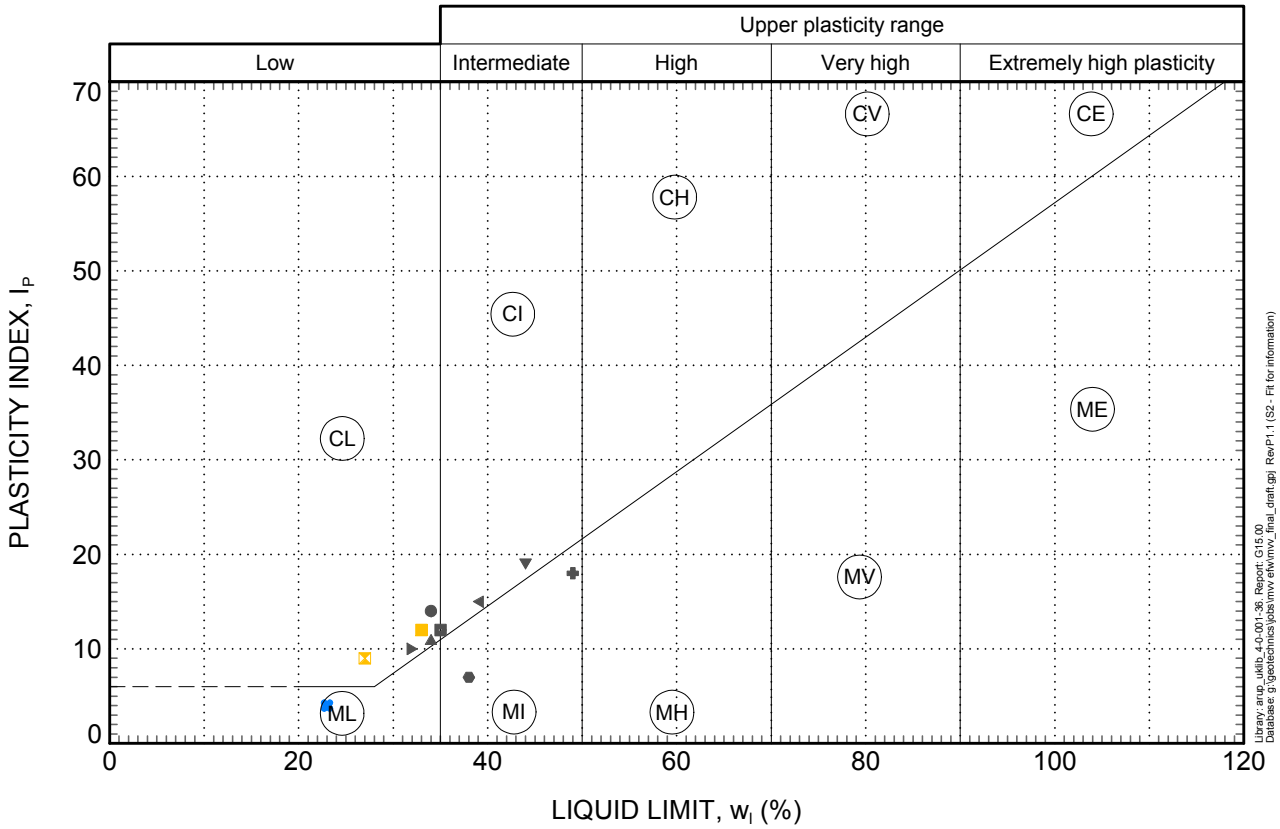
- OLD RED SANDSTONE (ORS)
- MADE GROUND (MADE GROUND)
- ALLUVIUM (ALV)
- FLUVIOGLACIAL DEPOSITS (GG)
- BHM01
- BHM02
- BHM03
- BHM04
- BHM05

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
STANDARD PENETRATION TESTS
ROUTE OF PROPOSED PIPELINE

245510-00

FIGURE 21



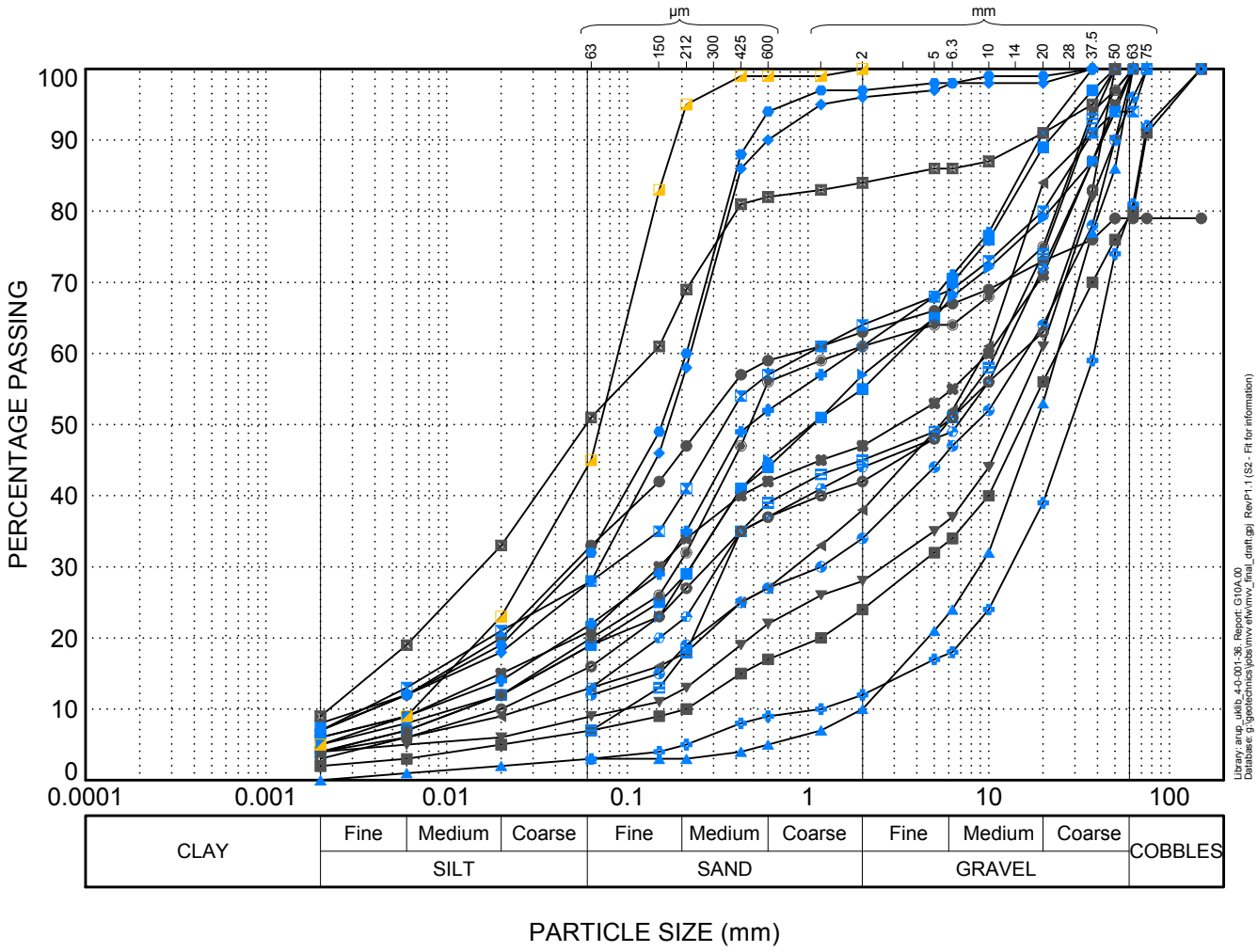
- MADE GROUND (MADE GROUND)
- BHM01, 27.1mOD
- BHM02, 27.9mOD
- BHM03, 28.8mOD
- BHM03, 27.1mOD
- BHM04, 27.9mOD
- TPM01, 27.1mOD
- TPM03, 28.9mOD
- TPM04, 28.9mOD
- TPM06, 32.1mOD
- BHM05, 29.0mOD
- BHM05, 26.5mOD

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
PLASTICITY CHART
ROUTE OF PROPOSED PIPELINE

245510-00

FIGURE 22

ARUP_gINT-v8.30.003
Made by Philip Todd on 8-Dec-16



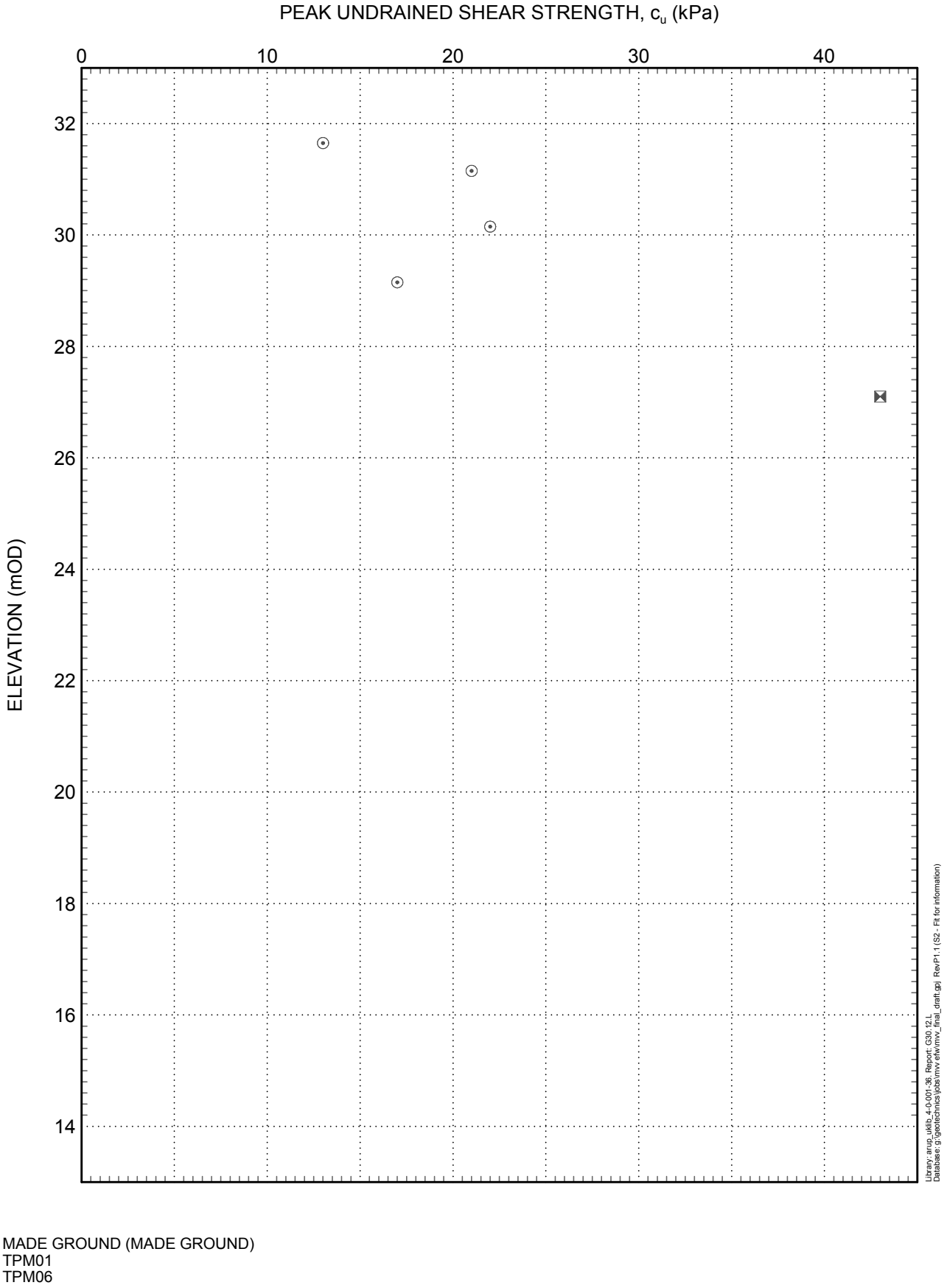
- MADE GROUND (MADE GROUND)
- ALLUVIUM (ALV)
- FLUVIOGLACIAL DEPOSITS (GG)
- BHM01, 26.9mOD
- BHM01, 26.7mOD
- BHM01, 22.7mOD
- BHM02, 28.7mOD
- BHM02, 27.7mOD
- BHM03, 28.6mOD
- BHM03, 27.1mOD
- BHM04, 28.6mOD
- BHM04, 27.9mOD
- BHM04, 27.1mOD
- TPM01, 26.1mOD
- TPM02, 27.0mOD
- TPM02, 25.5mOD
- TPM03, 28.5mOD
- TPM03, 27.0mOD
- TPM04, 28.0mOD
- TPM05, 28.7mOD
- TPM06, 31.7mOD
- BHM05, 28.8mOD
- BHM05, 26.1mOD

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
PARTICLE SIZE DISTRIBUTION
ROUTE OF PROPOSED PIPELINE

245510-00

FIGURE 23

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16

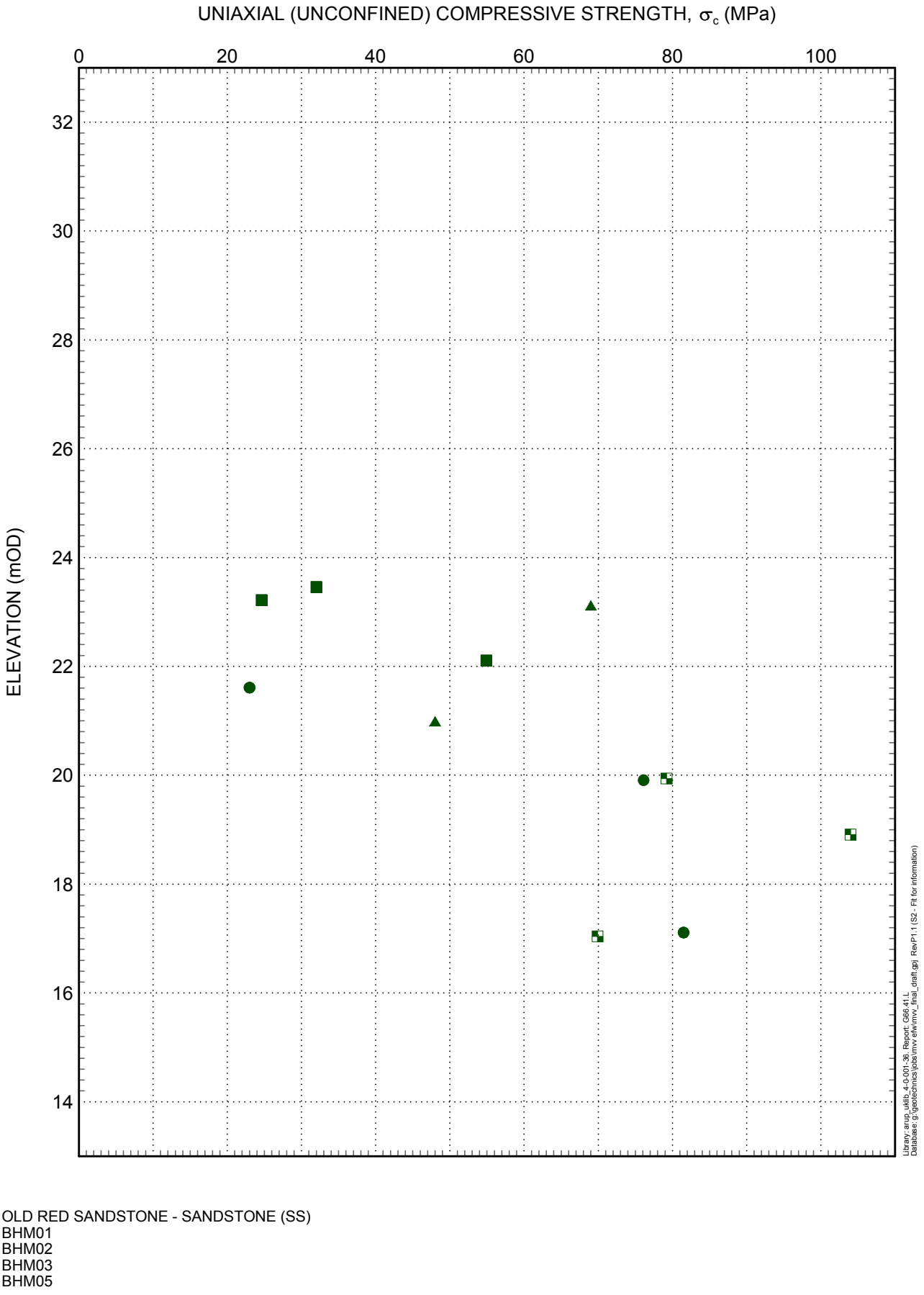


■ MADE GROUND (MADE GROUND)
⊠ TPM01
⊙ TPM06

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
UNDRAINED SHEAR STRENGTH FROM HAND VANE
ROUTE OF PROPOSED PIPELINE

245510-00 **FIGURE 24**

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16



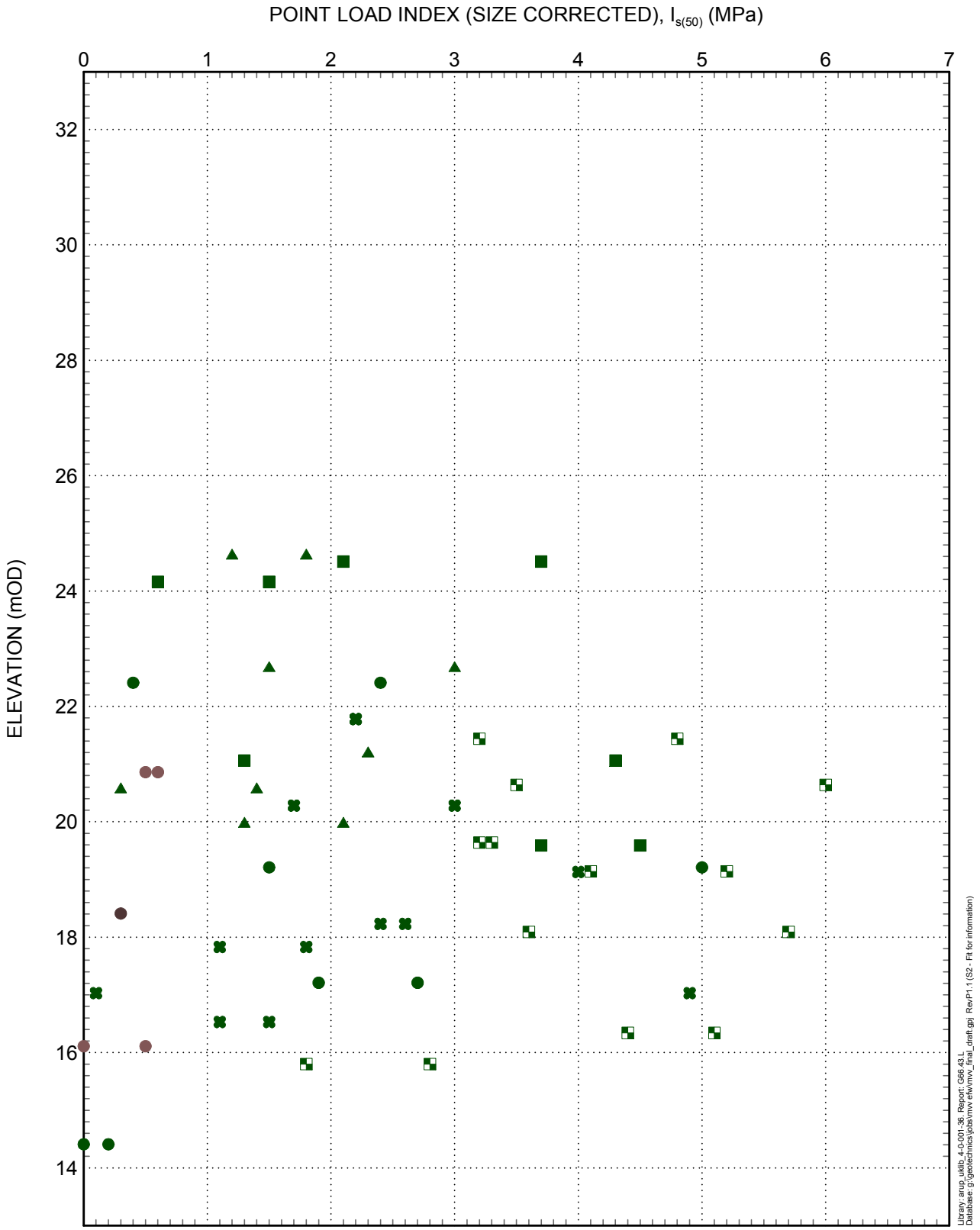
- OLD RED SANDSTONE - SANDSTONE (SS)
- BHM01
- BHM02
- BHM03
- BHM05

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
UNIAXIAL COMPRESSIVE STRENGTH
ROUTE OF PROPOSED PIPELINE

245510-00

FIGURE 25

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16



- OLD RED SANDSTONE - SANDSTONE (SS)
- OLD RED SANDSTONE - SILTSTONE (Slst)
- OLD RED SANDTONE - MUDSTONE (Mud)

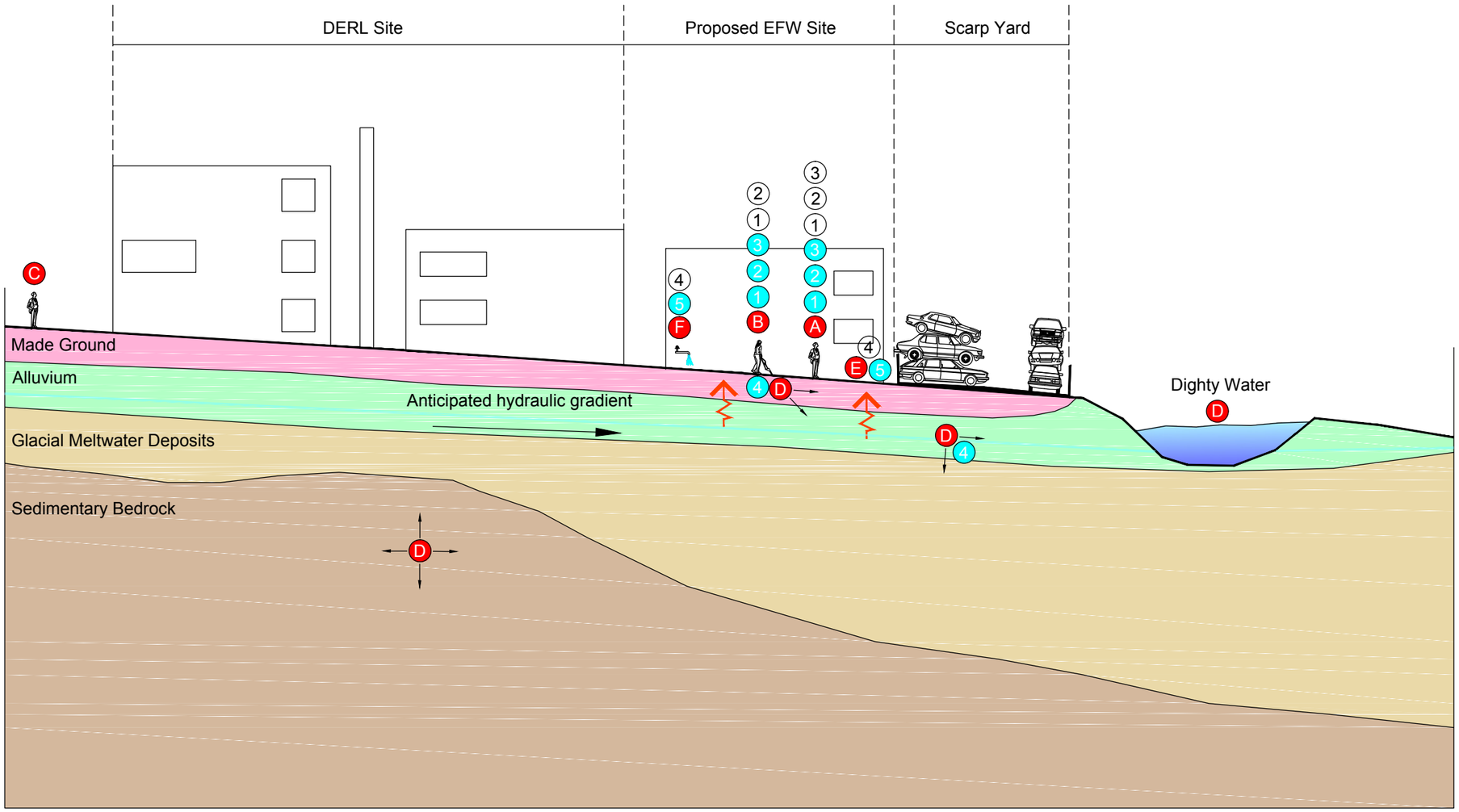
- BHM01
- BHM02
- BHM03
- BHM04
- BHM05

ARUP_gINT v8.30.003
Made by Philip Todd on 8-Dec-16

PROPOSED ENERGY FROM WASTE PLANT, DUNDEE
POINT LOAD INDEX (SIZE CORRECTED)
ROUTE OF PROPOSED PIPELINE

245510-00

FIGURE 26



Sources of Contamination

- Made ground at site contains asbestos containing material.
- Elevated ground gases beneath site.

Receptors

A Humans on-site (staff / visitors).
B Humans on-site (construction / maintenance workers).
C Humans off-site.
D Surface water (Dighty water) via groundwater
E Building materials
F Potable water pipes

Pollutant - Linkages

1 Dermal contact
2 Inhalation
3 Ingestion
4 Leaching/migration
5 Chemical attack

Mitigation Measures

① Adoption of good working practice and appropriate PPE in accordance with code of construction practice.

② Asbestos containing materials should be assessed by a specialist asbestos consultant.

③ Installation of appropriate gas protection measures.

④ Appropriate selection of concrete/water pipe materials.

Legend

Made Ground
Alluvium
Glacial Meltwater Deposits
Sedimentary Bedrock
Ground Gas
Groundwater

Rev	Date	By	Chkd	Appd
I1	09/12/16	ML	JG	JG
Issued for Information				

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Project Title
Proposed Energy from Waste Plant, Dundee
Geotechnical and Geo-environmental Interpretative Report
Client
MVV Environment Services Ltd

Drawing Title
Revised Conceptual Site Model

Scale at A3 N.T.S
Role Geotechnical
Suitability **Issue Report**
Arup Job No **245510-06**
Rev **I1**
Name
Figure 27

Do not scale
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Appendix A

Rationale for Assessment Criteria

Soils human health

To simplify the assessment of ground contamination risks, the Statutory Guidance suggests that generic soil guideline values may be used for initial screening of soil contamination testing results, provided that such guideline values are available and are appropriate to the site circumstances and the potential pollutant linkages in question. If the results from an adequate ground investigation are below such scientific and appropriate guidelines, then the site can be regarded as suitable for use (i.e. uncontaminated). If the results exceed the initial assessment then more detailed investigation and/ or risk assessment is required to determine whether or not there is a need for remediation or further risk management.

DEFRA, in conjunction with the Environment Agency, has developed the contaminated land exposure assessment (CLEA) framework [1]. The adoption of the CLEA Framework in Scotland is supported by SEPA. CLEA provides a risk assessment basis for developing both generic assessment criteria (GAC) and site specific assessment criteria (SSAC), and also provides risk assessment software to enable their derivation.

Arup has developed a series of GACs, using the latest version of the CLEA model (v.1.07)[2]. The GACs have been developed using toxicological and physiochemical properties derived by authoritative sources, such as the Environment Agency TOX reports, and from independently peer reviewed sources such as those prepared by LQM-CIEH [3] and CL:AIRE [4].

A number of standard land-uses have been developed under the CLEA framework for which Arup have developed GACs. These include a commercial land-use which is considered the most appropriate to the proposed Energy from Waste Plant.

In 2014, DEFRA published a series of screening values referred to as Category 4 Screening Levels (C4SLs) [2]. These are intended to represent a level that does not represent a risk of “significant harm” as identified by Part IIA of the EPA (1990), and have been developed for use within England as part of the contaminated land assessment framework. C4SLs have not formally been adopted in Scotland. Due to this and the fact that these values are generally less protective than the values developed under CLEA, the C4SLs have not been used current project, with the exception of for lead. The lead value as been adopted because it is based on the latest science based authoritative assessment of risk for this compound, which indicates a lower acceptable level for lead may exist than that assessed from the CLEA model (and is in fact lower than the previously published GAC for lead, hence why it has been adopted in this case). The C4SL level for lead represents a new toxicological benchmark referred to a “acceptably low” rather than minimal risk so the results close to this value have been considered carefully in this assessment.

There are currently no generic assessment criteria for asbestos in soils and C733 [6] makes it clear that such criteria are unlikely in the near future due to uncertainties on the mechanisms for fibre release, calculating the likely exposure and the risk of harm at low levels of exposure. As a precautionary measure asbestos in soils have been addressed on a presence or absence basis.

Where no appropriate screening values exist, for example for some volatile organic compounds, the detection limit has been taken for the initial assessment.

Water Environment

The potential risks posed by groundwater contamination to the water environment have been assessed by comparison of the results of the groundwater testing with published water quality standards (WQS) of various types.

The WQS adopted have been based upon resource protection values (RPVs) for non-hazardous and hazardous substances, as detailed in SEPA document WATPS-10-01 [7]. The RPVs are taken from screening values based upon the Water Supply Water Quality Regulations (Scotland), 2001 Drinking Water Quality Standards, Directive 98/83/EC of the Drinking Water Directive and the USEPA National Primary Drinking Water Regulations.

Where no RPV is available, the WQS have been based on the environmental quality standards given in SEPA's guidance document WAT-SG-53[8]. In the absence of a current UK drinking water standards or EQS for petroleum hydrocarbons, the TPH results have been compared to the WHO Guideline values [9]. In the absence of an RPV for copper, the published threshold value for Groundwater Drinking Water protected Area has been adopted[10].

References

[1] Environment Agency, 2009. Updated Technical Background to the CLEA Model. Science Report SC050021/SR3.

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[3] Nathanail, C.P, McCaffrey, C., Gillett, A.G., Ogden, R.C. and Nathanail, J.F., 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press Nottingham

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[5] DEFRA, March 2014. SP1010: Development of C4SLs for the Assessment of Land Affected by Contamination – Policy Companion Document.

[6] CIRIA, 2014. CIRIA C773: Asbestos in Soil and Made Ground: A guide to understanding and managing risks.

[7] SEPA, August 2014. Assigning Groundwater Assessment Criteria for Pollutant Inputs. WAT-PS-10-01 Revision 03.

[8] SEPA, December 2015. Environmental Standards for Discharges to Surface Waters. WAT-SG-53.

[9] World Health Organisation, 2004. Petroleum Products in Drinking Water

[10] The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Appendix B

Results of Chemical Testing on Soils

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TP02 1.00-1.10 MG	TP04 1.00-1.10 MG	TP06 0.20-0.30 MG	TP07 0.60-0.80 MG	TP07 2.00-2.10 MG	TP08 0.50-0.60 MG	TPD01 0.50-0.60 MG	TPD01 1.00-1.10 MG	TPD01 2.00-2.10 MG	TPD02 0.50-0.60 MG	TPD02 1.00-1.10 MG	TPD02 2.00-2.10 MG
Asbestos in Soil Screen / Identification Name	Type		-	Chrysotile	Chrysotile	-	-	-	-	-	-	-	Chrysotile	-
Asbestos in Soil	Type	**NONE**	Not-detected	Detected	Detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%		-	< 0.001	< 0.001	-	-	-	-	-	-	-	< 0.001	-
Asbestos Quantification Total	%		-	< 0.001	< 0.001	-	-	-	-	-	-	-	< 0.001	-
General Inorganics														
pH - Automated	pH Units	**<5.5 >9.5**	10.7	8.4	8.9	11.3	10.8	10.0	-	-	-	-	-	10.4
Total Cyanide	mg/kg	**168**	< 1	< 1	< 1	< 1	< 1	< 1	-	-	-	-	-	< 1
Total Organic Carbon (TOC)	%		0.6	0.7	1.2	1.8	1.1	2.2	-	-	-	-	-	0.7
Total Phenols														
Total Phenols (monohydric)	mg/kg	**440**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Heavy Metals / Metalloids														
Antimony (aqua regia extractable)	mg/kg	**7350**	< 1.0	1.9	3.9	3.1	2.9	3.2	-	-	-	-	-	3.2
Arsenic (aqua regia extractable)	mg/kg	**635**	< 1.0	5.0	6.8	6.4	6.6	6.5	-	-	-	-	-	3.4
Beryllium (aqua regia extractable)	mg/kg	**11.7**	0.46	0.42	0.69	0.55	0.57	0.73	-	-	-	-	-	0.56
Boron (water soluble)	mg/kg	**236000**	3.2	1.3	1.1	2.3	6.8	2.6	-	-	-	-	-	1.9
Cadmium (aqua regia extractable)	mg/kg	**190**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
Chromium (hexavalent)	mg/kg	**32.8**	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	-	-	-	-	-	< 4.0
Chromium (aqua regia extractable)	mg/kg	**8570**	36	19	33	25	27	32	-	-	-	-	-	23
Copper (aqua regia extractable)	mg/kg	**68300**	34	24	49	37	39	37	-	-	-	-	-	38
Lead (aqua regia extractable)	mg/kg	**2300**	20	23	51	83	51	45	-	-	-	-	-	16
Mercury (aqua regia extractable)	mg/kg	**15.4**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	**983**	30	18	29	24	24	32	-	-	-	-	-	28
Selenium (aqua regia extractable)	mg/kg	**12261**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Vanadium (aqua regia extractable)	mg/kg	**6360**	75	28	59	74	46	61	-	-	-	-	-	58
Zinc (aqua regia extractable)	mg/kg	**730000**	140	57	110	73	66	81	-	-	-	-	-	55
Monoaromatics														
Benzene	ug/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Toluene	µg/kg	**56294000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
p & m-xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
o-xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Petroleum Hydrocarbons														
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	**3190**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	**7780**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	**2000**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	**9690**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.5	-	-	-	-	-	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	**58800**	< 2.0	< 2.0	3.5	6.9	2.4	14	-	-	-	-	-	3.4
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg		< 8.0	< 8.0	13	25	19	45	-	-	-	-	-	14
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	**648000**	71	85	140	320	240	450	-	-	-	-	-	150
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	**648000**	33	59	85	300	160	400	-	-	-	-	-	140
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg		79	93	150	360	260	510	-	-	-	-	-	170
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg		110	150	240	650	410	920	-	-	-	-	-	300
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	**27**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	**56294**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	**3460**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	**16200**	< 1.0	< 1.0	< 1.0	2.2	1.1	1.3	-	-	-	-	-	3.2
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	**36200**	3.3	3.2	4.2	29	11	29	-	-	-	-	-	18
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	**26600**	25	16	30	170	78	140	-	-	-	-	-	90
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	**28400**	220	280	380	1400	770	1000	-	-	-	-	-	570
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	**28400**	270	380	470	1700	970	1400	-	-	-	-	-	660
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg		250	300	410	1600	860	1200	-	-	-	-	-	680
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg		520	680	880	3400	1800	2600	-	-	-	-	-	1300
VOCs														
Chloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Chloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Bromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Vinyl Chloride	µg/kg	**59.4**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Trichlorofluoromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,1-Dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Cis-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,1-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
2,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Trichloromethane	µg/kg	**99.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,1,1-Trichloroethane	µg/kg	**660000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,2-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,1-Dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Trans-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TP02 1.00-1.10 MG	TP04 1.00-1.10 MG	TP06 0.20-0.30 MG	TP07 0.60-0.80 MG	TP07 2.00-2.10 MG	TP08 0.50-0.60 MG	TPD01 0.50-0.60 MG	TPD01 1.00-1.10 MG	TPD01 2.00-2.10 MG	TPD02 0.50-0.60 MG	TPD02 1.00-1.10 MG	TPD02 2.00-2.10 MG
Benzene	µg/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Tetrachloromethane	µg/kg	**2870**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Trichloroethene	µg/kg	**1230**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Dibromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Bromodichloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Cis-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Trans-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Toluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,1,2-Trichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,3-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Dibromochloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Tetrachloroethene	µg/kg	**18600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,2-Dibromoethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Chlorobenzene	µg/kg	**55600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	**108000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
p & m-Xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Styrene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Tribromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
o-Xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Isopropylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Bromobenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
n-Propylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
2-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
4-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,3,5-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
tert-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,2,4-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
sec-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,3-Dichlorobenzene	µg/kg	**29900**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
p-Isopropyltoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,2-Dichlorobenzene	µg/kg	**2020000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,4-Dichlorobenzene	µg/kg	**4220000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,2,4-Trichlorobenzene	µg/kg	**215000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
Hexachlorobutadiene	µg/kg	**30700**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0
1,2,3-Trichlorobenzene	µg/kg	**102000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	-	-	< 1.0

SVOCs

Aniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
Phenol	mg/kg	**440**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
2-Chlorophenol	mg/kg	**3500**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
Bis(2-chloroethyl)ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
1,3-Dichlorobenzene	mg/kg	**299**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
1,2-Dichlorobenzene	mg/kg	**2020**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
1,4-Dichlorobenzene	mg/kg	**4220**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
2-Methylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
Hexachloroethane	mg/kg		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	-	-	< 0.05
Nitrobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
4-Methylphenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
Isophorone	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
2-Nitrophenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
2,4-Dimethylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
Bis(2-chloroethoxy)methane	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
1,2,4-Trichlorobenzene	mg/kg	**215**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
Naphthalene	mg/kg	**193**	< 0.05	< 0.05	< 0.05	0.33	< 0.05	< 0.05	-	-	-	-	-	0.62
2,4-Dichlorophenol	mg/kg	**3420**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
4-Chloroaniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
Hexachlorobutadiene	mg/kg	**30.7**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
4-Chloro-3-methylphenol	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
2,4,6-Trichlorophenol	mg/kg	**3850**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
2,4,5-Trichlorophenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
2-Methylnaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
2-Chloronaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
Dimethylphthalate	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
2,6-Dinitrotoluene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	< 0.1
Acenaphthylene	mg/kg	**83200**	< 0.10	< 0.10	< 0.10	0.11	< 0.10	0.12	-	-	-	-	-	< 0.10
Acenaphthene	mg/kg	**83700**	< 0.10	< 0.10	0.30	1.0	0.18	0.79	-	-	-	-	-	1.1
2,4-Dinitrotoluene	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
Dibenzofuran	mg/kg		< 0.2	< 0.2	< 0.2	0.4	< 0.2	0.3	-	-	-	-	-	0.7
4-Chlorophenyl phenyl ether	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
Diethyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
4-Nitroaniline	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
Fluorene	mg/kg	**63000**	< 0.10	< 0.10	0.21	0.78	< 0.10	0.57	-	-	-	-	-	1.1

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TP02 1.00-1.10 MG	TP04 1.00-1.10 MG	TP06 0.20-0.30 MG	TP07 0.60-0.80 MG	TP07 2.00-2.10 MG	TP08 0.50-0.60 MG	TPD01 0.50-0.60 MG	TPD01 1.00-1.10 MG	TPD01 2.00-2.10 MG	TPD02 0.50-0.60 MG	TPD02 1.00-1.10 MG	TPD02 2.00-2.10 MG
Azobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
Bromophenyl phenyl ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
Hexachlorobenzene	mg/kg	**104**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
Phenanthrene	mg/kg	**21900**	0.90	0.26	1.4	4.7	0.88	3.4	-	-	-	-	-	6.0
Anthracene	mg/kg	**523000**	0.27	0.14	0.43	1.7	0.32	1.4	-	-	-	-	-	1.5
Carbazole	mg/kg		< 0.3	< 0.3	< 0.3	0.4	< 0.3	0.4	-	-	-	-	-	0.6
Dibutyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	-	-	-	-	< 0.2
Anthraquinone	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	0.3
Fluoranthene	mg/kg	**22600**	1.0	0.42	2.0	7.1	1.5	5.2	-	-	-	-	-	6.0
Pyrene	mg/kg	**54200**	1.0	0.35	2.0	6.5	1.5	4.6	-	-	-	-	-	5.2
Butyl benzyl phthalate	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-	-	-	< 0.3
Benzo(a)anthracene	mg/kg	**167**	0.38	0.14	0.90	3.6	0.59	2.1	-	-	-	-	-	2.3
Chrysene	mg/kg	**346**	0.34	0.10	0.76	2.4	0.68	2.1	-	-	-	-	-	2.3
Benzo(b)fluoranthene	mg/kg	**44.3**	0.36	0.18	0.95	2.6	0.68	1.8	-	-	-	-	-	2.0
Benzo(k)fluoranthene	mg/kg	**1170**	0.15	< 0.10	0.31	1.7	0.37	1.1	-	-	-	-	-	1.0
Benzo(a)pyrene	mg/kg	**35.2**	0.38	0.19	0.98	2.8	0.79	1.9	-	-	-	-	-	1.9
Indeno(1,2,3-cd)pyrene	mg/kg	**501**	< 0.10	< 0.10	0.13	0.74	< 0.10	0.49	-	-	-	-	-	0.43
Dibenz(a,h)anthracene	mg/kg	**3.53**	< 0.10	< 0.10	< 0.10	0.25	< 0.10	0.13	-	-	-	-	-	0.18
Benzo(ghi)perylene	mg/kg	**3930**	< 0.05	< 0.05	< 0.05	0.60	< 0.05	0.21	-	-	-	-	-	0.25
PCBs														
PCB Congener 077	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 081	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 105	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 114	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 118	mg/kg		< 0.001	-	< 0.001	-	-	0.013	-	-	-	-	-	-
PCB Congener 123	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 126	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 156	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 157	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 167	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 169	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
PCB Congener 189	mg/kg		< 0.001	-	< 0.001	-	-	< 0.001	-	-	-	-	-	-
Total PCBs	mg/kg		< 0.012	-	< 0.012	-	-	0.013	-	-	-	-	-	-

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TPD03 0.50-0.60 MG	TPD03 1.00-1.10 MG	TPD03 2.00-2.10 MG	BHR01 0.90-1.00 MG	BHR02 2.00-2.45 MG	BHR03 0.50-0.60 MG	BHR03 2.00-2.45 MG	BHR04 0.30-0.50 MG	BHR05 0.30-0.50 MG	BHS09 0.30-0.50 MG	BHS09 1.20-1.65 MG	BHS10 0.50-0.60 MG	BHS11 2.00-2.45 MG
Asbestos in Soil Screen / Identification Name	Type		-	-	-	Chrysotile	Chrysotile			-	Chrysotile			-	-
Asbestos in Soil	Type	**NONE**	Not-detected	Not-detected	Not-detected	Detected	Detected	Not-detected	Not-detected	Not-detected	Detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%		-	-	-	0.001	< 0.001			-	< 0.001			-	-
Asbestos Quantification Total	%		-	-	-	0.001	< 0.001			-	< 0.001			-	-
General Inorganics															
pH - Automated	pH Units	**<5.5 >9.5**	-	-	11.3	9.6	9.2	10.5	7.4	11.6	11.4	9.1	9.4	9.7	7.9
Total Cyanide	mg/kg	**168**	-	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%		-	-	1.9	1.2	1.5	2.4	2.2	3.1	1.0	1.5	0.8	1.3	1.6
Total Phenols															
Total Phenols (monohydric)	mg/kg	**440**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Heavy Metals / Metalloids															
Antimony (aqua regia extractable)	mg/kg	**7350**	-	-	2.6	< 1.0	2.8	< 1.0	2.8	2.6	1.9	2.6	2.3	< 1.0	3.3
Arsenic (aqua regia extractable)	mg/kg	**635**	-	-	5.7	8.3	4.5	1.7	12	3.4	6.0	4.5	3.5	5.7	12
Beryllium (aqua regia extractable)	mg/kg	**11.7**	-	-	0.56	0.66	0.65	0.42	1.4	0.54	0.71	0.58	0.55	1.1	1.1
Boron (water soluble)	mg/kg	**236000**	-	-	1.7	0.9	2.9	2.3	0.8	1.2	1.0	3.0	3.0	1.2	4.1
Cadmium (aqua regia extractable)	mg/kg	**190**	-	-	< 0.2	0.4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	**32.8**	-	-	< 4.0	< 4.0	< 4.0		< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	**8570**	-	-	25	33	25	27	89	18	37	27	26	39	54
Copper (aqua regia extractable)	mg/kg	**68300**	-	-	31	39	89	19	79	33	30	21	34	30	43
Lead (aqua regia extractable)	mg/kg	**2300**	-	-	28	59	200	8.0	11	19	48	18	26	70	33
Mercury (aqua regia extractable)	mg/kg	**15.4**	-	-	< 0.3	0.6	0.6	< 0.3	0.6	< 0.3	< 0.3	< 0.3	0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	**983**	-	-	24	32	27	25	60	21	33	21	24	34	45
Selenium (aqua regia extractable)	mg/kg	**12261**	-	-	1.1	< 1.0	1.0	< 1.0	1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.5	4.1
Vanadium (aqua regia extractable)	mg/kg	**6360**	-	-	50	41	47	77	99	98	69	47	53	68	69
Zinc (aqua regia extractable)	mg/kg	**730000**	-	-	67	94	88	53	95	64	69	50	66	86	73
Monoaromatics															
Benzene	ug/kg	**27000**	-	-	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	**56294000**	-	-	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	-	-	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	**5923000**	-	-	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	**6603000**	-	-	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		-	-	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons															
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	**3190**	-	-	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	**7780**	-	-	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	**2000**	-	-	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	**9690**	-	-	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	**58800**	-	-	2.8	< 2.0	11		< 2.0	13	4.4	4.1	< 2.0	4.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg		-	-	19	< 8.0	32		< 8.0	57	12	24	10	18	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	**648000**	-	-	110	78	390		< 8.0	950	170	420	130	290	75
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	**648000**	-	-	94	36	330		< 8.4	750	160	420	130	310	53
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg		-	-	140	83	430		< 10	1000	190	450	140	310	82
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg		-	-	230	120	760		< 10	1800	350	870	270	630	140
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	**27**	-	-	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	**56294**	-	-	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	**3460**	-	-	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	**16200**	-	-	3.2	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	**36200**	-	-	33	< 2.0	13		< 2.0	26	9.1	6.4	2.6	6.3	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	**26600**	-	-	200	11	73		< 10	150	63	67	22	59	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	**28400**	-	-	680	220	950		< 10	2600	550	1300	260	870	120
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	**28400**	-	-	620	60	1000		< 8.4	3600	180	1500	430	350	55
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg		-	-	910	230	1000		< 10	2700	620	1400	280	930	130
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg		-	-	1500	290	2100		< 10	6300	800	2800	710	1300	180
VOCs															
Chloromethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	**59.4**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	**99.1**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	**660000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TPD03 0.50-0.60 MG	TPD03 1.00-1.10 MG	TPD03 2.00-2.10 MG	BHR01 0.90-1.00 MG	BHR02 2.00-2.45 MG	BHR03 0.50-0.60 MG	BHR03 2.00-2.45 MG	BHR04 0.30-0.50 MG	BHR05 0.30-0.50 MG	BHS09 0.30-0.50 MG	BHS09 1.20-1.65 MG	BHS10 0.50-0.60 MG	BHS11 2.00-2.45 MG
Benzene	µg/kg	**27000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	**2870**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	**1230**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	**18600**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	**55600**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	**108000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	**5923000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	**6603000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	8.3	< 1.0
sec-Butylbenzene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	**29900**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	**2020000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	**4220000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg		-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	**215000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	**30700**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	**102000**	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SVOCs															
Aniline	mg/kg		-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	mg/kg	**440**	-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Chlorophenol	mg/kg	**3500**	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg		-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	**299**	-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	**2020**	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	**4220**	-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg		-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg		-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Hexachloroethane	mg/kg		-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	mg/kg		-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Methylphenol	mg/kg		-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isophorone	mg/kg		-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Nitrophenol	mg/kg		-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg		-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg		-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	**215**	-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg	**193**	-	-	1.6	< 0.05	< 0.05	< 0.05	< 0.05	0.20	0.45	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	**3420**	-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloroaniline	mg/kg		-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	**30.7**	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg		-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	**3850**	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg		-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg		-	-	1.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg		-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	mg/kg		-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg		-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	**83200**	-	-	0.11	< 0.10	< 0.10	< 0.10	< 0.10	0.19	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	**83700**	-	-	3.4	< 0.10	0.28	< 0.10	< 0.10	1.3	0.97	0.35	< 0.10	0.42	< 0.10
2,4-Dinitrotoluene	mg/kg		-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibenzofuran	mg/kg		-	-	2.1	< 0.2	< 0.2	< 0.2	< 0.2	0.4	0.3	< 0.2	< 0.2	0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg		-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Diethyl phthalate	mg/kg		-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Nitroaniline	mg/kg		-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fluorene	mg/kg	**63000**	-	-	2.9	< 0.10	0.26	< 0.10	< 0.10	0.87	0.82	0.38	< 0.10	0.30	< 0.10

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TPD03 0.50-0.60 MG	TPD03 1.00-1.10 MG	TPD03 2.00-2.10 MG	BHR01 0.90-1.00 MG	BHR02 2.00-2.45 MG	BHR03 0.50-0.60 MG	BHR03 2.00-2.45 MG	BHR04 0.30-0.50 MG	BHR05 0.30-0.50 MG	BHS09 0.30-0.50 MG	BHS09 1.20-1.65 MG	BHS10 0.50-0.60 MG	BHS11 2.00-2.45 MG
Azobenzene	mg/kg		-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg		-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	**104**	-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Phenanthrene	mg/kg	**21900**	-	-	21	0.21	1.4	1.0	< 0.10	4.6	4.5	1.5	0.90	2.9	< 0.10
Anthracene	mg/kg	**523000**	-	-	5.8	< 0.10	0.48	0.42	< 0.10	1.5	1.4	0.57	0.28	0.62	< 0.10
Carbazole	mg/kg		-	-	1.5	< 0.3	< 0.3	< 0.3	< 0.3	0.5	< 0.3	< 0.3	< 0.3	0.3	< 0.3
Dibutyl phthalate	mg/kg		-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Anthraquinone	mg/kg		-	-	2.2	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Fluoranthene	mg/kg	**22600**	-	-	24	0.29	2.5	2.4	< 0.10	6.3	5.5	2.4	1.1	5.0	< 0.10
Pyrene	mg/kg	**54200**	-	-	20	0.28	2.4	2.5	< 0.10	5.3	5.3	2.4	1.1	4.5	< 0.10
Butyl benzyl phthalate	mg/kg		-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	**167**	-	-	11	< 0.10	1.1	1.3	< 0.10	2.7	2.3	1.0	0.53	1.8	< 0.10
Chrysene	mg/kg	**346**	-	-	8.3	< 0.05	1.1	1.4	< 0.05	2.8	2.0	1.3	0.42	2.0	< 0.05
Benzo(b)fluoranthene	mg/kg	**44.3**	-	-	9.2	< 0.10	1.2	2.3	< 0.10	3.0	2.2	1.2	0.42	2.2	< 0.10
Benzo(k)fluoranthene	mg/kg	**1170**	-	-	3.4	< 0.10	0.89	0.86	< 0.10	1.4	1.3	0.59	0.33	1.4	< 0.10
Benzo(a)pyrene	mg/kg	**35.2**	-	-	7.8	< 0.10	1.4	2.3	< 0.10	2.9	2.3	1.1	0.47	2.0	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	**501**	-	-	2.7	< 0.10	0.59	0.89	< 0.10	1.2	1.1	0.56	0.23	0.89	< 0.10
Dibenz(a,h)anthracene	mg/kg	**3.53**	-	-	0.79	< 0.10	< 0.10	0.30	< 0.10	0.41	0.20	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	**3930**	-	-	2.5	< 0.05	0.80	1.1	< 0.05	1.5	1.4	0.69	0.29	1.1	< 0.05
PCBs															
PCB Congener 077	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 081	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 105	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 114	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 118	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 123	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 126	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 156	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 157	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 167	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 169	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
PCB Congener 189	mg/kg		-	-	-		< 0.001		< 0.001	< 0.001		< 0.001	< 0.001		
Total PCBs	mg/kg		-	-	-		< 0.012		< 0.012	< 0.012		< 0.012	< 0.012		

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area D

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHS12 0.30-0.40 MG	BHS13 0.50-0.70 MG
Asbestos in Soil Screen / Identification Name	Type		-	-
Asbestos in Soil	Type	**NONE**	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%		-	-
Asbestos Quantification Total	%		-	-
General Inorganics				
pH - Automated	pH Units	**<5.5 >9.5**	8.0	10.5
Total Cyanide	mg/kg	**168**	< 1	< 1
Total Organic Carbon (TOC)	%		1.7	0.7
Total Phenols				
Total Phenols (monohydric)	mg/kg	**440**	< 1.0	< 1.0
Heavy Metals / Metalloids				
Antimony (aqua regia extractable)	mg/kg	**7350**	4.6	3.2
Arsenic (aqua regia extractable)	mg/kg	**635**	6.4	< 1.0
Beryllium (aqua regia extractable)	mg/kg	**11.7**	0.90	0.69
Boron (water soluble)	mg/kg	**236000**	1.4	1.0
Cadmium (aqua regia extractable)	mg/kg	**190**	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	**32.8**	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	**8570**	46	25
Copper (aqua regia extractable)	mg/kg	**68300**	49	37
Lead (aqua regia extractable)	mg/kg	**2300**	60	37
Mercury (aqua regia extractable)	mg/kg	**15.4**	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	**983**	40	37
Selenium (aqua regia extractable)	mg/kg	**12261**	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	**6360**	61	36
Zinc (aqua regia extractable)	mg/kg	**730000**	120	66
Monoaromatics				
Benzene	ug/kg	**27000**	< 1.0	< 1.0
Toluene	µg/kg	**56294000**	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0
p & m-xylene	µg/kg	**5923000**	< 1.0	< 1.0
o-xylene	µg/kg	**6603000**	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	**3190**	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	**7780**	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	**2000**	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	**9690**	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	**58800**	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg		< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	**648000**	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	**648000**	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg		< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg		< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	**27**	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	**56294**	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	**3460**	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	**16200**	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	**36200**	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	**26600**	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	**28400**	27	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	**28400**	25	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg		28	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg		53	< 10
VOCs				
Chloromethane	µg/kg		< 1.0	< 1.0
Chloroethane	µg/kg		< 1.0	< 1.0
Bromomethane	µg/kg		< 1.0	< 1.0
Vinyl Chloride	µg/kg	**59.4**	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg		< 1.0	< 1.0
1,1-Dichloroethene	µg/kg		< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg		< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg		< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0
1,1-Dichloroethane	µg/kg		< 1.0	< 1.0
2,2-Dichloropropane	µg/kg		< 1.0	< 1.0
Trichloromethane	µg/kg	**99.1**	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	**660000**	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg		< 1.0	< 1.0
1,1-Dichloropropene	µg/kg		< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg		< 1.0	< 1.0
Benzene	µg/kg	**27000**	< 1.0	< 1.0
Tetrachloromethane	µg/kg	**2870**	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg		< 1.0	< 1.0
Trichloroethene	µg/kg	**1230**	< 1.0	< 1.0
Dibromomethane	µg/kg		< 1.0	< 1.0
Bromodichloromethane	µg/kg		< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg		< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg		< 1.0	< 1.0
Toluene	µg/kg		< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg		< 1.0	< 1.0
1,3-Dichloropropane	µg/kg		< 1.0	< 1.0
Dibromochloromethane	µg/kg		< 1.0	< 1.0
Tetrachloroethene	µg/kg	**18600**	< 1.0	< 1.0

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area D

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHS12	BHS13
			0.30-0.40	0.50-0.70
			MG	MG
1,2-Dibromoethane	µg/kg		< 1.0	< 1.0
Chlorobenzene	µg/kg	**55600**	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	**108000**	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0
p & m-Xylene	µg/kg	**5923000**	< 1.0	< 1.0
Styrene	µg/kg		< 1.0	< 1.0
Tribromomethane	µg/kg		< 1.0	< 1.0
o-Xylene	µg/kg	**6603000**	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg		< 1.0	< 1.0
Isopropylbenzene	µg/kg		< 1.0	< 1.0
Bromobenzene	µg/kg		< 1.0	< 1.0
n-Propylbenzene	µg/kg		< 1.0	< 1.0
2-Chlorotoluene	µg/kg		< 1.0	< 1.0
4-Chlorotoluene	µg/kg		< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg		< 1.0	< 1.0
tert-Butylbenzene	µg/kg		< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg		< 1.0	< 1.0
sec-Butylbenzene	µg/kg		< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	**29900**	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg		< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	**2020000**	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	**4220000**	< 1.0	< 1.0
Butylbenzene	µg/kg		< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg		< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	**215000**	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	**30700**	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	**102000**	< 1.0	< 1.0
SVOCs				
Aniline	mg/kg		< 0.1	< 0.1
Phenol	mg/kg	**440**	< 0.2	< 0.2
2-Chlorophenol	mg/kg	**3500**	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg		< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	**299**	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	**2020**	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	**4220**	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg		< 0.1	< 0.1
2-Methylphenol	mg/kg		< 0.3	< 0.3
Hexachloroethane	mg/kg		< 0.05	< 0.05
Nitrobenzene	mg/kg		< 0.3	< 0.3
4-Methylphenol	mg/kg		< 0.2	< 0.2
Isophorone	mg/kg		< 0.2	< 0.2
2-Nitrophenol	mg/kg		< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg		< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg		< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	**215**	< 0.3	< 0.3
Naphthalene	mg/kg	**193**	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	**3420**	< 0.3	< 0.3
4-Chloroaniline	mg/kg		< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	**30.7**	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg		< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	**3850**	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg		< 0.2	< 0.2
2-Methylnaphthalene	mg/kg		< 0.1	< 0.1
2-Chloronaphthalene	mg/kg		< 0.1	< 0.1
Dimethylphthalate	mg/kg		< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg		< 0.1	< 0.1
Acenaphthylene	mg/kg	**83200**	< 0.10	< 0.10
Acenaphthene	mg/kg	**83700**	< 0.10	< 0.10
2,4-Dinitrotoluene	mg/kg		< 0.2	< 0.2
Dibenzofuran	mg/kg		< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg		< 0.3	< 0.3
Diethyl phthalate	mg/kg		< 0.2	< 0.2
4-Nitroaniline	mg/kg		< 0.2	< 0.2
Fluorene	mg/kg	**63000**	< 0.10	< 0.10
Azobenzene	mg/kg		< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg		< 0.2	< 0.2
Hexachlorobenzene	mg/kg	**104**	< 0.3	< 0.3
Phenanthrene	mg/kg	**21900**	< 0.10	< 0.10
Anthracene	mg/kg	**523000**	< 0.10	< 0.10
Carbazole	mg/kg		< 0.3	< 0.3
Dibutyl phthalate	mg/kg		< 0.2	< 0.2
Anthraquinone	mg/kg		< 0.3	< 0.3
Fluoranthene	mg/kg	**22600**	< 0.10	< 0.10
Pyrene	mg/kg	**54200**	< 0.10	< 0.10
Butyl benzyl phthalate	mg/kg		< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	**167**	< 0.10	< 0.10
Chrysene	mg/kg	**346**	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	**44.3**	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	**1170**	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	**35.2**	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	**501**	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	**3.53**	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	**3930**	< 0.05	< 0.05

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area E

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHS01	BHS02	BHS03	BHS04	BHS05	BHS06	BHS07	BHS08
			0.30-0.50	0.50-0.60	1.80-2.00	0.30-0.40	0.40-0.50	0.70-0.90	1.60-1.80	1.20-1.65
			MG	MG	MG	MG	MG	MG	MG	MG
Asbestos in Soil Screen / Identification Name	Type		-	-	-	-	Chrysotile	-	-	-
Asbestos in Soil	Type	**NONE**	Not-detected	Not-detected	Not-detected	Not-detected	Detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%		-	-	-	-	< 0.001	-	-	-
Asbestos Quantification Total	%		-	-	-	-	< 0.001	-	-	-
General Inorganics										
pH - Automated	pH Units	**<5.5 >9.5**	9.8	10.1	7.8	10.0	9.4	8.2	7.4	7.1
Total Cyanide	mg/kg	**168**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%		1.8	0.1	0.9	0.5	0.3	1.5	2.2	1.3
Total Phenols										
Total Phenols (monohydric)	mg/kg	**440**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Heavy Metals / Metalloids										
Antimony (aqua regia extractable)	mg/kg	**7350**	3.4	< 1.0	< 1.0	< 1.0	< 1.0	7.6	5.2	4.0
Arsenic (aqua regia extractable)	mg/kg	**635**	7.7	3.7	12	12	7.4	6.3	12	16
Beryllium (aqua regia extractable)	mg/kg	**11.7**	0.60	0.52	0.77	0.58	0.70	0.94	1.5	1.4
Boron (water soluble)	mg/kg	**236000**	1.5	< 0.2	1.1	< 0.2	3.5	1.3	1.6	0.7
Cadmium (aqua regia extractable)	mg/kg	**190**	< 0.2	< 0.2	< 0.2	< 0.2	0.7	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	**32.8**	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	**8570**	40	24	59	37	27	51	84	90
Copper (aqua regia extractable)	mg/kg	**68300**	45	23	54	19	37	140	70	65
Lead (aqua regia extractable)	mg/kg	**2300**	15	4.5	12	7.4	28	37	32	9.2
Mercury (aqua regia extractable)	mg/kg	**15.4**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	**983**	31	28	52	30	25	39	57	57
Selenium (aqua regia extractable)	mg/kg	**12261**	< 1.0	2.9	< 1.0	< 1.0	2.1	1.2	< 1.0	1.6
Vanadium (aqua regia extractable)	mg/kg	**6360**	81	64	89	81	38	70	99	100
Zinc (aqua regia extractable)	mg/kg	**730000**	85	55	77	67	98	170	93	95
Monoaromatics										
Benzene	ug/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	**56294000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons										
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	**3190**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	**7780**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	**2000**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	**9690**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	**58800**	3.4	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg		< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	**648000**	540	< 8.0	< 8.0	170	< 8.0	120	< 8.0	14
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	**648000**	740	< 8.4	< 8.4	250	20	100	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg		550	< 10	< 10	170	< 10	120	< 10	15
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg		1300	< 10	< 10	420	20	220	< 10	15
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	**27**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	**56294**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	**3460**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	**16200**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	**36200**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	**26600**	12	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	**28400**	770	< 10	< 10	340	47	170	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	**28400**	1200	< 8.4	< 8.4	560	83	220	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg		780	< 10	< 10	340	51	180	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg		2000	< 10	< 10	900	130	400	< 10	< 10

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area E

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHS01	BHS02	BHS03	BHS04	BHS05	BHS06	BHS07	BHS08
			0.30-0.50	0.50-0.60	1.80-2.00	0.30-0.40	0.40-0.50	0.70-0.90	1.60-1.80	1.20-1.65
			MG	MG	MG	MG	MG	MG	MG	MG
VOCs										
Chloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	**59.4**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	**99.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	**660000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	**2870**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	**1230**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	**18600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	**55600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	**108000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	**29900**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	**2020000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	**4220000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	**215000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	**30700**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	**102000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

MVV Site Dundee

Risk to Human Health - Assessment of made ground in Area E

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHS01	BHS02	BHS03	BHS04	BHS05	BHS06	BHS07	BHS08
			0.30-0.50	0.50-0.60	1.80-2.00	0.30-0.40	0.40-0.50	0.70-0.90	1.60-1.80	1.20-1.65
			MG	MG	MG	MG	MG	MG	MG	MG
SVOCs										
Aniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	mg/kg	**440**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Chlorophenol	mg/kg	**3500**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	**299**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	**2020**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	**4220**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Hexachloroethane	mg/kg		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Methylphenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isophorone	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Nitrophenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	**215**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg	**193**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	**3420**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloroaniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	**30.7**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	**3850**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	**83200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	**83700**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dinitrotoluene	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibenzofuran	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Diethyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Nitroaniline	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fluorene	mg/kg	**63000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Azobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	**104**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Phenanthrene	mg/kg	**21900**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	mg/kg	**523000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Carbazole	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dibutyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Anthraquinone	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Fluoranthene	mg/kg	**22600**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	mg/kg	**54200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Butyl benzyl phthalate	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	**167**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	mg/kg	**346**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	**44.3**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	**1170**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	**35.2**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	**501**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	**3.53**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	**3930**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PCBs										
PCB Congener 077	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 081	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 105	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 114	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 118	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 123	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 126	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 156	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 157	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 167	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 169	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
PCB Congener 189	mg/kg		-	-	-	< 0.001	< 0.001	< 0.001	-	-
Total PCBs	mg/kg		-	-	-	< 0.012	< 0.012	< 0.012	-	-

MVV Site Dundee

Risk to Human Health - Assessment of made ground in area of proposed pipeline

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TPM01A	TPM02	BHM01	BHM02	BHM03	BHM04	BHM05
			0.20-0.30	0.50-0.60	0.30-0.40	1.00-1.20	0.50-0.60	0.50-0.60	2.00-2.20
			MG	MG	MG	MG	MG	MG	MG
Asbestos in Soil Screen / Identification Name	Type		-	-			-		
Asbestos in Soil	Type	**NONE**	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%		-	-			-		
Asbestos Quantification Total	%		-	-			-		
General Inorganics									
pH - Automated	pH Units	**<5.5 >9.5**	7.7	7.3	7.1	7.3	8.0	7.7	8.7
Total Cyanide	mg/kg	**168**	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%		2.3	0.2	0.2	0.9	0.3	0.1	< 0.1
Total Phenols									
Total Phenols (monohydric)	mg/kg	**440**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Heavy Metals / Metalloids									
Antimony (aqua regia extractable)	mg/kg	**7350**	3.4	1.8	1.3	1.8	4.7	2.6	< 1.0
Arsenic (aqua regia extractable)	mg/kg	**635**	21	5.0	2.2	7.6	9.4	9.2	9.1
Beryllium (aqua regia extractable)	mg/kg	**11.7**	1.5	0.71	0.63	0.75	0.91	0.86	0.16
Boron (water soluble)	mg/kg	**236000**	1.5	1.1	0.3	0.7	< 0.2	0.4	0.2
Cadmium (aqua regia extractable)	mg/kg	**190**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	**32.8**	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	**8570**	97	61	57	50	69	62	49
Copper (aqua regia extractable)	mg/kg	**68300**	75	32	23	48	35	53	47
Lead (aqua regia extractable)	mg/kg	**2300**	18	4.0	7.5	17	5.6	5.5	9.6
Mercury (aqua regia extractable)	mg/kg	**15.4**	< 0.3	< 0.3	1.0	0.8	< 0.3	0.4	0.5
Nickel (aqua regia extractable)	mg/kg	**983**	52	54	36	50	60	59	51
Selenium (aqua regia extractable)	mg/kg	**12261**	5.1	1.2	< 1.0	< 1.0	< 1.0	1.9	< 1.0
Vanadium (aqua regia extractable)	mg/kg	**6360**	140	69	87	60	75	75	59
Zinc (aqua regia extractable)	mg/kg	**730000**	75	62	67	71	67	66	64
Monoaromatics									
Benzene	ug/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	**56294000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons									
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	**3190**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	**7780**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	**2000**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	**9690**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	**58800**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg		< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	**648000**	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	12
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	**648000**	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	14
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	14
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	**27**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	**56294**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	**3460**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	**16200**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	**36200**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	**26600**	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	**28400**	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	**28400**	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	< 10

MVV Site Dundee

Risk to Human Health - Assessment of made ground in area of proposed pipeline

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TPM01A	TPM02	BHM01	BHM02	BHM03	BHM04	BHM05
			0.20-0.30	0.50-0.60	0.30-0.40	1.00-1.20	0.50-0.60	0.50-0.60	2.00-2.20
			MG	MG	MG	MG	MG	MG	MG
VOCs									
Chloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	**59.4**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	**99.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	**660000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	**2870**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	**1230**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	**18600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	**55600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	**108000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	**29900**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	**2020000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	**4220000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	**215000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	**30700**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	**102000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SVOCs									
Aniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	mg/kg	**440**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Chlorophenol	mg/kg	**3500**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	**299**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	**2020**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	**4220**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Hexachloroethane	mg/kg		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

MVV Site Dundee

Risk to Human Health - Assessment of made ground in area of proposed pipeline

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TPM01A	TPM02	BHM01	BHM02	BHM03	BHM04	BHM05
			0.20-0.30	0.50-0.60	0.30-0.40	1.00-1.20	0.50-0.60	0.50-0.60	2.00-2.20
			MG	MG	MG	MG	MG	MG	MG
Nitrobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Methylphenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isophorone	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Nitrophenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	**215**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg	**193**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	**3420**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloroaniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	**30.7**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	**3850**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	**83200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	**83700**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dinitrotoluene	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibenzofuran	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Diethyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Nitroaniline	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fluorene	mg/kg	**63000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Azobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	**104**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Phenanthrene	mg/kg	**21900**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	mg/kg	**523000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Carbazole	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dibutyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Anthraquinone	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Fluoranthene	mg/kg	**22600**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	mg/kg	**54200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Butyl benzyl phthalate	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	**167**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	mg/kg	**346**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	**44.3**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	**1170**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	**35.2**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	**501**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	**3.53**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	**3930**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TP01 1.00-1.10 NAT	TP01 3.00-3.10 NAT	TP03 3.00-3.10 NAT	TP04 3.00-3.10 NAT	TP05 3.00-3.10 NAT	TP05 4.00-4.10 NAT	TP06 3.50-3.60 NAT	TP06 4.20-4.30 NAT	TP08 3.35-3.45 NAT	TPD01 3.90-4.00 NAT	TPD02 3.00-3.10 NAT	BHR01 2.00-2.45 NAT	BHR02 4.00-4.45 NAT
Asbestos in Soil Screen / Identification Name	Type		-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos in Soil	Type	**NONE**	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification (Stage 2)	%		-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification Total	%		-	-	-	-	-	-	-	-	-	-	-	-	-
General Inorganics															
pH - Automated	pH Units	**<5.5 >9.5**	7.3	5.6	7.4	5.8	7.1	7.4	6.0	7.0	6.6	6.0	7.3	7.3	6.4
Total Cyanide	mg/kg	**168**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%		1.3	6.1	2.3	8.2	7.2	0.7	6.7	1.3	2.4	7.4	3.3	1.5	8.6
Total Phenols															
Total Phenols (monohydric)	mg/kg	**440**	< 1.0	< 1.0	< 1.0	1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0	< 1.0	< 1.0	< 1.0
Heavy Metals / Metalloids															
Antimony (aqua regia extractable)	mg/kg	**7350**	3.5	2.8	3.2	< 1.0	1.3	2.8	3.7	2.7	3.5	2.7	2.7	3.0	1.3
Arsenic (aqua regia extractable)	mg/kg	**635**	9.6	12	13	3.9	4.6	7.8	13	7.7	7.7	36	7.7	12	5.7
Beryllium (aqua regia extractable)	mg/kg	**11.7**	0.99	0.50	1.2	0.64	0.59	0.77	1.2	0.65	0.56	0.65	0.96	1.4	0.54
Boron (water soluble)	mg/kg	**236000**	1.2	4.1	4.2	4.3	3.0	< 0.2	1.5	0.6	0.7	6.2	1.8	0.4	3.6
Cadmium (aqua regia extractable)	mg/kg	**190**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.2
Chromium (hexavalent)	mg/kg	**32.8**	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	**8570**	68	45	72	11	38	67	82	53	54	39	70	100	39
Copper (aqua regia extractable)	mg/kg	**68300**	50	55	62	93	67	55	87	46	33	99	48	71	46
Lead (aqua regia extractable)	mg/kg	**2300**	15	3.4	29	1.3	4.5	6.9	7.3	5.6	3.7	7.3	9.0	9.0	4.5
Mercury (aqua regia extractable)	mg/kg	**15.4**	0.8	< 0.3	< 0.3	1.0	< 0.3	< 0.3	1.2	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	0.6
Nickel (aqua regia extractable)	mg/kg	**983**	51	33	54	21	36	59	57	49	44	32	50	76	20
Selenium (aqua regia extractable)	mg/kg	**12261**	1.5	1.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.7	< 1.0	< 1.0	2.0
Vanadium (aqua regia extractable)	mg/kg	**6360**	74	45	85	4.4	41	71	92	58	59	100	85	97	53
Zinc (aqua regia extractable)	mg/kg	**730000**	79	71	95	18	43	64	120	52	69	40	70	95	25
Monoaromatics															
Benzene	ug/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	**56294000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons															
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	**3190**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	**7780**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	**2000**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	**9690**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	**58800**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg		< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	**648000**	< 8.0	< 8.0	16	< 8.0	< 8.0	< 8.0	< 8.0	8.3	< 8.0	16	8.0	14	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	**648000**	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	25	< 8.4	< 8.4	12
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg		< 10	< 10	17	< 10	< 10	< 10	< 10	< 10	< 10	17	< 10	15	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg		< 10	< 10	17	< 10	< 10	< 10	< 10	< 10	< 10	41	< 10	15	12
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	**27**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	**56294**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	**3460**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	**16200**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	**36200**	< 2.0	< 2.0	3.7	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	**26600**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	**28400**	< 10	20	140	25	13	< 10	16	< 10	< 10	59	< 10	17	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	**28400**	< 8.4	< 8.4	170	36	18	< 8.4	50	26	< 8.4	130	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg		< 10	20	150	25	13	< 10	16	< 10	< 10	68	< 10	18	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg		< 10	20	320	61	31	< 10	66	26	< 10	200	< 10	18	< 10

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Risk to Human Health - Assessment of natural soils in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TP01 1.00-1.10 NAT	TP01 3.00-3.10 NAT	TP03 3.00-3.10 NAT	TP04 3.00-3.10 NAT	TP05 3.00-3.10 NAT	TP05 4.00-4.10 NAT	TP06 3.50-3.60 NAT	TP06 4.20-4.30 NAT	TP08 3.35-3.45 NAT	TPD01 3.90-4.00 NAT	TPD02 3.00-3.10 NAT	BHR01 2.00-2.45 NAT	BHR02 4.00-4.45 NAT
VOCs															
Chloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	**59.4**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	**99.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	**660000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	**2870**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	**1230**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	**18600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	**55600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	**108000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	**29900**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	**2020000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	**4220000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	**215000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	**30700**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	**102000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SVOCs															
Aniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	mg/kg	**440**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Chlorophenol	mg/kg	**3500**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	**299**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	**2020**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	**4220**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Hexachloroethane	mg/kg		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TP01 1.00-1.10 NAT	TP01 3.00-3.10 NAT	TP03 3.00-3.10 NAT	TP04 3.00-3.10 NAT	TP05 3.00-3.10 NAT	TP05 4.00-4.10 NAT	TP06 3.50-3.60 NAT	TP06 4.20-4.30 NAT	TP08 3.35-3.45 NAT	TPD01 3.90-4.00 NAT	TPD02 3.00-3.10 NAT	BHR01 2.00-2.45 NAT	BHR02 4.00-4.45 NAT
Nitrobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Methylphenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isophorone	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Nitrophenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	**215**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg	**193**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	**3420**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloroaniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	**30.7**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	**3850**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	**83200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	**83700**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dinitrotoluene	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibenzofuran	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Diethyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Nitroaniline	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fluorene	mg/kg	**63000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Azobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	**104**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Phenanthrene	mg/kg	**21900**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.22	0.21	< 0.10	< 0.10
Anthracene	mg/kg	**523000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Carbazole	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dibutyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Anthraquinone	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Fluoranthene	mg/kg	**22600**	< 0.10	< 0.10	0.33	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.17	0.25	< 0.10	< 0.10
Pyrene	mg/kg	**54200**	< 0.10	< 0.10	0.33	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.13	0.21	< 0.10	< 0.10
Butyl benzyl phthalate	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	**167**	< 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
Chrysene	mg/kg	**346**	< 0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	**44.3**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	**1170**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	**35.2**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	**501**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	**3.53**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	**3930**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PCBs															
PCB Congener 077	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 081	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 105	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 114	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 118	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 123	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 126	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 156	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 157	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 167	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 169	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
PCB Congener 189	mg/kg		< 0.001	-	-	-	-	-	< 0.001	-	-	-	-		-
Total PCBs	mg/kg		< 0.012	-	-	-	-	-	< 0.012	-	-	-	-		-

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHR02 5.50-5.95 NAT	BHR03 3.00-3.45 NAT	BHR03 4.00-4.45 NAT	BHR04 4.00-4.45 NAT	BHR05 3.00-3.45 NAT	BHR05 4.50-4.95 NAT	BHS09 3.00-3.45 NAT	BHS09 5.00-5.50 NAT	BHS10 3.00-3.45 NAT	BHS11 4.50-5.00 NAT
Asbestos in Soil Screen / Identification Name	Type		-			-	-	-			-	-
Asbestos in Soil	Type	**NONE**	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification (Stage 2)	%		-			-	-	-			-	-
Asbestos Quantification Total	%		-			-	-	-			-	-
General Inorganics												
pH - Automated	pH Units	**<5.5 >9.5**	8.5	8.5	8.8	7.2	7.7	8.3	7.7	8.7	5.9	7.9
Total Cyanide	mg/kg	**168**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%		< 0.1	0.2	0.1	2.2	1.6	0.2	1.2	0.2	14	0.4
Total Phenols												
Total Phenols (monohydric)	mg/kg	**440**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Heavy Metals / Metalloids												
Antimony (aqua regia extractable)	mg/kg	**7350**	2.9	3.1	3.1	4.1	2.9	1.9	3.1	3.4	< 1.0	3.1
Arsenic (aqua regia extractable)	mg/kg	**635**	5.4	14	13	11	10	10	11	8.5	26	7.0
Beryllium (aqua regia extractable)	mg/kg	**11.7**	0.63	0.64	0.74	1.2	1.1	0.92	1.1	0.83	1.1	0.96
Boron (water soluble)	mg/kg	**236000**	0.8	0.5	0.3	2.2	2.2	0.6	1.0	0.3	5.4	0.4
Cadmium (aqua regia extractable)	mg/kg	**190**	< 0.2	< 0.2	< 0.2	0.2	< 0.2	< 0.2	0.3	0.3	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	**32.8**	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	**8570**	55	48	59	90	66	78	69	56	66	60
Copper (aqua regia extractable)	mg/kg	**68300**	44	41	42	74	46	73	73	48	76	37
Lead (aqua regia extractable)	mg/kg	**2300**	6.6	7.6	24	7.9	9.3	4.2	9.7	7.6	7.2	4.4
Mercury (aqua regia extractable)	mg/kg	**15.4**	< 0.3	< 0.3	0.6	0.9	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	**983**	44	41	50	74	53	60	63	44	59	45
Selenium (aqua regia extractable)	mg/kg	**12261**	< 1.0	< 1.0	< 1.0	2.0	1.8	< 1.0	2.0	< 1.0	2.3	< 1.0
Vanadium (aqua regia extractable)	mg/kg	**6360**	63	61	65	89	92	74	75	69	96	84
Zinc (aqua regia extractable)	mg/kg	**730000**	51	57	72	110	78	62	92	73	110	62
Monoaromatics												
Benzene	ug/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	**56294000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons												
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	**3190**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	**7780**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	**2000**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	**9690**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	**58800**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.5	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg		< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	15	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	**648000**	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	42	< 8.0	81	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	**648000**	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	50	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	49	< 10	99	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	100	< 10	99	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	**27**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	**56294**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	**3460**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	**16200**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	**36200**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	**26600**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	**28400**	< 10	< 10	< 10	< 10	< 10	< 10	65	< 10	31	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	**28400**	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	160	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	67	< 10	36	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	220	< 10	36	< 10

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHR02 5.50-5.95 NAT	BHR03 3.00-3.45 NAT	BHR03 4.00-4.45 NAT	BHR04 4.00-4.45 NAT	BHR05 3.00-3.45 NAT	BHR05 4.50-4.95 NAT	BHS09 3.00-3.45 NAT	BHS09 5.00-5.50 NAT	BHS10 3.00-3.45 NAT	BHS11 4.50-5.00 NAT
VOCs												
Chloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	**59.4**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	**99.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	**660000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	**2870**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	**1230**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	**18600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	**55600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	**108000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	**29900**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	**2020000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	**4220000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	**215000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	**30700**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	**102000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SVOCs												
Aniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	mg/kg	**440**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Chlorophenol	mg/kg	**3500**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	**299**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	**2020**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	**4220**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Hexachloroethane	mg/kg		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in Area A

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHR02 5.50-5.95 NAT	BHR03 3.00-3.45 NAT	BHR03 4.00-4.45 NAT	BHR04 4.00-4.45 NAT	BHR05 3.00-3.45 NAT	BHR05 4.50-4.95 NAT	BHS09 3.00-3.45 NAT	BHS09 5.00-5.50 NAT	BHS10 3.00-3.45 NAT	BHS11 4.50-5.00 NAT
Nitrobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Methylphenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isophorone	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Nitrophenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	**215**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg	**193**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	**3420**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloroaniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	**30.7**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	**3850**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	**83200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	**83700**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dinitrotoluene	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibenzofuran	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Diethyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Nitroaniline	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fluorene	mg/kg	**63000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Azobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	**104**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Phenanthrene	mg/kg	**21900**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	mg/kg	**523000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Carbazole	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dibutyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Anthraquinone	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Fluoranthene	mg/kg	**22600**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	mg/kg	**54200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Butyl benzyl phthalate	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	**167**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	mg/kg	**346**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	**44.3**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	**1170**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	**35.2**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	**501**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	**3.53**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	**3930**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PCBs												
PCB Congener 077	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 081	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 105	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 114	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 118	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 123	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 126	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 156	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 157	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 167	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 169	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
PCB Congener 189	mg/kg		-	< 0.001	< 0.001	-			< 0.001	< 0.001		
Total PCBs	mg/kg		-	< 0.012	< 0.012	-			< 0.012	< 0.012		

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in Area E

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHS02	BHS03	BHS05	BHS06	BHS07	BHS08
			2.00-2.45	2.80-3.00	1.80-2.00	1.80-2.00	2.60-2.80	2.00-2.45
			NAT	NAT	NAT	NAT	NAT	NAT
Asbestos in Soil Screen / Identification Name	Type		-	-	-	-	-	-
Asbestos in Soil	Type	**NONE**	-	-	-	-	-	-
Asbestos Quantification (Stage 2)	%		-	-	-	-	-	-
Asbestos Quantification Total	%		-	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	**<5.5 >9.5**	8.7	7.3	7.6	7.4	6.8	7.2
Total Cyanide	mg/kg	**168**	< 1	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%		< 0.1	5.4	0.3	3.9	6.6	3.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	**440**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	**7350**	< 1.0	< 1.0	< 1.0	2.5	3.5	3.5
Arsenic (aqua regia extractable)	mg/kg	**635**	14	16	9.3	19	28	13
Beryllium (aqua regia extractable)	mg/kg	**11.7**	0.74	0.98	0.71	1.7	0.91	1.4
Boron (water soluble)	mg/kg	**236000**	< 0.2	< 0.2	< 0.2	2.6	1.4	0.5
Cadmium (aqua regia extractable)	mg/kg	**190**	< 0.2	< 0.2	< 0.2	0.5	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	**32.8**	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	**8570**	61	76	57	100	75	94
Copper (aqua regia extractable)	mg/kg	**68300**	60	150	29	91	150	71
Lead (aqua regia extractable)	mg/kg	**2300**	5.4	7.6	8.3	8.2	7.9	8.5
Mercury (aqua regia extractable)	mg/kg	**15.4**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	**983**	55	47	55	65	51	60
Selenium (aqua regia extractable)	mg/kg	**12261**	< 1.0	< 1.0	< 1.0	< 1.0	3.2	2.7
Vanadium (aqua regia extractable)	mg/kg	**6360**	90	120	70	130	130	130
Zinc (aqua regia extractable)	mg/kg	**730000**	57	59	66	90	58	120
Monoaromatics								
Benzene	ug/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	**56294000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	**3190**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	**7780**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	**2000**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	**9690**	< 1.0	1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	**58800**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg		< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	**648000**	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	**648000**	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	**27**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	**56294**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	**3460**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	**16200**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	**36200**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	**26600**	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	**28400**	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	**28400**	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in Area E

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHS02 2.00-2.45 NAT	BHS03 2.80-3.00 NAT	BHS05 1.80-2.00 NAT	BHS06 1.80-2.00 NAT	BHS07 2.60-2.80 NAT	BHS08 2.00-2.45 NAT
VOCs								
Chloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	**59.4**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	**99.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	**660000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	**2870**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	**1230**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	**18600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	**55600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	**108000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	**29900**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	**2020000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	**4220000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	**215000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	**30700**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	**102000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SVOCs								
Aniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	mg/kg	**440**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Chlorophenol	mg/kg	**3500**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	**299**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	**2020**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	**4220**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Hexachloroethane	mg/kg		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in Area E

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	BHS02 2.00-2.45 NAT	BHS03 2.80-3.00 NAT	BHS05 1.80-2.00 NAT	BHS06 1.80-2.00 NAT	BHS07 2.60-2.80 NAT	BHS08 2.00-2.45 NAT
4-Methylphenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isophorone	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Nitrophenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	**215**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg	**193**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	**3420**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloroaniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	**30.7**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	**3850**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	**83200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	**83700**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dinitrotoluene	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibenzofuran	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Diethyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Nitroaniline	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fluorene	mg/kg	**63000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Azobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	**104**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Phenanthrene	mg/kg	**21900**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	mg/kg	**523000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Carbazole	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dibutyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Anthraquinone	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Fluoranthene	mg/kg	**22600**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	mg/kg	**54200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Butyl benzyl phthalate	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	**167**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	mg/kg	**346**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	**44.3**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	**1170**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	**35.2**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	**501**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	**3.53**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	**3930**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PCBs								
PCB Congener 077	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 081	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 105	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 114	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 118	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 123	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 126	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 156	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 157	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 167	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 169	mg/kg		-	-	< 0.001	< 0.001	-	-
PCB Congener 189	mg/kg		-	-	< 0.001	< 0.001	-	-
Total PCBs	mg/kg		-	-	< 0.012	< 0.012	-	-

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in are of proposed pipeline

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TPM01 2.00-2.10 NAT	TPM02 1.10-1.20 NAT	TPM06 1.00-1.10 NAT	TPM06 3.00-3.10 NAT	BHM01 0.70-0.90 NAT	BHM04 3.00-3.45 NAT	BHM05 2.80-3.20 NAT
Asbestos in Soil Screen / Identification Name	Type		-	-	-	-			
Asbestos in Soil	Type	**NONE**	-	-	-	-	-	-	
Asbestos Quantification (Stage 2)	%		-	-	-	-			
Asbestos Quantification Total	%		-	-	-	-			-
General Inorganics									
pH - Automated	pH Units	**<5.5 >9.5**	7.9	7.6	7.6	6.9	7.5	8.6	8.9
Total Cyanide	mg/kg	**168**	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%		< 0.1	< 0.1	0.9	2.5	0.3	0.1	< 0.1
Total Phenols									
Total Phenols (monohydric)	mg/kg	**440**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Heavy Metals / Metalloids									
Antimony (aqua regia extractable)	mg/kg	**7350**	2.7	3.8	3.2	3.0	4.1	4.6	< 1.0
Arsenic (aqua regia extractable)	mg/kg	**635**	7.3	4.8	12	7.8	10	2.5	3.3
Beryllium (aqua regia extractable)	mg/kg	**11.7**	0.49	0.66	1.1	0.82	0.92	0.77	< 0.06
Boron (water soluble)	mg/kg	**236000**	< 0.2	< 0.2	0.3	0.8	0.3	0.3	< 0.2
Cadmium (aqua regia extractable)	mg/kg	**190**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	**32.8**	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	**8570**	49	65	58	55	69	56	43
Copper (aqua regia extractable)	mg/kg	**68300**	41	41	53	54	41	52	45
Lead (aqua regia extractable)	mg/kg	**2300**	4.9	5.3	16	22	6.8	4.4	7.8
Mercury (aqua regia extractable)	mg/kg	**15.4**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	**983**	46	61	49	58	57	46	36
Selenium (aqua regia extractable)	mg/kg	**12261**	< 1.0	< 1.0	< 1.0	< 1.0	1.7	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	**6360**	61	70	89	63	93	58	52
Zinc (aqua regia extractable)	mg/kg	**730000**	47	62	79	92	74	44	57
Monoaromatics									
Benzene	ug/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	**56294000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons									
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	**3190**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	**7780**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	**2000**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	**9690**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	**58800**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg		< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	**648000**	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	**648000**	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	**27**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	**56294**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	**3460**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	**16200**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	**36200**	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	**26600**	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	**28400**	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	**28400**	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg		< 10	< 10	< 10	< 10	< 10	< 10	< 10

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in are of proposed pipeline

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TPM01 2.00-2.10 NAT	TPM02 1.10-1.20 NAT	TPM06 1.00-1.10 NAT	TPM06 3.00-3.10 NAT	BHM01 0.70-0.90 NAT	BHM04 3.00-3.45 NAT	BHM05 2.80-3.20 NAT
VOCs									
Chloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	**59.4**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	**99.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	**660000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	**27000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	**2870**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	**1230**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	**18600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	**55600**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	**108000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	**5706000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	**5923000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	**6603000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	**29900**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	**2020000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	**4220000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	**215000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	**30700**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	**102000**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SVOCs									
Aniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	mg/kg	**440**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Chlorophenol	mg/kg	**3500**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	**299**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	**2020**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	**4220**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Hexachloroethane	mg/kg		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Methylphenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isophorone	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

MVV Site Dundee

Risk to Human Health - Assessment of natural soils in are of proposed pipeline

Analytical Parameter (Soil Analysis)	Units	Assessment criteria	TPM01 2.00-2.10 NAT	TPM02 1.10-1.20 NAT	TPM06 1.00-1.10 NAT	TPM06 3.00-3.10 NAT	BHM01 0.70-0.90 NAT	BHM04 3.00-3.45 NAT	BHM05 2.80-3.20 NAT
2-Nitrophenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	**215**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg	**193**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	**3420**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloroaniline	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	**30.7**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	**3850**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	**83200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	**83700**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4-Dinitrotoluene	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibenzofuran	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Diethyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Nitroaniline	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fluorene	mg/kg	**63000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Azobenzene	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	**104**	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Phenanthrene	mg/kg	**21900**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	mg/kg	**523000**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Carbazole	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dibutyl phthalate	mg/kg		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Anthraquinone	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Fluoranthene	mg/kg	**22600**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	mg/kg	**54200**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Butyl benzyl phthalate	mg/kg		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	**167**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	mg/kg	**346**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	**44.3**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	**1170**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	**35.2**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	**501**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	**3.53**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	**3930**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Analytical Report Number: 16-26292
Project / Site name: 32229 - Dundee
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

"The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
621319	TP04	1.00-1.10	156	Loose fibres	**Chrysotile**	< 0.001	**< 0.001**
621323	TP06	0.20-0.30	130	Loose fibres	**Chrysotile**	< 0.001	**< 0.001**
621335	TPD02	1.00-1.10	171	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
623378	BHR02	2.00-2.45	129	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
626722	BHR01	0.90-1.00	136	Loose Fibres	**Chrysotile**	0.001	**0.001**
626724	BHR05	0.30-0.50	144	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
630767	BHS05	0.40-0.50	142	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

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The results included within the report are representative of the samples submitted for analysis.

Appendix C

Results of Leachate Testing on Soils

MVV Dundee - Assessment of leachate results

			AREA A - PROPOSED EfW CHP											AREA E - EXISTING DERL SITE				AREA OF PROPOSED PIPELINE			
Sample Reference			TP02	TP04	TP06	TP07	BHR01	BHR02	BHR03	BHR03	BHR05	BHS09	BHS10	BHS01	BHS03	BHS07	BHS08	BHM01	BHM04	TPM01A	TPM02
Depth (m)			1.00-1.10	1.00-1.10	0.20-0.80	0.60-0.80	0.90-1.00	2.00-2.45	2.00-2.45	0.50-0.60	0.30-0.50	1.20-1.65	0.50-0.60	0.30-0.50	1.80-2.00	1.60-1.80	1.20-1.65	0.30-0.40	0.50-0.60	0.20-0.30	0.50-0.60
Material origin			MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Analytical Parameter (Leachate Analysis)	**Units**	**Assessment criteria**																			
Speciated PAHs																					
Naphthalene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.34	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.67	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.43	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.18	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene *	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene *	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	**0.01**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene *	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene *	µg/l		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sum of 4 PAHs *		**0.1**	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Total PAH																					
Total EPA-16 PAHs	µg/l		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	1.6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Heavy Metals / Metalloids																					
Arsenic (dissolved)	µg/l	**10**	8.3	4.8	< 1.1	6.5	1.9	11	12	14	12	18	13	24	4.6	4.4	6.7	1.8	1.6	< 1.1	< 1.1
Cadmium (dissolved)	µg/l	**5**	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chromium (dissolved)	µg/l	**50**	0.9	0.9	1.0	1.8	0.5	0.7	1.9	1.2	2.0	2.3	1.9	3.8	5.7	5.4	5.8	8.0	5.4	2.9	0.8
Copper (dissolved)	µg/l	**1500**	26	7.9	11	23	6.2	12	< 0.7	7.9	18	17	21	7.4	23	22	20	4.5	6.4	12	3.0
Lead (dissolved)	µg/l	**10**	4.9	1.9	2.7	2.3	< 1.0	1.2	1.0	< 1.0	3.8	1.6	5.6	2.5	1.1	2.2	5.9	1.8	1.3	< 1.0	< 1.0
Mercury - CV-AFS	µg/l	**1**	0.011	< 0.007	0.026	0.011	< 0.007	< 0.007	0.008	< 0.007	0.012	< 0.007	0.035	0.012	0.013	0.011	0.014	0.012	< 0.007	0.013	< 0.007
Nickel (dissolved)	µg/l	**20**	4.2	2.0	3.2	5.5	1.9	1.8	3.6	3.3	2.7	3.5	2.5	2.6	4.3	4.2	3.9	4.8	4.2	2.3	2.4
Selenium (dissolved)	µg/l	**10**	< 4.0	24	< 4.0	5.1	< 4.0	16	< 4.0	< 4.0	< 4.0	19	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Zinc (dissolved)	µg/l	**11.9**	6.8	3.7	3.2	7.5	8.6	3.0	4.7	2.8	7.0	1.9	9.4	9.2	8.8	10	13	11	7.3	4.0	1.7

SEPA RPV (WAT-PS-10-01)
SEPA EQS FOR SURFACE WATER (WAT-SG-53)
EQS FOR ENGLAND & WALES FOR GW DRINKING WATER PROTECTION AREA

Appendix D

Results of Chemical Testing on Groundwater

MVV Site Dundee
Area A - Proposed EfW CHP - Results of Groundwater Analysis

				ROUND 1						ROUND 2		
Lab Sample Number				634858	635828	634859	634861	635829	634860	649557	649558	649559
Sample Reference				BHR01	BHR02	BHR03	BH04A	BHR05	BHS09	BHR03	BHR04	BHR05
Sample Number				1	1	1	1	1	1	1	1	1
Depth (m)				1.81	1.75	0.52	2.10	1.94	2.01	0.30	2.26	1.62
Date Sampled				26/09/2016	27/09/2016	26/09/2016	26/09/2016	27/09/2016	26/09/2016	26/10/2016	26/10/2016	26/10/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	1210	1235	1330
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**assessment criteria.**									
General Inorganics												
pH	pH Units	N/A	**<5.5 >9.5**	8.1	7.0	7.7	8.6	7.1	7.6	7.8	7.8	6.9
Total Cyanide (Low Level 1 µg/l)	µg/l	1	**50**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	5.0	2.0	13
Sulphate as SO_4	µg/l	45	**400000**	136000	216000	342000	48500	207000	246000	163000	30300	216000
Sulphate as SO_4	mg/l	0.045	**400**		220			210		160	30	220
Chloride	mg/l	0.15	**250**	140	220	590	20	480	240	70	64	550
Ammoniacal Nitrogen as N	µg/l	15	**500**	140	960	1700	72	1000	1300	2200	73	1500
Chemical Oxygen Demand (Total)	mg/l	2	**40**	550	6900	370	150	270	84	410	9.8	300
BOD (Biochemical Oxygen Demand)	mg/l	1	**7**	< 1.0	2.9	4.7	10	1.7	2.9	< 1.0	2.5	< 1.0
Hardness - Total	mgCaCO3/l	1	**-**	408	347	257	48.4	421	818	335	211	495
Total Phenols												
Total Phenols (monohydric)	µg/l	1	**7.7**	< 1.0	5.9	< 1.0	< 1.0	1.7	< 1.0	< 1.0	1.1	< 1.0
Speciated PAHs												
Naphthalene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene *	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene *	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	**0.01**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene *	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene *	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sum of 4 PAHs *	µg/l	0.01	**0.1**	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Total PAH												
Total EPA-16 PAHs	µg/l	0.16		< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
Heavy Metals / Metalloids												
Antimony (dissolved)	µg/l	0.4	**5**	0.5	1.1	1.5	2.0	0.7	< 0.4	1.4	< 0.4	< 0.4
Arsenic (dissolved)	µg/l	0.15	**10**	0.84	7.62	6.04	6.79	1.14	1.71	6.83	1.99	1.79
Beryllium (dissolved)	µg/l	0.1	**4**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	**1000**	100	100	320	56	160	79	80	360	180
Cadmium (dissolved)	µg/l	0.02	**5**	< 0.02	< 0.02	0.04	< 0.02	0.02	< 0.02	0.05	< 0.02	< 0.02
Calcium (dissolved)	mg/l	0.012		110	100	73	12	130	210	97	53	150
Chromium (hexavalent)	µg/l	5	**3.4**	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	**50**	0.2	0.6	0.8	0.9	0.4	0.3	1.0	< 0.2	1.6
Copper (dissolved)	µg/l	0.5	**1500**	< 0.5	3.5	4.5	< 0.5	5.7	< 0.5	16	< 0.5	6.8
Lead (dissolved)	µg/l	0.2	**10**	< 0.2	< 0.2	0.3	0.6	< 0.2	< 0.2	2.4	< 0.2	1.3
Magnesium (dissolved)	mg/l	0.005		34	21	18	4.4	25	74	23	19	28
Mercury (dissolved)	µg/l	0.05	**1**	0.22	0.24	0.33	0.42	0.22	0.30	0.08	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	**20**	0.8	2.0	7.6	< 0.5	6.3	5.0	8.2	< 0.5	4.9
Selenium (dissolved)	µg/l	0.6	**10**	< 0.6	1.0	1.3	14	< 0.6	< 0.6	1.6	< 0.6	1.9
Vanadium (dissolved)	µg/l	0.2	**60**	0.8	1.5	5.8	5.7	0.9	0.3	12	< 0.2	2.3
Zinc (dissolved)	µg/l	0.5	**11.9**	2.5	2.5	7.6	0.6	4.3	9.7	9.6	2.6	5.3
Monoaromatics												
Benzene	µg/l	1	**1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	**700**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	**300**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	**500**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	**500**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	**-**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons												
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	**15000**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	**15000**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	**300**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	**300**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	**300**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	**300**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	10	**10**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C7 - C8	µg/l	10	**200**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C8 - C10	µg/l	10	**200**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C10 - C12	µg/l	10	**100**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	**100**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	**90**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	**90**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

MVV Site Dundee
Area A - Proposed EfW CHP - Results of Groundwater Analysis

				ROUND 1						ROUND 2		
Lab Sample Number				634858	635828	634859	634861	635829	634860	649557	649558	649559
Sample Reference				BHR01	BHR02	BHR03	BH04A	BHR05	BHS09	BHR03	BHR04	BHR05
Sample Number				1	1	1	1	1	1	1	1	1
Depth (m)				1.81	1.75	0.52	2.10	1.94	2.01	0.30	2.26	1.62
Date Sampled				26/09/2016	27/09/2016	26/09/2016	26/09/2016	27/09/2016	26/09/2016	26/10/2016	26/10/2016	26/10/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	1210	1235	1330
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**assessment criteria.**									
VOCs												
Chloromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	0.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	75	< 1.0	< 1.0	< 1.0	11.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	300	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/l	1	500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/l	1	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/l	1	500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l	1	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/l	1	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SVOCs												
Aniline	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenol	µg/l	0.05	7.7	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	600	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	80	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachloroethane	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Isophorone	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	70	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Naphthalene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloroaniline	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobutadiene	µg/l	0.05	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

MVV Site Dundee
Area A - Proposed EfW CHP - Results of Groundwater Analysis

				ROUND 1						ROUND 2		
Lab Sample Number				634858	635828	634859	634861	635829	634860	649557	649558	649559
Sample Reference				BHR01	BHR02	BHR03	BH04A	BHR05	BHS09	BHR03	BHR04	BHR05
Sample Number				1	1	1	1	1	1	1	1	1
Depth (m)				1.81	1.75	0.52	2.10	1.94	2.01	0.30	2.26	1.62
Date Sampled				26/09/2016	27/09/2016	26/09/2016	26/09/2016	27/09/2016	26/09/2016	26/10/2016	26/10/2016	26/10/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	1210	1235	1330
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**assessment criteria.**									
2,4,5-Trichlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylnaphthalene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Chloronaphthalene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dimethylphthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenzofuran	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Diethyl phthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Nitroaniline	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Azobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	µg/l	0.05	**0.1**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbazole	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibutyl phthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthraquinone	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Butyl benzyl phthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	**0.01**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCBs by GC-ECD - WHO 12												
PCB Congener 105	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 114	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 118	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 123	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 126	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 156	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 157	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 167	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 169	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 189	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Total PCBs	ug/l	0.3		< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300

SEPA RPV (WAT-PS-10-01)
SEPA EQS FOR SURFACE WATER (WAT-SG-53)
EQS FOR ENGLAND & WALES FOR GW PROTECTION AREA
WHO DRINKING WATER STANDARD FOR PETROLEUM PRODUCT

MVV Site Dundee
Remainder of Site - Results of Groundwater Analysis

				AREA D		AREA E									PROPOSED PIPELINE						
				ROUND 1		ROUND 2	ROUND 1							ROUND 2					ROUND 1				ROUND 2		
Lab Sample Number				635835	635836	649563	635830	635831	635832	635833	636376	636378	636377	649560	649561	649562	636379	636380	636381	637131	649564	649565	649566
Sample Reference				BHS12	BHS13	BHS12	BHS01	BHS02	BHS03	BHS04	BHS08	BH04	BH05	BHS01	BHS03	BHS08	BHM01	BHM03	BHM04	BHM05	BHM01	BHM03	BHM05
Sample Number				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Depth (m)				1.03	1.07	1.05	2.51	2.58	2.39	2.53	2.12	1.75	1.78	2.40	2.37	1.81	1.18	1.84	2.64	2.99	1.21	1.29	2.71
Date Sampled				27/09/2016	27/09/2016	26/10/2016	27/09/2016	27/09/2016	27/09/2016	27/09/2016	28/09/2016	28/09/2016	28/09/2016	26/10/2016	26/10/2016	26/10/2016	28/09/2016	28/09/2016	28/09/2016	30/09/2016	26/10/2016	26/10/2016	26/10/2016
Time Taken				None Supplied	None Supplied	1000	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	1000	1040	1110	None Supplied	None Supplied	None Supplied	None Supplied	1430	1520	1600
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**assessment criteria.**																				
General Inorganics																							
pH	pH Units	N/A	**<5.5 >9.5**	6.9	6.9	7.0	7.2	7.3	10.8	7.4	7.8	7.2	7.9	7.4	7.9	8.2	8.1	7.8	7.8	7.8	8.0	7.5	7.5
Total Cyanide (Low Level 1 µg/l)	µg/l	1	**50**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.5	5.0	1.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sulphate as SO_4	µg/l	45	**400000**	139000	58000	156000	113000	57700	166000	103000	15500	30800	20900	109000	156000	18100	31600	65800	64600	21200	32900	18000	16300
Sulphate as SO_4	mg/l	0.045	**400**	140	58	160	110	58	170	100	15	31	21	110	160	18	32	66	65		33	18	16
Chloride	mg/l	0.15	**250**	64	40	54	110	130	86	100	68	93	27	120	500	44	18	42	58	81	43	34	69
Ammoniacal Nitrogen as N	µg/l	15	**500**	220	310	120	< 15	< 15	1100	< 15	200	1400	< 15	150	270	< 15	< 15	100	< 15	160	37	60	18
Chemical Oxygen Demand (Total)	mg/l	2	**40**	6500	2500	1300	610	300	18000	360	980	4000	19	620	310	160	780	11000	2000	520	250	2400	330
BOD (Biochemical Oxygen Demand)	mg/l	1	**7**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4.1	< 1.0	1.8	< 1.0	1.0	< 1.0	2.3	1.1	< 1.0	22	61	1.4	< 1.0	< 1.0	2.1
Hardness - Total	mgCaCO3/l	1	**-**	330	268	355	243	112	190	223	65.4	333	275	201	332	54.3	90.5	144	111	171	145	300	286
Total Phenols																							
Total Phenols (monohydric)	µg/l	1	**7.7**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs																							
Naphthalene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene *	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene *	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	**0.01**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene *	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene *	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sum of 4 PAHs *	µg/l	0.01	**0.1**	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Total PAH																							
Total EPA-16 PAHs	µg/l	0.16		< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
Heavy Metals / Metalloids																							
Antimony (dissolved)	µg/l	0.4	**5**	0.5	< 0.4	< 0.4	< 0.4	0.5	3.0	0.6	1.2	0.7	< 0.4	< 0.4	< 0.4	2.5	1.0	1.0	1.8	< 0.4	< 0.4	< 0.4	< 0.4
Arsenic (dissolved)	µg/l	0.15	**10**	1.07	1.04	1.43	< 0.15	0.25	6.15	0.50	4.69	6.02	0.43	0.41	1.85	27.2	1.23	0.85	1.59	0.81	1.70	0.85	0.63
Beryllium (dissolved)	µg/l	0.1	**4**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1.4	< 0.1	1.7	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	**1000**	110	85	120	96	74	52	94	22	71	56	93	83	30	39	51	77	43	55	55	55
Cadmium (dissolved)	µg/l	0.02	**5**	0.02	< 0.02	< 0.02	0.03	0.03	< 0.02	0.03	0.04	< 0.02	< 0.02	< 0.02	0.05	< 0.02	0.03	0.05	0.03	0.02	< 0.02	< 0.02	0.08
Calcium (dissolved)	mg/l	0.012		85	67	87	61	27	76	55	20	93	76	42	93	18	25	36	34	48	35	76	77
Chromium (hexavalent)	µg/l	5	**3.4**	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	**50**	< 0.2	0.2	< 0.2	0.3	0.4	7.1	0.4	0.8	0.2	< 0.2	0.8	0.6	0.9	0.8	0.6	2.1	1.2	< 0.2	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	**1500**	0.5	< 0.5	2.0	2.3	3.0	6.6	3.6	2.2	< 0.5	2.1	5.0	3.5	4.6	0.6	1.8	3.3	2.0	0.9	2.2	1.7
Lead (dissolved)	µg/l	0.2	**10**	0.2	< 0.2	< 0.2	< 0.2	0.3	< 0.2	< 0.2	1.9	< 0.2	< 0.2	< 0.2	< 0.2	1.0	< 0.2	< 0.2	0.3	0.3	< 0.2	< 0.2	< 0.2
Magnesium (dissolved)	mg/l	0.005		29	25	33	22	11	< 0.005	21	3.6	24	21	23	24	2.0	6.9	13	6.4	13	14	27	22
Mercury (dissolved)	µg/l	0.05	**1**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.15	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.27	1.03	0.58	0.14	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	**20**	2.2	1.2	0.9	2.4	1.3	17	2.8	5.4	4.3	2.8	1.2	1.5	2.0	1.2	3.1	6.7	2.4	< 0.5	2.4	1.3
Selenium (dissolved)	µg/l	0.6	**10**	< 0.6	< 0.6	1.4	0.7	1.6	3.2	< 0.6	< 0.6	< 0.6	1.0	0.9	2.6	2.1	1.5	8.9	6.4	7.7	< 0.6	0.8	< 0.6
Vanadium (dissolved)	µg/l	0.2	**60**	< 0.2	1.7	1.6	0.5	0.5	200	1.0	29	1.4	0.3	0.6	11	17	1.1	1.2	1.7	2.5	0.7	0.7	1.1
Zinc (dissolved)	µg/l	0.5	**11.9**	3.3	1.7	1.1	5.6	1.0	4.2	4.8	7.2	5.9	6.5	4.4	2.2	4.4	1.4	8.2	3.2	3.3	2.1	1.6	1.0
Monoaromatics																							
Benzene	µg/l	1	**1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	**700**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	**300**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	**500**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	**500**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	**-**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons																							
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	**15000**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	**15000**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	**300**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	**300**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	**300**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	**300**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	10	**10**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C7 - C8	µg/l	10	**200**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C8 - C10	µg/l	10	**200**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C10 - C12	µg/l	10	**100**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	**100**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	**90**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	**90**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
VOCs																							
Chloromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	**100**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	**0.5**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	**75**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.1	4.1	4.7	< 1.0	< 1.0	< 1.0	< 1.0

MVV Site Dundee

Remainder of Site - Results of Groundwater Analysis

				AREA D			AREA E										PROPOSED PIPELINE						
				ROUND 1		ROUND 2	ROUND 1							ROUND 2			ROUND 1				ROUND 2		
Lab Sample Number				635835	635836	649563	635830	635831	635832	635833	636376	636378	636377	649560	649561	649562	636379	636380	636381	637131	649564	649565	649566
Sample Reference				BHS12	BHS13	BHS12	BHS01	BHS02	BHS03	BHS04	BHS08	BH04	BH05	BHS01	BHS03	BHS08	BHM01	BHM03	BHM04	BHM05	BHM01	BHM03	BHM05
Sample Number				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Depth (m)				1.03	1.07	1.05	2.51	2.58	2.39	2.53	2.12	1.75	1.78	2.40	2.37	1.81	1.18	1.84	2.64	2.99	1.21	1.29	2.71
Date Sampled				27/09/2016	27/09/2016	26/10/2016	27/09/2016	27/09/2016	27/09/2016	27/09/2016	28/09/2016	28/09/2016	28/09/2016	26/10/2016	26/10/2016	26/10/2016	28/09/2016	28/09/2016	28/09/2016	30/09/2016	26/10/2016	26/10/2016	26/10/2016
Time Taken				None Supplied	None Supplied	1000	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	1000	1040	1110	None Supplied	None Supplied	None Supplied	None Supplied	1430	1520	1600
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**assessment criteria.**																				
1,1,1-Trichloroethane	µg/l	1	200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	300	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/l	1	500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/l	1	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/l	1	500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l	1	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/l	1	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SVOCs																							
Aniline	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenol	µg/l	0.05	7.7	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	600	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	80	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachloroethane	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Isophorone	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	70	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Naphthalene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloroaniline	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobutadiene	µg/l	0.05	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylnaphthalene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Chloronaphthalene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dimethylphthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenzofuran	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Diethyl phthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Nitroaniline	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Azobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	µg/l	0.05	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbazole	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibutyl phthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthraquinone	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Butyl benzyl phthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

MVV Site Dundee
Remainder of Site - Results of Groundwater Analysis

				AREA D			AREA E										PROPOSED PIPELINE						
				ROUND 1		ROUND 2	ROUND 1							ROUND 2			ROUND 1				ROUND 2		
Lab Sample Number				635835	635836	649563	635830	635831	635832	635833	636376	636378	636377	649560	649561	649562	636379	636380	636381	637131	649564	649565	649566
Sample Reference				BHS12	BHS13	BHS12	BHS01	BHS02	BHS03	BHS04	BHS08	BH04	BH05	BHS01	BHS03	BHS08	BHM01	BHM03	BHM04	BHM05	BHM01	BHM03	BHM05
Sample Number				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Depth (m)				1.03	1.07	1.05	2.51	2.58	2.39	2.53	2.12	1.75	1.78	2.40	2.37	1.81	1.18	1.84	2.64	2.99	1.21	1.29	2.71
Date Sampled				27/09/2016	27/09/2016	26/10/2016	27/09/2016	27/09/2016	27/09/2016	27/09/2016	28/09/2016	28/09/2016	28/09/2016	26/10/2016	26/10/2016	26/10/2016	28/09/2016	28/09/2016	28/09/2016	30/09/2016	26/10/2016	26/10/2016	26/10/2016
Time Taken				None Supplied	None Supplied	1000	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	1000	1040	1110	None Supplied	None Supplied	None Supplied	None Supplied	1430	1520	1600
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**assessment criteria.**																				
PCBs by GC-ECD - WHO 12																							
PCB Congener 105	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 114	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 118	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 123	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 126	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 156	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 157	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 167	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 169	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
PCB Congener 189	ug/l	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Total PCBs	ug/l	0.3		< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300	< 0.300

SEPA RPV (WAT-PS-10-01)
SEPA EQS FOR SURFACE WATER (WAT-SG-53)
EQS FOR ENGLAND & WALES FOR GW PROTECTION AREA
WHO DRINKING WATER STANDARD FOR PETROLEUM PRODUCT

Appendix E

Results of Chemical Testing on Surface Water

MVV Site Dundee
Assessment of Surface Water Results

Lab Sample Number				656326	656327	656328
Sample Reference				SW1	SW2	SW3
Sample Number				1	1	1
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				09/11/2016	09/11/2016	09/11/2016
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Assessment Criteria**			
General Inorganics						
pH	pH Units	N/A	**<5.5 >9.5**	8.1	8.1	8.1
Total Cyanide (Low Level 1 µg/l)	µg/l	1	**1**	< 1.0	< 1.0	< 1.0
Sulphate as SO_4	µg/l	45	**400000**	17100	17500	17400
Sulphate as SO_4	mg/l	0.045	**400**	17	17	17
Chloride	mg/l	0.15	**250**	150	150	140
Ammoniacal Nitrogen as N	µg/l	15	**500**	44	140	32
Chemical Oxygen Demand (Total)	mg/l	2	**40**	11	8.4	14
BOD (Biochemical Oxygen Demand)	mg/l	1	**7**	1.5	1.7	1.6
Hardness - Total	mgCaCO3/l	1	**-**	120	117	122
Total Phenols						
Total Phenols (monohydric)	µg/l	1	**7.7**	4.3	3.1	2.4
Speciated PAHs						
Naphthalene	µg/l	0.01	**2**	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	**0.1**	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	**0.0063**	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	**0.00017**	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	**-**	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	-	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	-	< 0.01	< 0.01	< 0.01
Total PAH						
Total EPA-16 PAHs	µg/l	0.16	-	< 0.16	< 0.16	< 0.16
Heavy Metals / Metalloids						
Antimony (dissolved)	µg/l	0.4	**5**	0.8	0.8	0.8
Arsenic (dissolved)	µg/l	0.15	**50**	0.54	0.49	0.59
Beryllium (dissolved)	µg/l	0.1	**4**	< 0.1	0.7	0.7
Boron (dissolved)	µg/l	10	**2000**	36	36	36
Cadmium (dissolved)	µg/l	0.02	**0.08**	< 0.02	< 0.02	< 0.02
Calcium (dissolved)	mg/l	0.012	**-**	31	30	32
Chromium (hexavalent)	µg/l	5	**3.4**	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	**4.7**	0.5	0.4	0.5
Copper (dissolved)	µg/l	0.5	**1**	14	11	11
Lead (dissolved)	µg/l	0.2	**1.2**	< 0.2	< 0.2	< 0.2
Magnesium (dissolved)	mg/l	0.005	**-**	10	10	10
Mercury (dissolved)	µg/l	0.05	**0.07**	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	**4**	0.9	0.7	1.0
Selenium (dissolved)	µg/l	0.6	**10**	< 0.6	< 0.6	< 0.6
Vanadium (dissolved)	µg/l	0.2	**20**	0.7	0.8	0.8
Zinc (dissolved)	µg/l	0.5	**11.9**	2.9	2.7	2.4
Monoaromatics						
Benzene	µg/l	1	**10**	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	**74**	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	**20**	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	**30**	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	**30**	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	**-**	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons						
TPH-CWG - Aliphatic >C5 - C6	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aromatic >C7 - C8	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aromatic >C8 - C10	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aromatic >C10 - C12	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	10	< 10	< 10	< 10

MVV Site Dundee
Assessment of Surface Water Results

Lab Sample Number				656326	656327	656328
Sample Reference				SW1	SW2	SW3
Sample Number				1	1	1
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				09/11/2016	09/11/2016	09/11/2016
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Assessment Criteria**			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	10	< 10	< 10	< 10
VOCs						
Chloromethane	µg/l	1		< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1		< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1		< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1		< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1		< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1		< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1		< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/l	1		< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1		< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	**2.5**	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	**100**	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/l	1	**10**	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1		< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	**10**	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/l	1		< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/l	1		< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1		< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1		< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1		< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1		< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1		< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	**74**	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/l	1	**400**	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1		< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1		< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1		< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1		< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1		< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	**20**	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/l	1	**30**	< 1.0	< 1.0	< 1.0
Styrene	µg/l	1		< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1		< 1.0	< 1.0	< 1.0
o-Xylene	µg/l	1	**30**	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1		< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0
Bromobenzene	µg/l	1		< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1		< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1		< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/l	1		< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1		< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1		< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	**0.6**	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1		< 1.0	< 1.0	< 1.0
SVOCs						
Aniline	µg/l	0.05		< 0.05	< 0.05	< 0.05
Phenol	µg/l	0.05	**7.7**	< 0.05	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05		< 0.05	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05		< 0.05	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05
Hexachloroethane	µg/l	0.05		< 0.05	< 0.05	< 0.05
Nitrobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05
Isophorone	µg/l	0.05		< 0.05	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05		< 0.05	< 0.05	< 0.05

MVV Site Dundee
Assessment of Surface Water Results

Lab Sample Number				656326	656327	656328
Sample Reference				SW1	SW2	SW3
Sample Number				1	1	1
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				09/11/2016	09/11/2016	09/11/2016
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Assessment Criteria**			
1,2,4-Trichlorobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05
Naphthalene	µg/l	0.01		< 0.01	< 0.01	< 0.01
2,4-Dichlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05
4-Chloroaniline	µg/l	0.05		< 0.05	< 0.05	< 0.05
Hexachlorobutadiene	µg/l	0.05		< 0.05	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05		< 0.05	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05		< 0.05	< 0.05	< 0.05
2-Methylnaphthalene	µg/l	0.05		< 0.05	< 0.05	< 0.05
2-Chloronaphthalene	µg/l	0.05		< 0.05	< 0.05	< 0.05
Dimethylphthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l	0.05		< 0.05	< 0.05	< 0.05
Acenaphthylene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01		< 0.01	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l	0.05		< 0.05	< 0.05	< 0.05
Dibenzofuran	µg/l	0.05		< 0.05	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05		< 0.05	< 0.05	< 0.05
Diethyl phthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05
4-Nitroaniline	µg/l	0.05		< 0.05	< 0.05	< 0.05
Fluorene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Azobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l	0.05		< 0.05	< 0.05	< 0.05
Hexachlorobenzene	µg/l	0.05		< 0.05	< 0.05	< 0.05
Phenanthrene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Carbazole	µg/l	0.05		< 0.05	< 0.05	< 0.05
Dibutyl phthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05
Anthraquinone	µg/l	0.05		< 0.05	< 0.05	< 0.05
Fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Butyl benzyl phthalate	µg/l	0.05		< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01		< 0.01	< 0.01	< 0.01
PCBs by GC-ECD - WHO 12						
PCB Congener 77	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 81	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 105	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 114	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 118	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 123	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 126	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 156	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 157	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 167	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 169	ug/l	0.02		< 0.020	< 0.020	< 0.020
PCB Congener 189	ug/l	0.02		< 0.020	< 0.020	< 0.020
Total PCBs	ug/l	0.3		< 0.300	< 0.300	< 0.300

SEPA EQS FOR SURFACE WATER (WAT-SG-53)
SEPA GROUNDWATER RPV (WAT-PS-10-01)