Imported Fill
Validation Report
Proposed Residential Development
Herbert Road
Newport

Prepared for:
Keepmoat

December 2016

Report No. 12032/VR1-V2



terrafirma

REPORT TITLE	**:**	**Imported Fill Validation Report:** **Herbert Road, Newport**
REPORT STATUS	**:**	**Final**
JOB NUMBER	**:**	**12032/VR1-V2**
DATE	**:**	**December 2016**
PREPARED BY	**:**	R. Howells. …….. **(Mrs R. Howells)**
REVIEWED BY	**:**	M. Lake …….. **(Mr M. Lake)**
APPROVED BY	**:**	Guy Lake …….. **(Dr G. C. Lake)**

Executive Summary

In order to comply with current Government directives and the Flood Consequence Assessment (FCA) approved by NRW the site is to be raised from its original level to an average formation level of 8.80m AOD.

Riversee Limited has to date completed partial fill of the site. This has been achieved by importation of soils from various sources.

All imported materials have been chemically screened and confirmed suitable use in accordance with Terra Firma Remediation Strategy, or in agreement with Newport City Council and National Resources Wales.

In-situ geotechnical testing has confirmed the effectiveness of the compaction process.

In-situ monitoring of settlement with in-situ piezometers and settlement pins is on-going. Assessment of the piezometer results in June 2016 confirmed that primary settlement was not complete since pore water pressure continued to fall and that dissipation of pore water pressure appears faster in the peat layers than in the clay. Piezometer 1 set within peat took roughly half the time for peak pore water pressure to dissipate to 40% than Piezometer 3 set within clay. Measured settlement to date (June 2016) recorded settlement of up to 28mm since the commencement of the earthworks.

TABLE OF CONTENTS

Section 1 Introduction

1.1 General
1.2 Limitations and Exceptions

Section 2 Site Summary

2.1 Geo-environmental and Geotechnical Site Investigation
2.1.1 Ground Conditions
2.1.2 Foundation Solution
2.1.3 Contamination and Human Health Risk Assessment
2.1.4 Environmental Risk Assessment
2.2 Remediation Strategy
2.3 Earthworks

Section 3 Chemical Validation of Imported Engineered Fill

Section 4 Human Health Risk Assessment

Section 5 Verification of Fill Compaction

Section 6 Settlement Monitoring

Section 7 Groundwater and Reen Monitoring

Section 8 Engineering Recommendations

8.1 Foundation and Floor Slab Solution
8.2 Protection of Buried Concrete
8.3 Compaction of Imported Fill

Tables

Table 3.1 Summary of Imported Materials
Table 3.2 Summary of Correspondence
Table 5.1 Summary of In-situ Geotechnical Results
Table 6.1 Installation details of Piezometers
Table 6.2 Tidal Effect on Piezometers
Table 6.3 Summary of Piezometer Monitoring to Date14/7/15 to 27/5/16
Table 6.4 Summary of Survey Data
Table 6.5 Summary of Predicted Settlements

Graphs

Graph 6.1 Piezometer Monitoring Results
Graph 6.2 Dissipation of Peak Pore Water Pressure
Graph 6.3 Settlement Monitoring Pin Results
Graph 6.4 Settlement at Monitoring Pins P2A and P3B
Graph 6.5 Settlement at Monitoring Pins
Graph 6.6 2 Week Adjustment fit of Logarithmic Settlement Curve Due to Earthworks Delay

TABLE OF CONTENTS (Continued)

Figures

Figure 6.1 Piezometer (P1 - P6) and Settlement Pin (SP1 - SP8) Locations
Figure 7.1 Water Monitoring Well Locations

Annexes

Annex A Geotechnical and Geo-Environmental Report
Annex B Remediation Strategy
Annex C Upper Half of Riversee Limited Stockpile DETS test certificates 27313-1 & 27519-2
Annex D Lower Half of Riversee Limited Stockpile DETS test certificates 40034-2 & 40314
Annex E Citivision Soils DETS test certificates 47308-1 & 46635
Annex F Soils Sourced From North of Drainage Reen DETS test certificate 77110
Annex G Soil and Leachate Test Results Chemical Summary Tables
Annex H Green Lane and Hawes Lane Soils – Risk Assessment Report
Annex I Copies of Correspondence
Annex J Compaction Specification Reports
Annex K Geotechnical Test Results Certificates
Annex L Groundwater Monitoring Letter 25
Annex M NRW Email Response to Letter 25

SECTION 1 Introduction

1.1 General

In order to comply with current Government directives and the Flood Consequence Assessment (FCA) approved by NRW the site is to be raised from its original level to an average formation level of 8.80m AOD.

Riversee Limited has to date completed partial fill of the site. This has been achieved by importation of soils from various sources.

The following sections provide a summary of the site, detail both chemical and geotechnical validation of the imported fill, and present the findings of settlement monitoring to date.

1.2 Limitations and Exceptions

The Imported Fill Validation Report has been prepared for Keepmoat. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The report represents the findings and opinions of experienced geo-technical and geo-environmental consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may also be required.

SECTION 2 Site Summary

2.1 Geotechnical and Geo-environmental Site Investigation

Investigation of the site was previously undertaken by Terra Firma (Wales) Limited. The details of the investigation were reported on in March 2013 (Geo-environmental and Geo-technical Report No. 12032). A copy of this report is provided in **Annex A**.

The site investigation was carried out between the 31st of October and the 8th of November 2012 comprising 19 trial pits and six cable percussive boreholes and three mini percussive boreholes.

In March 2014 additional testing of groundwater was performed.

2.1.1 Ground Conditions

The ground conditions encountered beneath the site can in general be summarised as made ground to between 0.2m ad 3.3m depth, underlain by soft grey and brown clay with bands of peat and intermittent sand and gravel deposits. Below 5.9m/10.3m depth firm becoming very soft red brown gravelly clay prevails, grading in to red mudstone between 10m to 12.7m depth.

2.1.2 Foundation Solution

Construction of shallow traditional foundations upon un-compacted made ground over soft clay bands beneath the site would lead to high total and differential settlements.

Precast concrete driven piles founded within the underlying very weak red brown and grey mudstone with a suspended floor slab were therefore recommended.

2.1.3 Contamination and Human Health Risk Assessment

During the intrusive investigation, small disturbed soil samples were collected for contamination screening from trial pits (TP). A number of contaminants of concern were identified when comparing results to current residential (not including plant uptake) threshold levels, as summarised below:

Table 2.2 Summary of Contaminants of Concern in Soil

Hole and depth (m bgl)	Chemical	Guideline (mg/kg)	Exceedance (mg/kg)
TP5 1.3m	Arsenic	32	40
TP2 0.90m	Cyanide	8	10
TP8 0.50m	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene	11 2.7 3.3 0.28	13 11 9 1.6
TP6 1.8m TP7 0.20m	Chrysotile – Loose Bundles	-	-
TP13 0.60m	PCB 2,4,4'-Trichlorobiphenyl 2,2',5,5'-Tetrachlorobiphenyl	0.08 0.08 0.08	0.16 0.12 0.05

2.1.3 Contamination and Human Health Risk Assessment (Continued)

In the human health risk assessment construction workers and future site residents were considered as potential receptors to contamination in site soils.

It was concluded that future site users will be protected by the thick layer of fill to be imported and that construction workers could be protected by good site management, COSHH, good standards of hygiene and appropriate health & safety on site, with personal protection equipment (PPE) and dust suppression where appropriate.

Upon development all garden and landscaped areas will be finished with a minimum of 600mm of clean imported subsoil and topsoil.

Comparison of in-situ gas monitoring results with CIRIA report C665 confirmed that gas protection measures will be required. It was concluded that gas protection to a 'gas characteristic 2' level may be adequate. However, further on-site gas monitoring from from flux boxes is to be undertaken during on completion of the earthworks to confirm that this level of protection will be suitable.

Basic radon protection measures should be incorporated into all new buildings on site. The radon/gas barrier should also be effective as a barrier to PCB vapours.

Prior to the placement of water supply pipes an assessment should be made, by the water provider, of soil along the route of the pipe with reference made to the material selection criteria quoted in UKWIR Report Ref No 10/WM/03/21 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'.

2.1.4 Environmental Risk Assessment

Groundwater wells were installed and groundwater samples were also retrieved for testing. Samples from the drainage reen were taken and analysed in June 2013. Petroleum hydrocarbons, zinc and fluoranthene were found as contaminants in groundwater and the reen. Two rounds of groundwater testing in March 2014 identified only a single exceedence of zinc, in one location.

Monitoring of groundwater level in boreholes in January 2014 over a tidal cycle confirmed that there was no tidal influence on groundwater in the underlying sands and gravel and no hydraulic continuity between groundwater and the River Usk. The River Usk and hydrological environment are not therefore considered to be at risk.

2.2 Remediation Strategy

Following the Geotechnical and Geo-environmental Site Investigation a Remediation Strategy Report was prepared in December 2013. This has been updated several times, reflecting the proposed works for site.

A copy of the August 2015 Remediation Strategy Report is provided in **Annex B**.

In general, the following remedial measures proposed to ensure no risks to human health and the environment were:

1. Raising the site above the flood plain with imported engineered fill. All imported materials to date have been validated as suitable for use. All further imported fill will similarly be sampled, tested and validated as required.

2. Upon completion of the development placement of 600mm capping of clean soil (subsoil and topsoil) in garden and landscaped areas.

3. Installation as a minimum a 2000 gauge membrane suitable for protection against ground gas, radon gas and PCB vapours in all new buildings. Passive under-floor venting and taping and sealing of all joints will also be required. Dependant on further on-site flux box gas monitoring more robust gas protection measures may be required.

4. Sampling and analysis of groundwater prior to and following initial fill works.

5. New water supply pipes to be chosen in accordance with UKWIR Report Ref No 10/WM/03/21 ‘Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites’.

2.3 Earthworks

To date the site levels have been part-raised in accordance with the Remediation Strategy.

The following sections detail validation works completed on the imported engineered fill.

SECTION 3 Chemical Validation Imported Engineering Fill

A summary of the materials imported to date is provided in **Table 3.1** below.

Table 3.1 Summary of Imported Materials

Soil Source	Estimated Volume Imported (m^3)	Date Imported on to Site	Soil Validation Test Results
Upper Half of Riversee Limited Stockpile (Adjacent Herbert Road Site)	14,000	Small portion imported and placed in south of site prior to July 2015 Remainder July 2015	DETS test certificates 27313-1 & 27519-2 **Annex C**
Lower Half of Riversee Limited Stockpile (Adjacent Herbert Road Site)	9000	July 2015	DETS test certificates 40034-2 & 40314 **Annex D**
Taylor Wimpey Citivision Site	1000	August 2015	DETS test certificate 47308-1 **Annex E**
Taylor Wimpey Citivision Site	500	October 2015	DETS test certificate 46635 **Annex F**
Soils taken from area of site north of the drainage reen	500	October 2015	DETS test certificate 77110 **Annex G**
Soils sourced from Green Lane and Hawes Lane, Wentloog	15,000	Part imported November & December 2016 Remainder to be imported in 2017	Contained within soils Risk Assessment Report **Annex H**

All soils were tested for a range of substances and compared to regulatory soil and leachate guidelines values in accordance with Terra Firma Remediation Strategy. The soil test certificates are appended, as detailed in **Table 3.1**.

The Riversee Limited stockpile was sampled and tested in two halves. Each half was tested prior to import.

Other soil sources were sampled and tested once imported, except the Green Lane and Hawes Lane soils which were sampled at source and prior to import whilst stockpiled on land adjacent to site.

The soil and leachate test results (except Green Lane and Hawes Lane soils) are summarised in table format, please refer to **Annex E**. On occasion some soil samples exhibited exceedences of chemicals above their respective soil or water threshold level were identified. Newport City Council Environmental Protection officer and the NRW were contacted and acceptance of the soils sought in these instances.

Green Lane and Hawes Lane soil results were subject to a site specific risk assessment as requested by NRW, see **Annex H**.

Chemical Validation Imported Engineering Fill (Continued)

Table 3.2 below and **Annex I** detail correspondence between Terra Firma, the NRW and Newport Council during fill works.

Table 3.2 Summary of Correspondence

From	To	Format	Date	Subject	Annex I Ref
TFW	Riversee Limited	letter	22.06.2015	Chemical summary of soils from upper part of Riversee stockpile. Concludes soils should be acceptable provided appropriate bespoke permit granted from the NRW to allow asbestos	1
TFW	Newport Council Planning	Email	22.06.2015	Sent copy of letter on upper part of stockpile (as above) for approval	2
TFW	Riversee Ltd Copied to NRW and Newport Council Pollution Control	letter	06.08.2015	Summary of chemistry of lower part of Riversee stockpile and updated Remediation Strategy. **Riversee Limited stockpile material permitted for use on site. Remediation Strategy updated to include remedial measures required to protect against asbestos in fill material as requested by Newport Council Contaminated Land**	3a&b
NRW	Newport Council Planning	Letter	14.08.2015	Response to letter regarding leachate chemistry of lower part of Riversee stockpile	4
NRW	TFW	let20	19.08.2015	Response to NRW letter dated 14.08.2015. Stockpile chemical summary – suggestion place Riversee stockpiled soils at least 50m from reen	5
TFW	Newport Council Pollution Control	Email	13.10.2015	Query of high lead exceedence in Citivision (Aberbargoed – wrongly named) soils	6
Newport Council Pollution Control	TFW	Email	15.10.2015	Response to TF email 13.10.2015	7
TFW	NRW	Email	27.10.2015	Regarding Citivision soil and leachate results	8
NRW	TFW	Email	12.11.2015	Reply to TFW email 27.10.2015	9
TFW	Newport Council Pollution Control	Email	17.11.2015	Regarding asbestos and lead in Citivision soils	10
TFW	NRW	let 21	18.11.2015	Citivision source leachate results - TFW justification for acceptance	11
Newport Council Planning	TFW	Email	25.11.2015	Council/NRW inform that they are not recommending discharge of condition. Request info by 02.12.2015	12
TFW	NRW	Email	26.11.2015	Regarding above Newport Council correspondence 25.11.2015 and reference to Let20	13
NRW	NRW	Email	26.11.2015	**Confirmed received TFW let20 and agreed informally that proposal to place Lower Riversee Stockpile material 50m from reen was acceptable**	14
NRW	TFW and Newport Council Planning	Email with letter (SE-2015-119016-03-L02)	02.12.2015	NRW formal response to TFW let20 Partial discharge of condition 5 & 6 (remediation strategy) following receipt of TFW let20	15
NRW	TFW	Email	02.12.2015	Questioning how will know which part of the stockpile deposited where on site and placement of geotextile membrane	16
TFW	Newport Council Planning	Let 22	10.12.2016	Response to email 02.12.2015 (Annex Ref 14). Confirmation of fill placement and outline of intended remediation and validation proceedures	17

Chemical Validation Imported Engineering Fill (Continued)

Table 3.2 Summary of Correspondence (Continued)

From	To	Format	Date	Subject	Annex I Ref
Newport Council Pollution Control	TFW	Email	22.01.2016	Response to TFW email 18.11.2015 regarding Citivision soils **Newport Council confirm Citivision soils are acceptable**	18
Newport Council Pollution Control	TFW	Email	24.10.2016	Confirmation Risk Assessment Report on Green Lane and Hawes Lane soils is acceptable provided risk from ground gas considered Reference to proposed flux box testing subsequently added	19
TFW	NRW	Email	04.11.2016	Provision of Risk Assessment Report on Green Lane and Hawes Lane soils	20
NRW	TFW	Email	11.11.2016	**Confirmation from NRW that Risk Assessment Report on Green Lane and Hawes Lane soils is acceptable and that soils are permitted to be imported**	20

SECTION 4 Human Health Risk Assessment

Soils on site were tested prior to fill works. A number of contaminants were identified.

Fill materials imported to date were also found to contain some contamination, including asbestos.

In the human health risk assessment construction workers and future site residents are considered as potential receptors to contamination in site soils.

Both groups of receptors could be exposed to site soil through dermal contact with soil/soil dust, ingestion of soil/soil dust or inhalation of soil dust. Inhalation of asbestos fibres is also a potential pathway.

Contamination in original site soils is too deep to present a risk to future site residents. Imported fill similarly is considered to be at a depth at which no risks to future site residents will be presented given that the remainder of the required engineered fill will not contain asbestos and a 600mm capping layer of clean imported subsoil and topsoil will be placed in all garden and landscaped areas upon development.

Site construction workers may possibly be exposed to site soils through activities such as installing bored piles or deep drainage works. Assessment of contamination has been carried out by comparison of results to residential thresholds, which considers long term exposure to site residents. Also, thresholds assume a worst case and reflect the risk to the most vulnerable receptor, a child. Site construction workers are at very low risk from the identified contaminants (except asbestos) given the relative very low exposure time. These very low risks may be mitigated through good site management, COSHH, good standards of hygiene and appropriate health & safety on site, with personal protection equipment (PPE) and dust suppression where appropriate.

The risk to construction workers from asbestos must be considered. Asbestos was present in two localised areas in the original site investigation, and is present in the imported fill. Asbestos fibres can accumulate in the lungs over time, and is known to cause asbestosis (scarring of the lungs), mesothelioma (cancer of the lung lining) and lung cancer.

For any activities that involve exposing fill soils or in-situ made ground in the area of original site investigation locations TP6 and TP7 (see **Annex A**) the contractor should seek appropriate additional protection against asbestos fibres. This is likely to include appropriate PPE and dust suppression.

SECTION 5 Verification of Fill Compaction

The Riversee Limited stockpile was geotechnically tested prior to import to enable an Earthworks Compaction Specification Report to be provided.

The Compaction Specification Reports for the top half of this stockpile (Report No. 12032/CS1, dated July 2015) and bottom half (Report No. 12032/CS2, dated July 2015) are provided in **Annex J**.

A small portion of the top of the Riversee Limited stockpile was imported on to site prior to official commencement of the earthworks. This was placed across the southern end of the site. This fill was subject to plate testing and sand replacement density (SRD) tests on the 24th July 2015. A number of tests were also performed on the in-situ ground across the northern part of the site at this time.

'North' of the site refers to the area north of the track (see original topographic plan in Figure 2.1). 'South' is the area below the track.

Also prior to earthworks a small mound of imported soils (also from the top of the Riversee Limited stockpile) had been placed in the northwest of the site.

As the fill levels were raised further plate load and SRD tests were completed.

The testing completed is summarised in **Table 5.1** on the following page.

Recent sampling on behalf of Keepmoat confirmed the placed fill thickness to range between 0.6m and 1.3m.

Verification of Fill Compaction (Continued)

Table 5.1 Summary of In-situ Geotechnical Tests

Fill Location and Details	Source	Date Imported	Date Tested	Test Type
Pre earthworks fill placed in south of site and mound in northwest of site Max 600mm fill thickness	Top of Riversee Limited Stockpile	Pre July 2015	24.07.2015	Plate tests SRDs
400mm (2 layers) across north of site 200mm fill across southeast quadrant of site	Top of Riversee Limited Stockpile including previously imported bund	30.07.2015 – 04.08.2015	05.08.2015	Plate tests SRDs
Small mound placed along eastern half of southern site edge	Bottom of Riversee Limited Stockpile	05.08.2015		
Fill stockpiled then spread in southwest quadrant of site (400mm thick) Small mound in south spread over southeast quadrant (200mm thick)	Bottom of Riversee Limited Stockpile	07.08.2015		
Fill spread over north of site (200mm)	Bottom of Riversee Limited Stockpile	10.08.2015 – 11.08.2015		
Fill now 600mm in north and 400mm in south Eastern half of site tested following period of stipping / drying / replacing material previously tested and spread of mound in southeast quadrant 05.08.2015			18.08.2015 19.08.2015	Plate tests
Fill spread over eastern half of site	Bottom of Riversee Limited Stockpile	19.08.2015		
Fill stockpiled in northwest corner of site	First batch of Citivision soils	08.09.2015 – 10.09.2015		
Fill placed across the site, Northern area, the haul road and southern area.	- Fill from North/CV - Fill from S.pile - Fill from S.pile		11.09.2015	Plate tests
SRD 1 – Centre North SRD 2 – Southwest SRD 3 – South	- Fill from North - Fill from S.pile - Fill from S.pile		14.09.2015	SRDs
Placed in north of the site	Material taken from north of the reen	16.09.2015 – 18.09.2015	**Untested**	
Placed in central south of site	Bottom of Riversee Limited Stockpile	28.09.2015 & 02.10.2015	**Untested**	
Placed in south of the site	Second batch of Citi-vision soils	05.10.2015	**Untested**	

Test result certificates are provided in **Annex K.** Where any unsatisfactory results were identified the fill was stripped or broken up to allow further drying before re-rolling and testing.

In November and December 2016 soils sourced from Green Lane and Hawes Lane were imported. These soils have not yet been subject to in-situ geotechnical tests.

SECTION 6 Settlement Monitoring

During July 2015 six vibrating wire piezometers and eight settlement monitoring pins were installed across the site.

The location of these monitoring points is illustrated in **Figure 6.1** below.

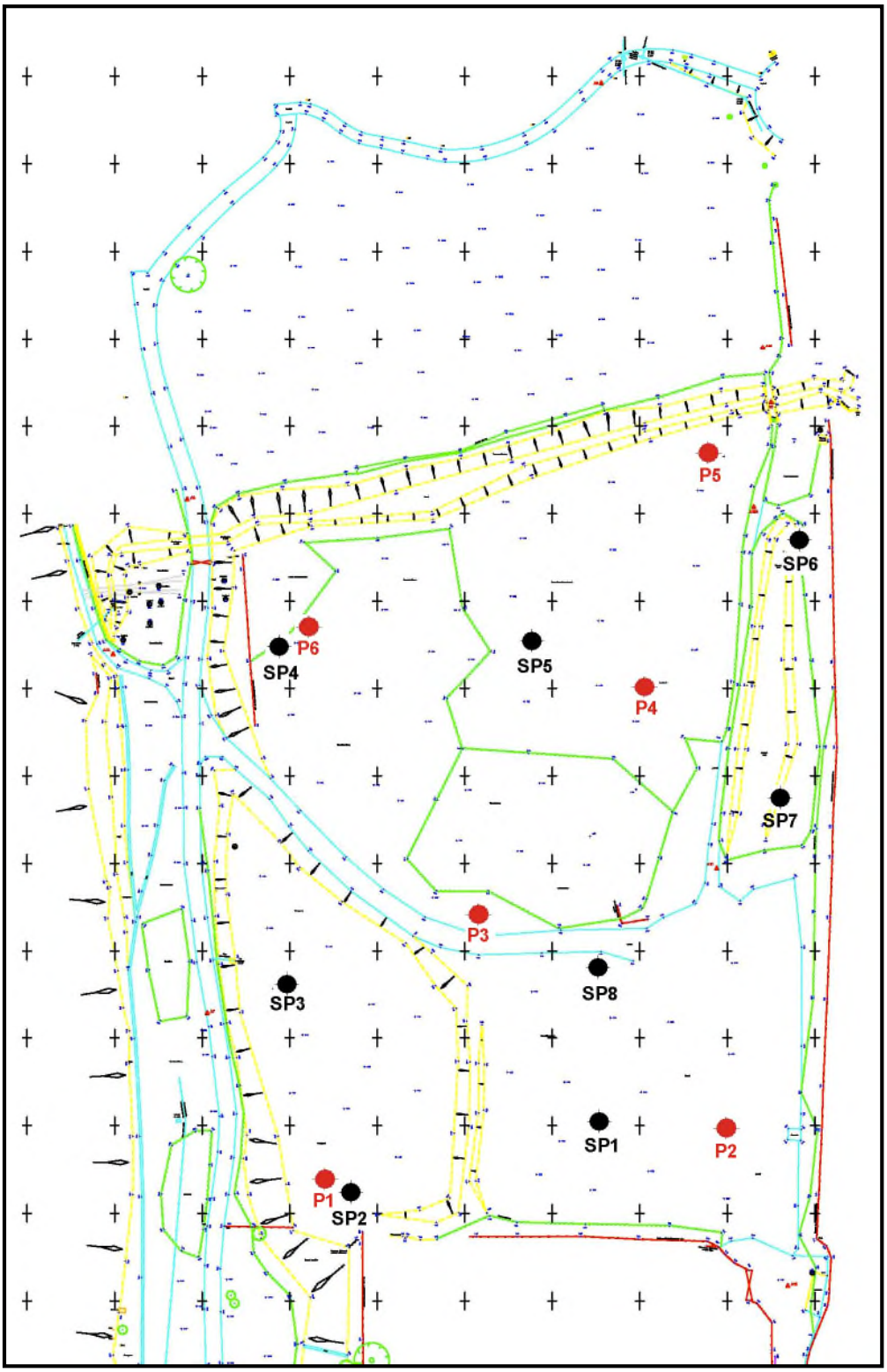


Figure 6.1: Piezometer (P1 – P6) and Settlement Pin (SP1 – SP8) Locations

Settlement Monitoring (Continued)

The piezometers and settlement pins were monitored and surveyed at regular intervals during the earthworks completed so far (July to October 2015), and intermittent monitoring was also completed in the period between October 2015 and May 2016.

With raising ground levels settlement is expected to occur on site in two phases, instantaneous and primary settlement and subsequent secondary settlement.

During instantaneous settlement the soil experiences only shear deformation resulting into change in shape without volumetric deformation. The loss of pore pressure in the soil is zero. Since this settlement is instantaneous it can only be monitored via monitoring pins as the pore pressure cannot be measured (zero).

During primary consolidation / settlement the soil is deformed by movement and compression of soil particles which overall results in volume change. Water held in pores of a saturated soil will migrate to pores of lower pressure (The process of consolidation). Primary settlement is time dependent on a logarithmic scale and stops when pore water pressure returns to baseline level.

Secondary consolidation / settlement occurs following the fall of pore water pressure. Secondary consolidation / settlement includes but is not limited to the following factors;

- Creep: With increasing pressure the grains may become so tightly packed that they will deform causing the soil mass to continue to reduce in volume
- Viscous behaviour of water between particles and pore water: During secondary compression the highly viscous water between the points of contact of soil particles is squeezed out.
- Compression and degradation of organic matter,

Consolidation is a process by which soils decrease in volume by decreasing water content within a saturated soil without replacement of water by air. Consolidation occurs when water is expelled under long term static loads. When a stress or surcharge is applied to a saturated soil the soil particles can compact, therefore reducing its bulk volume and excess water will be “squeezed out”. As a soil consolidates excess pore water pressure will fall.

Vibrating wire piezometers were used to monitor pore water pressures (a pressure correlating to meters of water). Vibrating wire piezometers convert fluid pressures on a sensitive diaphragm into a frequency signal. The signals are capable of long transmission distances without degradation, tolerant of wet conditions and resistant to external electrical noise.

Settlement Monitoring (Continued)

To measure settlement baseline data is required.

Table 6.1 Installation details of Piezometers

Piezometer	Depth	Strata Description	Initial Reading		Possible Baseline Reading	
			mH2O	Date	mH2O	Date
P1	6.30mbgl	Peat	2.05	14/7/15	4.45	23/7/16
P2	2.60mbgl	Clay	0.017	15/7/15	2.20	24/7/16
P3	3.70mbgl	Clay	2.429	16/7/15	2.20	24/7/16
P4	4.95mbgl	Peat	0.358	16/7/15	4.10	22/7/16
P5*	2.90mbgl	Peat	0.324	17/7/15	1.95	29/7/16
P6	5.00mbgl	Clay	4.087	22/7/15	4.50	28/7/16
*P5 was last recorded on 4/1/16. The piezometer has been destroyed.						

The possible baseline readings are considered representative although project program would not permit prolonged monitoring to refine the baseline pressures further.

During the establishment of a baseline the piezometers were monitored for changes in pore pressure coinciding with changes in tide level. The tidal range of the River Usk in Newport can extend over 13m. Tide information from The United Kingdom Hydrographic Office for Newport, Wales was used to identify low tide and high tides. Despite the significant tidal range the effect on piezometers was slight / negligible.

As confirmation the piezometers were measured again from low tide to high tide, (a 10.3m tidal range) between 11:00 and 17:00 on 27/5/2016. The data is summarised below.

Table 6.2 Tidal Effect on Piezometers

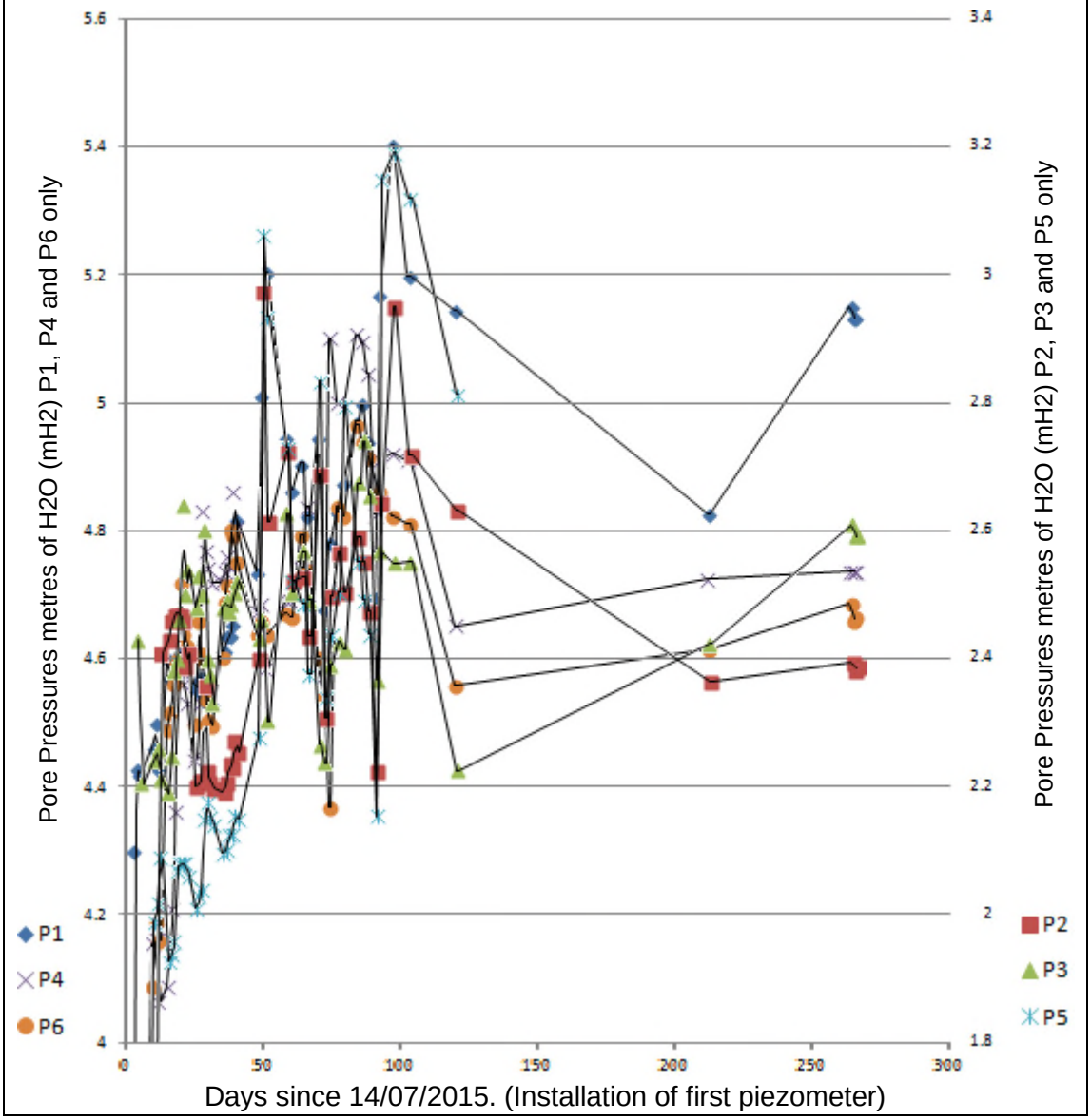
Time	11:00	14:00	17:00	Maximum measured Change in Pore Pressure
Tide Description	Low Tide	Rising Tide	High Tide	
P1	5.151573	5.13387	5.13387	-0.018mH2O
P2	2.3939187	2.3825055	2.3882121	-0.011mH2O
P3	2.6096248	2.5912062	2.5912062	-0.018mH2O
P4	4.7355286	4.7355286	4.7355286	0mH2O
P5	Destroyed			
P6	4.6853254	4.6593008	4.6646852	-0.026mH2O
Pore Pressures reported in mH2O.				

Pore water pressure would be anticipated to increase at high tide with rising water levels however this does not appear to be evident. The equivalent of under 30mm groundwater change was observed between low tide and high tide in this instance. It is considered that the groundwater beneath the site is unlikely to be significantly influenced by the high tidal range of the Usk.

Pore water pressure was monitored daily (or more) during the period of full time supervision. Full time supervision was between 14/7/2015 through to 20/8/2015. Budgetary constraints from 20/8/2015 meant that monitoring became less frequent.

Settlement Monitoring (Continued)

Graph 6.1 : Piezometer Monitoring Results

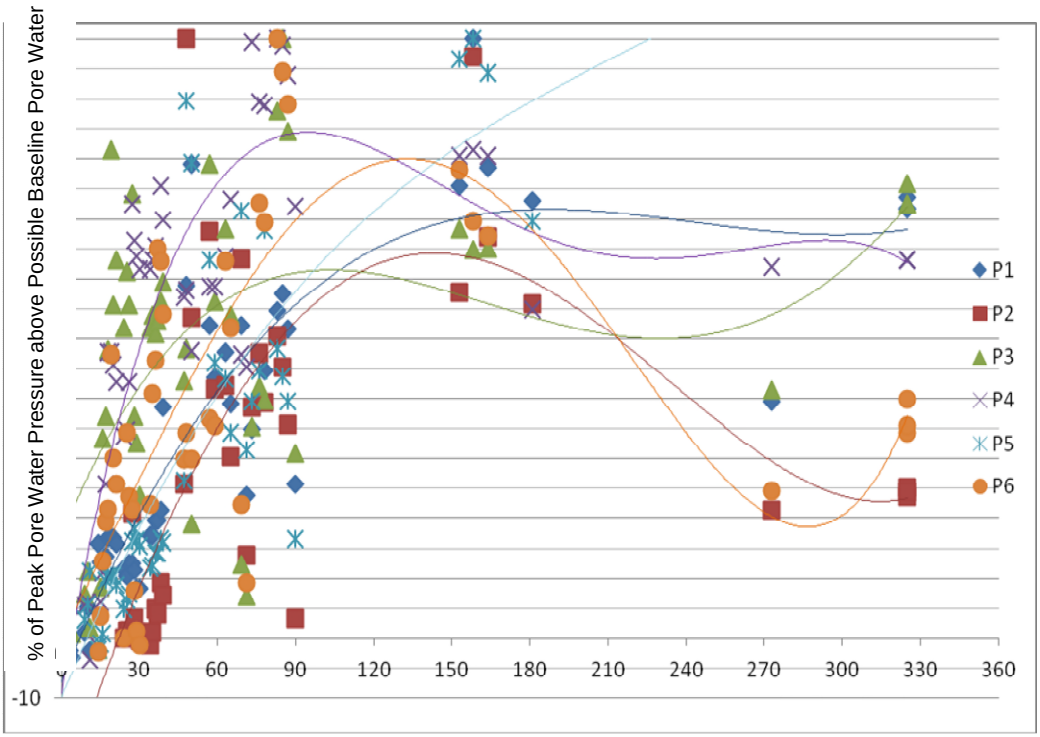


During full time supervision the increasing pore water pressures observed from the piezometers appeared to correlate with the placement of fill. As evidenced by jumps in pore water pressure over the day. Peak pore water pressure dissipated initially quickly but the rate of dissipation reduced resulting in jumps of pore water pressure.

Settlement Monitoring (Continued)

During settlement pore water pressure dissipates as water is squeezed out of consolidating material. The graph below shows the generation of peak pore water pressure generated by the placement of fill typically between 3 and 5 months after the commencement of the earthworks.

Graph 6.2 : Dissipation of Peak Pore Water Pressure



Days since 14/07/2015. (Installation of first piezometer)

Pore water pressure has been observed to be dissipating, evidence of consolidation and settlement. However the monitoring of pore water pressure dissipation has been disrupted by unsupervised filling events subsequent to the termination of full time supervision.

Pore water pressure dissipation of a single filling event should produce a single curve. Unsupervised filling events are likely to explain for the polymodal lines of best fit of pore water dissipation suggesting that following the initial placement of the assessed stockpile further material has been placed on site. Gaps in monitoring at 4 months and 8 months after the commencement of the earthworks have lead to some uncertainty over likely pore water pressures beneath the site at those times.

A summary of pore water pressure dissipation 11 months after commencement of the earthworks is presented below;

Settlement Monitoring (Continued)

Table 6.3 Summary of Piezometer Monitoring to Date14/7/15 to 27/5/16		
Piezometer 1	Strata: Peat (6.30mbgl)	Location: South-western Corner of Site (Near River Usk Embankment)
Piezometer P1 dissipated to 40% of peak pore water pressure after 3 months but has recently increased to over 70% indicating the recent placement of fill. After a period of dispersion of water pressure there was a significant increase in pore water pressure at Piezometer P1 located beneath a recently placed plateaued stockpile.		
Piezometer 3	Strata: Clay (2.60mbgl)	Location: Southern Centre of Site
Piezometer P3 like Piezometer P1 also dissipated to 40% of peak water pressure taking ~6 months. Piezometer P3 like Piezometer P1 has also recently increased to over 70% of peak pore water pressure. After a period of dispersion of water pressure there was a significant increase in pore water pressure at Piezometer P3 both located adjacent to a recently placed plateaued stockpile to the south of the site.		
Piezometer 2	Strata: Clay (3.70mbgl)	Location: South-eastern Corner of Site (Near Rail Embankment)
Piezometer P2 dissipated initially but rose again to 95% of peak water pressure after 3 months. Pore water pressure dissipated again taking a further 3 months to dissipate to ~20% of peak pore water pressure however recently no dissipation has been recorded. After a period of dispersion of water pressure there was a slight increase in pore water pressure at Piezometer P2 located adjacent to a recently placed plateaued stockpile.		
Piezometer 4	Strata: Peat (4.95mbgl)	Location: North-Centre of Site
Piezometer P4 dissipated initially falling to 55% of peak pore water pressure after 3 months. Pore water pressure at Piezometer P4 has failed to dissipate in the last 4 months and currently in excess of 60% of peak pore water pressure. After a period of dispersion of water pressure there was a slight increase in pore water pressure at Piezometer P4 located near a recently placed plateaued stockpile.		
Piezometer 5	Strata: Peat (2.90mbgl)	Location: North-eastern corner of Site (Near Rail Embankment)
Before being destroyed Piezometer 5 was observing evidence of peak pore water pressure dissipation having dissipated to 70% of peak water pressure within a month.		
Piezometer 6	Strata: Clay (5.00mbgl)	Location: North-western corner of Site (Near River Usk Embankment)
After 6 months pore water pressure appears to have dissipated between to 20-40% of peak pore water pressure. The recent changes to pore water pressure only equate to an equivalent groundwater level change of ~100mm which is considered possible especially considering proximity to the River Usk and the sensitivity of the peat. After a period of dispersion of water pressure there was a slight increase in pore water pressure at Piezometer P6. There appears to be no obvious cause for this and may be a result of natural variation. Peat is known to be a more susceptible material to change than clay.		
Observations: Primary settlement is not complete since pore water pressure continues to fall. Dissipation of pore water pressure appears faster in the peat layers than in the clay. Piezometer 1 set within peat took roughly half the time for peak pore water pressure to dissipate to 40% than Piezometer 3 set within clay.		

Settlement Monitoring (Continued)

Settlement monitoring pins were installed targeting the following areas;

Monitoring Pin 1: South-eastern Corner of the site, near rail embankment,
Monitoring Pin 2: South-western Corner of the site, near River Usk Embankment,(Destroyed)
Monitoring Pin 3: Western Edge of the site, near River Usk Embankment,(Destroyed)
Monitoring Pin 4: North-western Corner of the site, near River Usk Embankment,(Destroyed)
Monitoring Pin 5: Northern edge of the site, near reen,
Monitoring Pin 6: North-eastern corner of the site, near rail embankment,(Destroyed)
Monitoring Pin 7: Eastern Edge of the site, near rail embankment,
Monitoring Pin 8: Centre of site

Unfortunately half of the original monitoring pins were disturbed during the earthworks causing the loss of corresponding baseline information for settlement monitoring. A summary of all survey data to date is presented in **Table 6.4** below.

Table 6.4 Summary of Survey Data

	Round1	Round2	Round3	Round4	Round5	Round6	Round7	Round8
Pin	17/7/15	24/7/15	7/8/15	17/8/15	24/8/15	2/10/15	29/12/15	17/3/16
P1	9.435	9.435	9.435	9.435	9.424	9.427	9.4187	9.418
P2	**D**	10.069	**D**	**D**	**D**	**D**	**D**	**D**
P2A	-	-	10.071	10.064	10.055	10.059	10.0464	10.0429
P3	9.136	9.136	9.137	**D**	**D**	**D**	**D**	**D**
P3A	-	-	-	9.195	**D**	**D**	**D**	**D**
P3B	-	-	-	-	-	9.708	9.6882	9.68
P4	8.772	8.773	8.771	**D**	**D**	**D**	**D**	**D**
P4A	-	-	-	-	9.009	9.013	8.9902	8.982
P5	9.195	9.195	9.198	9.195	9.186	9.178	9.1563	9.149
P6	9.22	**D**	**D**	**D**	**D**	**D**	**D**	**D**
P6A	-	9.268	9.267	9.271	9.264	9.274	9.2721	9.263
P7	8.954	8.954	8.955	8.955	8.945	8.935	8.9125	8.91
P8	9.209	9.209	9.207	9.208	9.199	9.202	9.1563	9.185

- = not present
D = Destroyed,
Green filled cells indicate pins with a mostly complete set of monitoring data

During earthworks half of the monitoring points were lost or damaged resulting in the loss of data comparable to baseline conditions. Monitoring Pins 2, 3, 4 and 6 were lost. Monitoring Pins 1, 5, 7 and 8 remain intact.

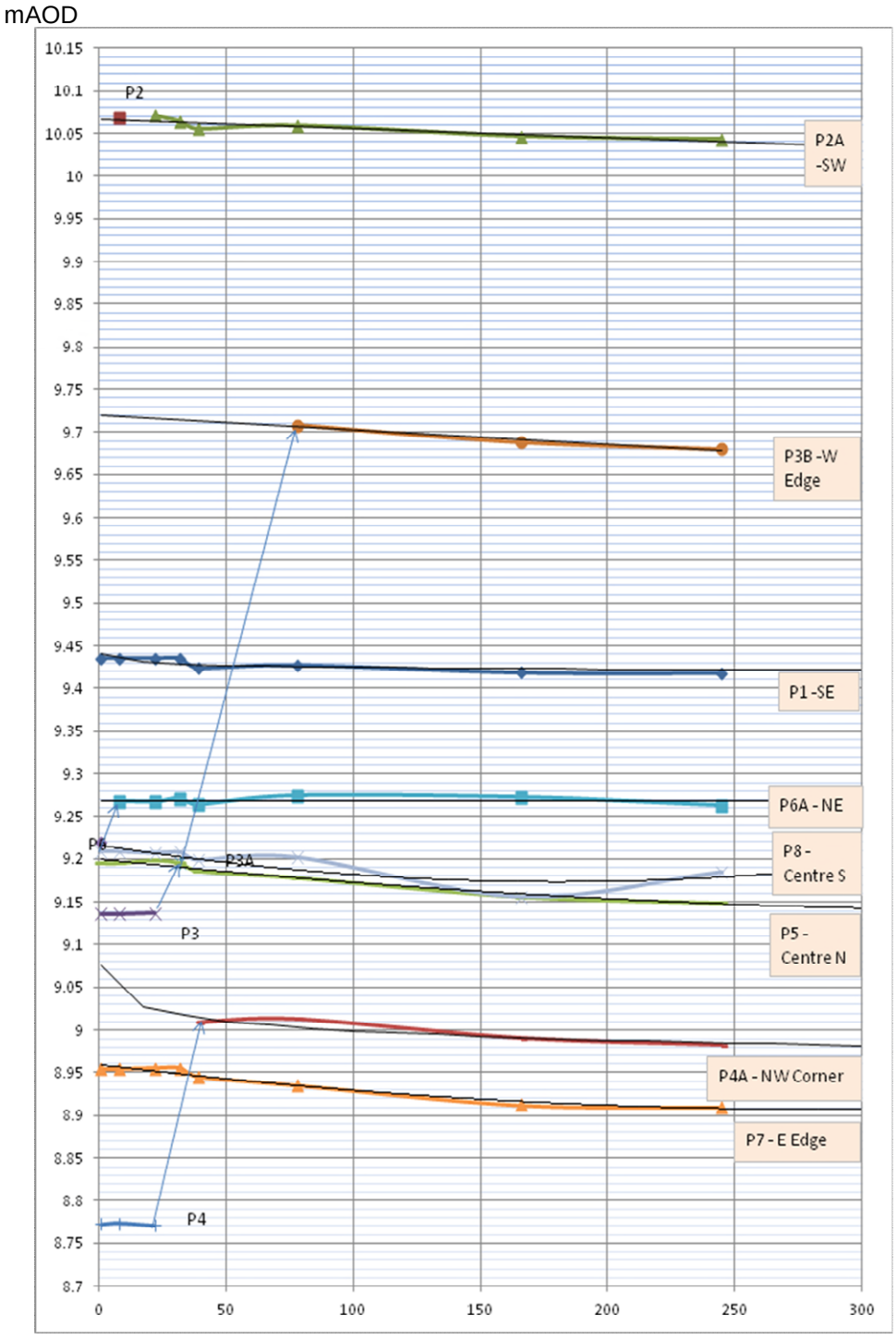
Justification of Survey Rounds;
Round 1, 17/7/15. Initial Survey (P2 damaged - not surveyed)
Round 2, 24/7/15. Initial Survey of P2 and P6A
Round 3, 7/8/15, Initial Survey of P2A
Round 4, 17/8/15, Initial Survey of P3A and survey of damaged P2A
Round 5, 24/8/15, Initial Survey (P3A damaged - not surveyed)
Round 6, 2/10/15 Initial Survey of P3A

Round 7, 29/12/15 Follow up survey
Round 8, 17/3/15 Follow up survey

Settlement Monitoring (Continued)

The graph below shows all of the surveyed monitoring pins on an arithmetic time scale. When a monitoring pin was damaged or destroyed an effort was made to replace the pin. When a monitoring pin was damaged / destroyed it was given a sequential alphabetical designation.

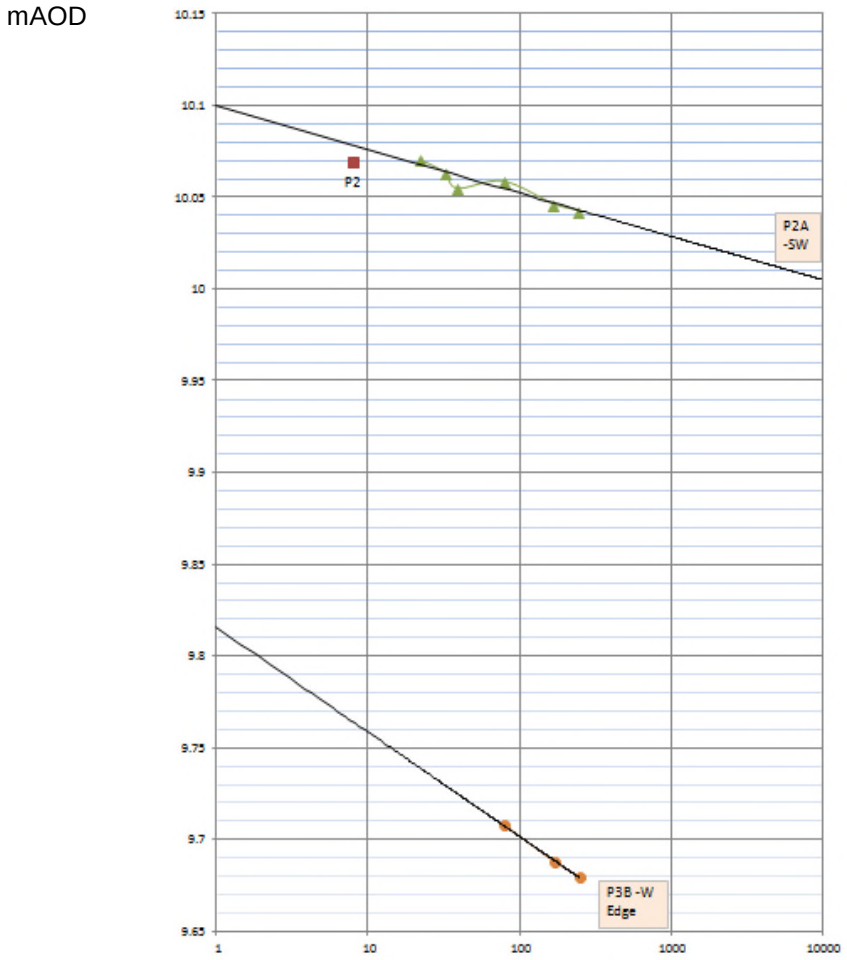
Graph 6.3 : Settlement Monitoring Pin Results



Settlement Monitoring (Continued)

In principle secondary settlement is infinite with settlement rates dropping on a logarithmic scale. However in practice the increase in settlement after 10^4 days (~30years) appears to be generally "complete".

Graph 6.4 Settlement at Monitoring Pins P2A and P3B
(South-western Corner and Western Edge only)



Days since 17/07/2015. (First survey of Settlement Pins) – Log base 10
* Note Original Pins of P2, P3 and P3A were lost or damaged.

Monitoring Pin 2

Unfortunately baseline conditions for Monitoring Pin 2 (located within the south-western corner of the site) were lost as the pin was destroyed following the placement of fill. Monitoring Pin 2A however recorded ~28mm of settlement over 7 months. Whilst the initial readings may be lost it may be possible to conjecture future settlement from the data obtained.

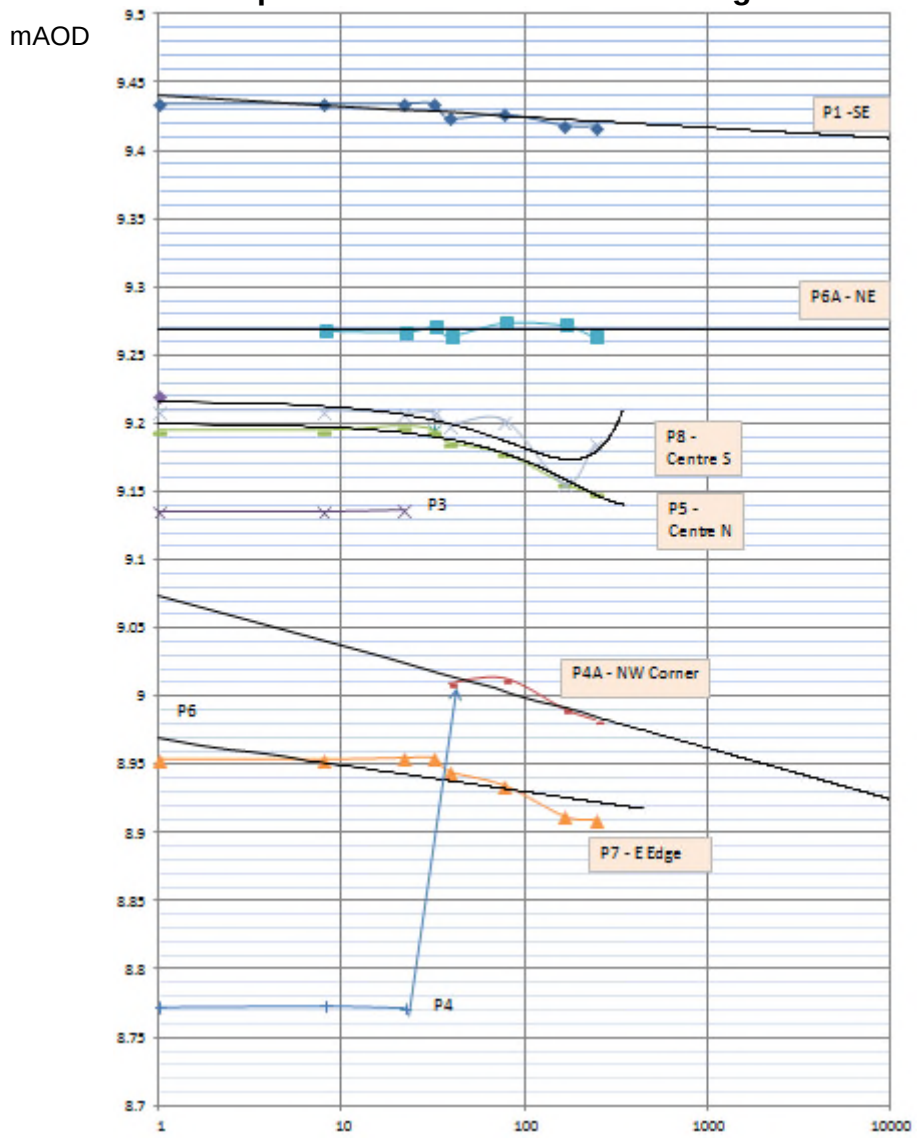
Following the current trend of settlement the above graph indicates at that levels may settle to 10.005mAOD after 10^4 days (~30years or 2045). With the last survey indicating levels of 10.043m a further 0.035m (35mm) should be anticipated under the current surcharge by 2045.

Settlement Monitoring (Continued)

Monitoring Pin 3

Unfortunately baseline conditions for Monitoring Pin 3 (located on the western edge of the site) were lost as the pin was destroyed following the placement of fill. Monitoring Pin 3A was similarly lost. It is considered that any attempt to assess future settlement from Monitoring Pin 3B would be open to too much error and inaccuracy to predict. It is however noted that having measured ~30mm settlement in 5 months that future settlement at this location may be greater than at Monitoring Pin 2A.

Graph 6.5 Settlement at Monitoring Pins



Days since 17/07/2015. (First survey of Settlement Pins) – Log base 10

* Note Original Pins of P4 and P6 were lost or damaged.

Monitoring Pin 1

Data for Monitoring Pin 1 (located near the South-eastern Corner of the site) is complete and to date indicates settlement of ~10mm over 8 months. Conjecturing future settlement from the data obtained indicates that levels may settle to 9.41mAOD after 10^4 days (~30years or 2045). With the last survey indicating levels of 9.42m a further 0.010m (10mm) should be anticipated under the current surcharge by 2045.

Settlement Monitoring (Continued)

Monitoring Pin 6

Unfortunately baseline conditions for Monitoring Pin 6 (located within the North-eastern corner of the site) were lost as the pin was destroyed. Monitoring Pin 6A has however recorded ~5mm of settlement over 7 months. Whilst the initial readings may be lost it may be possible to conjecture future settlement from the data obtained.

Following the current trend of settlement the above graph indicates at that levels may have settled at 9.27mAOD after 10^4 days (~30years or 2045). With the survey indicating fluctuating levels of 9.263m no further settlement is anticipated under the current surcharge by 2045.

Monitoring Pin 4

Unfortunately baseline conditions for Monitoring Pin 4 (located within the North-western corner of the site) were lost as the pin was destroyed. Monitoring Pin 4 recorded 1mm of settlement within a month before it was destroyed.

Like Monitoring Pin 3B it is considered that any attempt to assess future settlement from only 4 survey points at Monitoring Pin 4A would be open to too much error and inaccuracy to predict. It is however noted that following the current trend of settlement the graph indicates at that levels may settle to 8.920mAOD after 10^4 days (~30years or 2045). With the most recent survey indicating levels of 8.982mAOD a further 62mm settlement is anticipated under the current surcharge by 2045. However, this statement is based upon fewer readings.

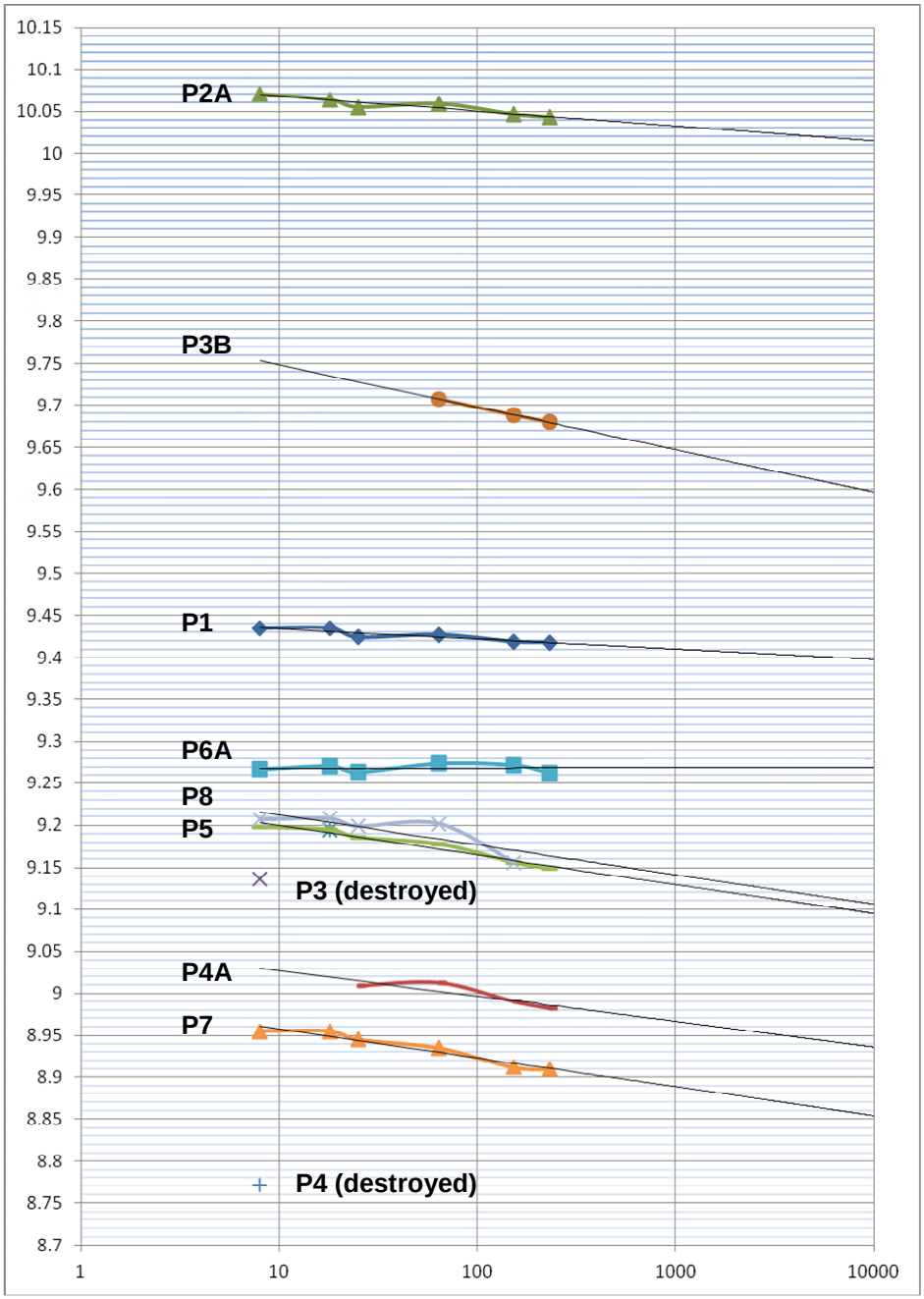
Monitoring Pin 5, Monitoring Pin 7 and Monitoring Pin 8

Data for Monitoring Pins 5, 7 and 8 do not appear to fit a logarithmic settlement curve suggesting that the start date may be out. No settlement was observed within the first two weeks. This could be a result of the earthworks taking longer than anticipated and the placement of fill in these areas being delayed. It has therefore been considered to discount the first two weeks of placement of the settlement pins since the correlation with a logarithmic settlement curve is closer.

Settlement Monitoring (Continued)

Data for Monitoring Pins 5, 7 and 8 do not appear to fit a logarithmic settlement curve as no settlement was observed within the first two weeks. This suggests that the start date may be out. Therefore Graph 3.6 shows settlement on a logarithmic scale starting on 31/7/2015, two weeks after the commencement of the earthworks. Settlement at Monitoring Pins 5 and 7 appear to be a closer fit as a result.

Graph 6.6 2 Week Adjusted fit of Logarithmic Settlement Curve due to Earthworks Delay



Days since 31/07/2015. (2 wks after first survey of Settlement Pins) – Log base 10

Settlement Monitoring (Continued)

Monitoring Pin 5,

Monitoring Pin 5 from the northern centre of the site follows a logarithmic settlement curve fairly closely. In an effort to predict settlement the existing trend, which may be inaccurate, indicate a possible settlement to ~9.1mAOD, a further ~50mm settlement from recent level.

Monitoring Pin 7

Monitoring Pin 7 from the eastern edge of the site follows a logarithmic settlement curve fairly closely. In an effort to predict settlement the existing trend, which may be inaccurate, indicate a possible settlement from ~8.91mAOD to ~8.85mAOD, a further ~60mm settlement from recent level.

Monitoring Pin 8

Monitoring Pin 8 from the southern centre of the site continues to deviate from a logarithmic settlement curve. It may be that the pin was damaged or that multiple phases of earthworks over an extended period mean that settlement cannot be traced from a single event. The most recent survey result indicates an increase in level, which suggests that the pin may be damaged and has been discounted from the estimate below.

In an effort to predict settlement the existing trend, which may be inaccurate, indicate a possible settlement to ~9.1mAOD, a further ~50mm settlement from recent level. It is noted however that the settlement prediction is comparable to Monitoring Pin 5 which is expected to be similar.

Settlement Monitoring (Continued)

Table 6.5 Summary of Predicted Settlements

Monitoring Pin	Initial Survey mAOD	Measured Settlement	Predicted Settlement after 10^4 days (2045)*		Predicted Settlement Remaining (2045)*
Monitoring Pin 1 (SE Corner)	9.435	-18mm (7 months)	- 25mm (approx)	9.410 mAOD	- 6mm (approx)
Monitoring Pin 2 (SW Corner)	10.069	Not Achieved	N/A		N/A
Monitoring Pin 2A (SW Corner)	10.071	-28mm (7 months)	-66mm (approx)	10.005 mAOD	- 38mm (approx)
Monitoring Pin 3 (W Edge)	N/A	+1mm (1 month)	N/A		N/A
Monitoring Pin 3A (W Edge)	9.195	Not Achieved	N/A		N/A
Monitoring Pin 3B (W Edge)	9.708	-28mm (5 months)	N/A		N/A
Monitoring Pin 4 (NW Corner)	8.772	-1mm (1 month)	N/A		N/A
Monitoring Pin 4A (NW Corner)	9.009	-27mm (7 months)	-89mm (v.approx)	8.920 mAOD	- 62mm (v. approx)
Monitoring Pin 5** (N Edge)	9.195	46mm (7 months)	-100mm (approx)	9.095 mAOD	- 54mm (approx)
Monitoring Pin 6 (NE Corner)	9.220	Not Achieved	N/A		N/A
Monitoring Pin 6A (NE Corner)	9.268	-5mm (7 months)	0mm (approx)	9.27 mAOD	0mm (approx)
Monitoring Pin 7** (E Edge)	8.954	44mm (7 months)	104mm (approx)	8.85 mAOD	- 60mm (approx)
Monitoring Pin 8** (Centre)	9.209	53mm (7 months)	99mm (v.approx)	9.11 mAOD	- 46mm (v.approx)

Assumptions:
Earthworks are instantiations with settlement beginning on Day 1.
Settlement is logarithmic

Known Inaccuracies:
Earthworks was not instantaneous and in reality took longer than anticipated
Earthworks has not occurred equally across the site, notably:

- Some areas have more fill placed than others.
- Additional fill has been placed during the settlement process sometimes months later through intermittent earthworks post supervision.

Notes:
Established base line levels filled green
* Assuming no further fill is placed
** Monitoring Pins 5, 7 and 8 do not conform with a logarithmic settlement curve. A better fit is achieved when the start date is set back 14 days. Estimates for Monitoring Pins therefore discount any settlement during the first two survey rounds.
N/A = Not achievable, insufficient baseline information.

SECTION 7 Groundwater and Reen Monitoring

Sampling and testing of the deep groundwater and reen water was scheduled to be carried out prior to earthworks, and two rounds following completion of the intended Riversee Limited fill works or no later than 6 months of earthworks commencement.

Six water monitoring wells were installed, BH1 to BH6, as illustrated in **Figure 7.1** below.

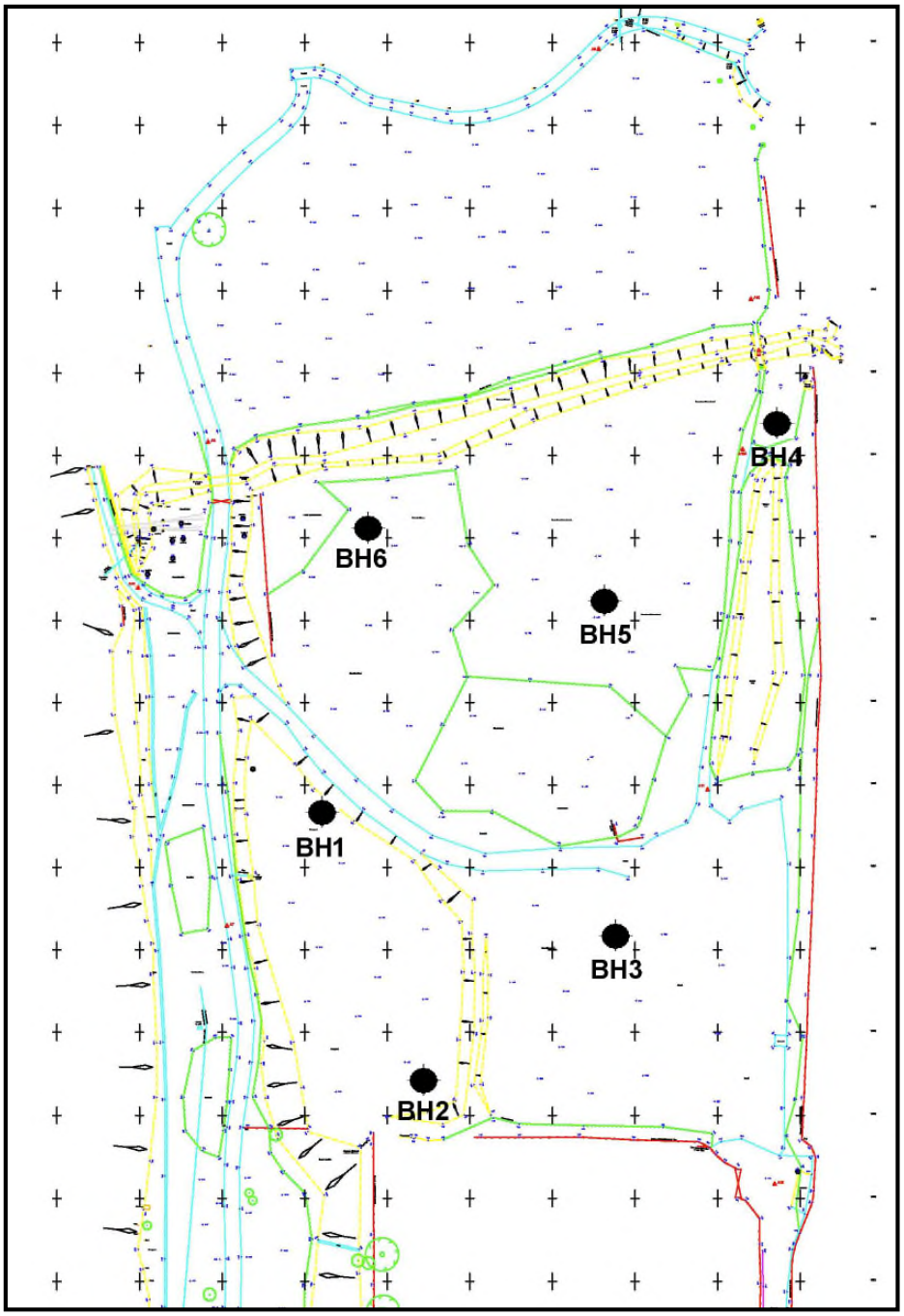


Figure 7.1: Water Monitoring Well Locations

Groundwater and Reen Monitoring (Continued)

The pre-earthworks monitoring round was carried out in July 2015.

The second monitoring round was undertaken in January 2016, and the third followed in February 2016.

All water results were acceptable, displaying no notable variation to the previously established water quality.

The results were presented to the NRW in Letter 25, dated 30th August 2016. A copy of this letter is presented in **Annex L**.

This letter proposed that no further groundwater monitoring was required.

The NRW subsequently agreed that this would be acceptable in an email dated 1st September 2016. A copy of this email may be found in **Annex M**.

Soils sourced from Green Lane and Hawes Lane were determined to have a low risk to the drainage reen. However, testing of reen waters during fill works and for 2 months after placement of this fill will be carried out.

SECTION 8 Engineering Recommendations

8.1 Foundation and Floor Slab Solution

Due to the presence of soft clay bands beneath the site traditional shallow foundations are not recommended. Such foundations are likely to lead to high total and differential settlements.

A piled foundation is advised for the proposed residential properties. Precast concrete driven piles founded within the underlying very weak red brown and grey mudstone are recommended. For a 275mm square precast concrete pile driven to an appropriate set within the underlying gravels a safe working load of typically 500kN should be achieved. Based upon the site investigation data, pile lengths should vary between 12m and 15m beneath original ground levels. Following placement of the fill piles lengths will be increase to approximately 14 and 17m below original ground levels.

The estimated working loads, pile type and lengths should be confirmed by a specialist piling contractor. It may be prudent to test drive piles at select locations. For the quoted pile size, founded within the competent gravels, total settlements should not exceed 10mm with differential movements between adjacent piles being less than half this value. Allowances should be made for re-driving piles should buried obstructions be encountered.

A trunk sewer passes beneath the site and the use of precast concrete piles is prohibited along its route. Due to these restrictions all new dwellings to be built along the sewer route are to be founded upon bored piles. The sewer lies at around 25m depth below ground level, within the underlying mudstone. These piles should be bored and installed as specified by the piling contractor.

Floor slabs should be designed as suspended.

Measurements should be kept on pile vibrations during driving. Measures should also be taken to dampen such vibrations. If, however, vibrations exceed permissible values then consideration should be given to using a contiguous flight auger (cfa)/bored pile solution.

Network Rail may also require a bored pile solution close to the railway.

8.2 Protection of Buried Concrete

Laboratory soil chemical analysis undertaken for the Geotechnical and Geo-environmental Report identified concentrations of total sulphate of between 200 and 2500 mg/kg and pH of between 8.2 and 11.8 pH units. Due to an elevated level of total sulphate in TP12 at 0.40m below ground level, sulphate aqueous extract was undertaken. A value of 160 mg/l was recorded.

Sulphate levels in the imported fill range between 400mg/kg and 4100mg/kg., at a pH of between 7.6 and 11.7. Leachate sulphate results ranged between 2mg/l and 51mg/l at a pH of between 6.5 and 10.7.

Based upon the above results we recommend that all buried concrete should conform to Design Class DS-1, ACEC Class AC-1, of BRE Digest 1:2005.

8.3 Compaction of Imported Fill

Fill materials should be placed at or close to, i.e. 95%, of their optimum moisture content/maximum dry density and compacted in layers as per the requirements of the the Department of Transport 'Specification for Highway Works, Series 600'.

Where combinations of different types or categories of plant are used, the depth of the layer should be for the type of plant requiring the least depth of layer, and the number of passes should be that for the type of plant requiring the greatest number of passes.

Earthmoving plants are not recommended for use as compaction plant, nor are lighter categories of plants used to provide preliminary compaction to assist the use of heavier plant.

Any deleterious material, such as timber and plastic, should be removed.

Any roots and tree roots should be excavated and removed.

The stability of excavations or fills should not be compromised by the location of stock piled materials or use of plant or location of temporary buildings/structures.

All earthworks must be kept free of water including arranging for the rapid removal of water, water shed onto the earthworks and water entering the earthworks from any source.

Fill materials especially cohesive (silt and clay) fill should not be deposited and compacted during wet weather, where an increase in moisture content will increase the liquid limit of the soil.

All exposed fill surfaces must be adequately weather proofed during inclement weather or at the end of the working day/compaction process. Any exposed cohesive fill that becomes wet and slurrified due to water ingress or weather erosion must be stripped off, spread into thin layers and aerated. The fill should then be re-compacted.

Plant movement across compaction layers should be restricted to that plant necessary for its deposition, spreading and compaction.

Fill areas should be constructed evenly over their full width and their fullest possible extent and the contractor should control and direct constructional plant and other traffic uniformly over them. Damage by construction plant should be made good with material having the same characteristics and strength as the material had before it was damaged.

Embankments and other areas of unsupported fills should not be constructed with steeper side slopes than the materials effective shear strength, with exception to allowing the adequate compaction at the edges before trimming back, within the minimum period necessary for the safety of the works.

Where fill is to be placed against a natural slope, or sloping earthworks face including embankments, cuttings and other fills and excavations, such faces should be appropriately benched immediately before placing the subsequent fill.

8.3 Compaction of Imported Fill (Continued)

In-situ plate bearing tests and/or density tests (sand replacement method) should be undertaken to ensure the compaction process is performing satisfactory during the enabling works. In-situ testing should be undertaken at an appropriate spacing to reflect the adequacy of the compaction process beneath the entire development area.

The earthworks should be supervised by a suitable engineer.

The tests should be conducted in accordance with BS 1377: Part 9: 1990 under the supervision of a qualified geotechnical engineer.

Should the in-situ testing indicated that the compaction process has been inadequate, the deposited material must be excavated out and re-laid.

Allowances should be made for the removal of soft spots and their replacement with imported suitable selected inert granular materials or suitable inert site won materials.

ANNEX A
Geotechnical and Geo-Environmental Report

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-27313-1

26-Feb-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-27313-1

Client Reference 12032-SP1

Contract Title Herbet Road Stockpile - Round 1

Description 25 Soil samples, 1 Misc sample.

Date Received 16-Feb-15

Date Started 16-Feb-15

Date Completed 26-Feb-15

Test Procedures Identified by prefix DETSn (details on request), Asbestos Analysis DETSC 1101.

Notes **This report supersedes 15-27313, Extra Testing**

Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

MCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Sample ID	Depth	Lab No	Completed	Matrix Description
S1	0.5	768693	23/02/2015	Dark brown gravelly sandy CLAY
S2	1.7	768694	23/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S3	3	768695	23/02/2015	Dark brown gravelly sandy CLAY
S4	2	768696	23/02/2015	Dark brown gravelly sandy CLAY
S5	3	768697	23/02/2015	Dark brown gravelly sandy CLAY
S6	0.5	768698	23/02/2015	Dark brown gravelly sandy CLAY
S7	3	768699	23/02/2015	Dark brown gravelly sandy CLAY
S8	0.8	768700	23/02/2015	Dark brown gravelly sandy CLAY
S9	0.5	768701	23/02/2015	Dark brown gravelly sandy CLAY
S10	2	768702	23/02/2015	Dark brown gravelly sandy CLAY with odd rootlets
S11	3	768703	23/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S12	0.5	768704	23/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S13	2.3	768705	23/02/2015	Dark brown gravelly sandy CLAY
S14	3	768706	23/02/2015	Dark brown gravelly sandy CLAY with odd rootlets
S15	2	768707	23/02/2015	Dark brown gravelly sandy CLAY
S16	3	768708	23/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S17	0.3	768709	23/02/2015	Dark brown gravelly sandy CLAY
S18	1.3	768710	23/02/2015	Dark brown gravelly sandy CLAY with odd rootlets (Made Ground includes brick)
S19	2.8	768711	23/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S20	0.5	768712	23/02/2015	Dark brown gravelly sandy CLAY
S21	1.3	768713	23/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S22	2.5	768714	23/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S23	0.5	768715	23/02/2015	Dark brown gravelly sandy CLAY
S24	1.4	768716	23/02/2015	Dark brown gravelly sandy CLAY
S25	2.5	768717	23/02/2015	Dark brown gravelly sandy CLAY

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768693	768694	768695	768696	768697	768698
			Sample ID	S1	S2	S3	S4	S5	S6
			Depth	0.50	1.70	3.00	2.00	3.00	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	5.8	13	12	< 0.2	12	10
Cadmium	DETSC 2301#	0.1	mg/kg	1.1	0.7	0.7	< 0.1	0.7	0.6
Chromium	DETSC 2301#	0.15	mg/kg	53	25	20	< 0.15	18	18
Chromium III	DETSC 2301*	0.15	mg/kg	53	25	20	< 0.15	18	18
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	39	31	25	< 0.2	26	53
Lead	DETSC 2301#	0.3	mg/kg	51	47	43	< 0.3	43	93
Mercury	DETSC 2325#	0.05	mg/kg	0.09	0.09	< 0.05	0.05	0.06	< 0.05
Nickel	DETSC 2301#	1	mg/kg	53	21	22	< 1.0	20	16
Selenium	DETSC 2301#	0.5	mg/kg	0.7	< 0.5	1.2	< 0.5	0.9	1.1
Zinc	DETSC 2301#	1	mg/kg	140	89	80	< 1.0	85	110
Inorganics									
pH	DETSC 2008#			10.0	9.1	8.7	9.6	8.5	8.4
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2
Organic matter	DETSC 2002#	0.1	%	3.0	2.4	2.0	2.7	2.6	2.5
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.11	0.16	0.13	0.10	0.06	0.06
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768693	768694	768695	768696	768697	768698
			Sample ID	S1	S2	S3	S4	S5	S6
			Depth	0.50	1.70	3.00	2.00	3.00	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	0.06	< 0.03	0.05
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	0.07	0.10	0.04	0.07
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	0.05	0.08	0.04	0.06
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	0.04	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.06	0.04	0.04	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03	0.04	< 0.03	0.04
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	< 0.10	0.33	0.16	0.36	< 0.10	0.22
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	0.4

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768699	768700	768701	768702	768703	768704
			Sample ID	S7	S8	S9	S10	S11	S12
			Depth	3.00	0.80	0.50	2.00	3.00	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	9.8	14	< 0.2	17	9.0	9.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	2.1	< 0.1	1.0	0.6	0.5
Chromium	DETSC 2301#	0.15	mg/kg	20	48	< 0.15	22	19	18
Chromium III	DETSC 2301*	0.15	mg/kg	20	48	< 0.15	22	19	18
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	25	140	< 0.2	48	20	29
Lead	DETSC 2301#	0.3	mg/kg	37	110	< 0.3	74	36	45
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.16	0.10	0.13	< 0.05
Nickel	DETSC 2301#	1	mg/kg	27	41	< 1.0	23	20	22
Selenium	DETSC 2301#	0.5	mg/kg	1.2	43	< 0.5	1.4	0.7	1.4
Zinc	DETSC 2301#	1	mg/kg	93	200	< 1.0	160	130	82
Inorganics									
pH	DETSC 2008#			8.6	8.1	8.2	11.0	9.0	8.6
Cyanide total	DETSC 2130#	0.1	mg/kg	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.2	2.2	3.5	2.2	9.7	2.5
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.07	0.06	0.06	0.17	0.10	0.07
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768699	768700	768701	768702	768703	768704
			Sample ID	S7	S8	S9	S10	S11	S12
			Depth	3.00	0.80	0.50	2.00	3.00	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.09	0.04	0.06	0.11	0.06	0.09
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.11	0.05	0.10	0.18	0.07	0.14
Pyrene	DETSC 3303#	0.03	mg/kg	0.09	0.04	0.09	0.15	0.06	0.11
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	0.04	0.07	< 0.03	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	0.06	0.09	< 0.03	0.07
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	0.07	0.10	< 0.03	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.05	0.06	< 0.03	0.05
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.43	0.14	0.47	0.85	0.19	0.60
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.3	< 0.3	< 0.3	2.2	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768705	768706	768707	768708	768709	768710
			Sample ID	S13	S14	S15	S16	S17	S18
			Depth	2.30	3.00	2.00	3.00	0.30	1.30
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	10	3.9	4.4	3.9	4.9	19
Cadmium	DETSC 2301#	0.1	mg/kg	0.7	0.5	0.4	0.5	0.5	1.2
Chromium	DETSC 2301#	0.15	mg/kg	24	17	24	20	29	25
Chromium III	DETSC 2301*	0.15	mg/kg	24	17	24	20	29	25
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	17	15	19	16	16	47
Lead	DETSC 2301#	0.3	mg/kg	26	11	8.4	27	25	130
Mercury	DETSC 2325#	0.05	mg/kg	0.05	< 0.05	0.13	0.27	0.08	0.13
Nickel	DETSC 2301#	1	mg/kg	20	23	27	19	25	26
Selenium	DETSC 2301#	0.5	mg/kg	1.0	1.0	0.6	0.7	0.6	2.8
Zinc	DETSC 2301#	1	mg/kg	77	72	51	56	64	1200
Inorganics									
pH	DETSC 2008#			8.6	8.5	10.3	10.5	8.8	8.0
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Organic matter	DETSC 2002#	0.1	%	2.4	2.7	2.0	4.5	2.0	4.9
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.07	0.08	0.16	0.27	0.07	0.07
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.06	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.01	0.14	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.12	0.01	0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.01	0.01	< 0.01	0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.07	0.01	0.12	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768705	768706	768707	768708	768709	768710
			Sample ID	S13	S14	S15	S16	S17	S18
			Depth	2.30	3.00	2.00	3.00	0.30	1.30
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	0.13	0.04	0.31	0.09	0.06
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.07	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.20	0.05	0.43	0.11	0.12
Pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.16	0.04	0.36	0.09	0.09
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	< 0.03	0.16	0.04	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.04	0.08	< 0.03	0.19	0.05	0.08
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	0.08	< 0.03	0.19	0.05	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.08	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03	0.13	< 0.03	0.04
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.09	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.08	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.24	0.77	0.14	2.1	0.42	0.54
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.3	0.5	0.6	0.7	0.6	0.6

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768711	768712	768713	768714	768715	768716
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	< 0.2	9.1	11	9.8	15	7.0
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	1.0	0.8	1.0	0.8	1.1
Chromium	DETSC 2301#	0.15	mg/kg	< 0.15	21	25	36	17	22
Chromium III	DETSC 2301*	0.15	mg/kg	< 0.15	21	25	36	17	22
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	< 0.2	25	25	40	40	19
Lead	DETSC 2301#	0.3	mg/kg	< 0.3	51	35	52	34	48
Mercury	DETSC 2325#	0.05	mg/kg	0.17	0.05	0.08	< 0.05	0.07	0.06
Nickel	DETSC 2301#	1	mg/kg	< 1.0	21	24	28	22	18
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.7	< 0.5	< 0.5	0.8
Zinc	DETSC 2301#	1	mg/kg	< 1.0	100	91	180	110	110
Inorganics									
pH	DETSC 2008#			10.2	8.4	9.8	9.7	8.5	10.6
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.2	2.7	3.5	2.6	2.3	2.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.15	0.06	0.12	0.11	0.05	0.17
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.02	< 0.01	0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.04	< 0.01	0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768711	768712	768713	768714	768715	768716
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.50	0.05	0.09	0.06	0.04	0.16
Anthracene	DETSC 3303	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.2	0.10	0.11	0.07	0.09	0.21
Pyrene	DETSC 3303#	0.03	mg/kg	0.86	0.08	0.09	0.06	0.08	0.19
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.38	0.04	0.05	< 0.03	0.05	0.08
Chrysene	DETSC 3303	0.03	mg/kg	0.41	0.06	0.04	0.04	0.07	0.09
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.31	0.06	0.05	0.04	0.07	0.10
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.22	< 0.03	0.04	< 0.03	0.04	0.07
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	0.04	0.04
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	4.3	0.38	0.47	0.27	0.48	1.1
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.5	0.5	0.4	0.6	0.6

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	768717
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	SOIL
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	7.5
Cadmium	DETSC 2301#	0.1	mg/kg	1.0
Chromium	DETSC 2301#	0.15	mg/kg	24
Chromium III	DETSC 2301*	0.15	mg/kg	24
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	27
Lead	DETSC 2301#	0.3	mg/kg	63
Mercury	DETSC 2325#	0.05	mg/kg	0.05
Nickel	DETSC 2301#	1	mg/kg	21
Selenium	DETSC 2301#	0.5	mg/kg	0.6
Zinc	DETSC 2301#	1	mg/kg	95
Inorganics				
pH	DETSC 2008#			10.7
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.18
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	30
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	30
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	53
Aromatic C5-C35	DETSC 3072*	10	mg/kg	53
TPH Ali/Aro	DETSC 3072*	10	mg/kg	83

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	768717
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	SOIL
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.08
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.13
Pyrene	DETSC 3303#	0.03	mg/kg	0.12
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05
Chrysene	DETSC 3303	0.03	mg/kg	0.05
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.05
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.05
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.04
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.65
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.5

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Asbestos Analysis
Bulk & Soil Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	Sample ID	Sample Location	Material Type*	Result	Comment*	Analyst
768693	S1 0.50		SOIL	NAD	none	Andrew Little
768694	S2 1.70		SOIL	NAD	none	Andrew Little
768695	S3 3.00		SOIL	NAD	none	Andrew Little
768696	S4 2.00		SOIL	NAD	none	Andrew Little
768697	S5 3.00		SOIL	NAD	none	Andrew Little
768698	S6 0.50		SOIL	Chrysotile	Clumps of Chrysotile fibres present	Andrew Little
768699	S7 3.00		SOIL	Chrysotile	Bundle of chrysotile fibre present	Andrew Little
768700	S8 0.80		SOIL	NAD	none	Andrew Little
768701	S9 0.50		SOIL	NAD	none	Andrew Little
768702	S10 2.00		SOIL	NAD	none	Andrew Little
768703	S11 3.00		SOIL	Chrysotile	Small bundles of chrysotile fibres present	Andrew Little
768704	S12 0.50		SOIL	Amosite	Free Amosite fibres present	Andrew Little
768705	S13 2.30		SOIL	Amosite Chrysotile	Clump of Amosite/Chrysotile present	Andrew Little
768706	S14 3.00		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768707	S15 2.00		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768708	S16 3.00		SOIL	Chrysotile	Bundle of chrysotile fibre present	Andrew Little
768709	S17 0.30		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768710	S18 1.30		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768711	S19 2.80		SOIL	Chrysotile	Free Chrysotile fibres present	Andrew Little
768712	S20 0.50		SOIL	Chrysotile	Bundles of Chrysotile fibres present	Andrew Little
768713	S21 1.30		SOIL	Chrysotile	Bundle of chrysotile fibre present	Andrew Little
768714	S22 2.50		SOIL	Chrysotile	Bundles of Chrysotile fibres present	Andrew Little
768715	S23 0.50		SOIL	Chrysotile	Free Chrysotile fibres present	Andrew Little
768716	S24 1.40		SOIL	NAD	none	Andrew Little
768717	S25 2.50		SOIL	Chrysotile	Bundles of Chrysotile fibres present	Andrew Little
768718	S16A 3.00		Cement	Chrysotile	none	Andrew Little

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768698	768699	768703	768704
		Sample ID	S6	S7	S11	S12
		Depth	0.50	3.00	3.00	0.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.001	<0.001	<0.001	na
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	< 0.001
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	645.18	1061.41	748.41	1157.84
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	0.001	<0.001	<0.001	na
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	<0.001
% Serpentine fibres in sample		Mass %	na	na	na	<0.001
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768705	768706	768707	768708
		Sample ID	S13	S14	S15	S16
		Depth	2.30	3.00	2.00	3.00
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.024**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.024	<0.001	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	1226.44	1188.37	1497.67	838.56
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	0.024	na	na	na
% Serpentine bundles in sample		Mass %	na	<0.001	<0.001	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768709	768710	768711	768712
		Sample ID	S17	S18	S19	S20
		Depth	0.30	1.30	2.80	0.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	na	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	< 0.001	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	1345.77	840.34	683.00	1038.48
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	na	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	<0.001	na
% Serpentine fibres in sample		Mass %	na	na	<0.001	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768713	768714	768715	768717
		Sample ID	S21	S22	S23	S25
		Depth	1.30	2.50	0.50	2.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	na	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	< 0.001	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	960.31	964.16	1039.32	1100.66
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	na	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	<0.001	na
% Serpentine fibres in sample		Mass %	na	na	<0.001	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 15-27313-1
Client Ref 12032-SP1
Contract Herbet Road Stockpile - Round 1

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
768693	S1 0.50 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768694	S2 1.70 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768695	S3 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768696	S4 2.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768697	S5 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768698	S6 0.50 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768699	S7 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768700	S8 0.80 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768701	S9 0.50 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768702	S10 2.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768703	S11 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768704	S12 0.50 SOIL	12/02/15	GJ 250ml, PT 1L		
768705	S13 2.30 SOIL	12/02/15	GJ 250ml, PT 1L		
768706	S14 3.00 SOIL	12/02/15	GJ 250ml, PT 1L		
768707	S15 2.00 SOIL	12/02/15	GJ 250ml x2, PT 1L		
768708	S16 3.00 SOIL	12/02/15	GJ 250ml x2, PT 1L		
768709	S17 0.30 SOIL	12/02/15	GJ 250ml, PT 1L x2		
768710	S18 1.30 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768711	S19 2.80 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768712	S20 0.50 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768713	S21 1.30 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768714	S22 2.50 SOIL	12/02/15	GJ 1L, GJ 250ml, PT 1L x2		
768715	S23 0.50 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768716	S24 1.40 SOIL	12/02/15	GJ 250ml, PT 1L x2		
768717	S25 2.50 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768718	S16A 3.00 MISC	12/02/15	PT 1L x2		

Key: G-Glass P-Plastic J-Jar V-Vial T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-27519

27-Feb-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-27519

Client Reference 12032-SP1

Contract Title Herbert Road Stockpile - Round 1

Description 11 Soil samples.

Date Received 17-Feb-15

Date Started 17-Feb-15

Date Completed 27-Feb-15

Test Procedures Identified by prefix DETSn (details on request), Asbestos Analysis DETSC 1101.

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-27519
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

Sample ID	Lab No	Completed	Matrix Description
S26	769704	27/02/2015	Dark brown gravelly sandy CLAY with odd rootlets
S27	769705	27/02/2015	Dark brown gravelly sandy CLAY
S28	769706	27/02/2015	Dark brown gravelly sandy CLAY with odd rootlets (Made Ground includes brick)
S29	769707	27/02/2015	Dark brown gravelly sandy CLAY with odd rootlets
S30	769708	27/02/2015	Dark brown gravelly sandy CLAY
S31	769709	27/02/2015	Dark brown gravelly sandy CLAY
S32	769710	27/02/2015	Dark brown gravelly sandy CLAY with odd rootlets
S33	769711	27/02/2015	Dark brown gravelly sandy CLAY
S34	769712	27/02/2015	Dark grey gravelly sandy CLAY
S35	769713	27/02/2015	Dark gravelly sandy CLAY
S36	769714	27/02/2015	Brown gravelly sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769704	769705	769706	769707	769708	769709	769710
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	8.2	8.4	7.4	9.0	8.5	9.2	7.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.5	1.4	0.6	0.6	2.0	0.6
Chromium	DETSC 2301#	0.15	mg/kg	21	19	21	25	19	21	22
Chromium III	DETSC 2301*	0.15	mg/kg	21	19	21	25	19	21	22
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	26	21	31	27	25	21	23
Lead	DETSC 2301#	0.3	mg/kg	40	38	78	41	42	82	33
Mercury	DETSC 2325#	0.05	mg/kg	0.07	< 0.05	0.12	0.10	0.07	0.10	0.09
Nickel	DETSC 2301#	1	mg/kg	24	21	21	25	19	20	26
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	120	80	130	92	80	140	74
Inorganics										
pH	DETSC 2008#			8.7	9.3	9.5	8.6	8.7	11.3	8.8
Cyanide total	DETSC 2130#	0.1	mg/kg	0.1	0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1
Organic matter	DETSC 2002#	0.1	%	3.1	2.6	2.1	3.8	3.1	2.5	2.8
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.07	0.07	0.08	0.16	0.27	0.07	0.07
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	15	< 3.4	< 3.4	< 3.4	9.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	15	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	8.5	10
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	15	< 10	< 10	< 10	18	10

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769704	769705	769706	769707	769708	769709	769710
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	0.06	0.06	0.06	0.12	0.17	0.06
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.05	0.04	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	0.10	0.12	0.09	0.25	0.12	0.08
Pyrene	DETSC 3303#	0.03	mg/kg	0.07	0.09	0.10	0.07	0.22	0.10	0.07
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.04	0.04	0.05	< 0.03	0.11	0.04	0.04
Chrysene	DETSC 3303	0.03	mg/kg	0.05	0.06	0.06	0.05	0.12	0.06	0.04
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	0.06	0.06	0.04	0.13	0.05	0.04
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.05	< 0.03	0.09	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.06	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.05	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.33	0.45	0.50	0.30	1.2	0.61	0.33
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.4	< 0.3	< 0.3	0.4	0.4	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769711	769712	769713	769714
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	6.5	4.7	8.5	4.8
Cadmium	DETSC 2301#	0.1	mg/kg	1.2	0.6	0.6	1.0
Chromium	DETSC 2301#	0.15	mg/kg	14	21	15	18
Chromium III	DETSC 2301*	0.15	mg/kg	14	21	15	18
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	14	11	20	13
Lead	DETSC 2301#	0.3	mg/kg	39	21	26	41
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	16	12	20	16
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	97	48	63	85
Inorganics							
pH	DETSC 2008#			11.5	10.9	9.0	11.5
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.7	4.5	1.9	1.0
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.15	0.06	0.12	0.11
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	7.1	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	15	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	9.8	150	17	19
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	180	17	19
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.03	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	0.10	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	2.5	14	< 0.6	0.8
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	19	260	< 1.4	15
Aromatic C5-C35	DETSC 3072*	10	mg/kg	22	270	< 10	16
TPH Ali/Aro	DETSC 3072*	10	mg/kg	32	450	17	34

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769711	769712	769713	769714
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.21	0.22	< 0.03	0.10
Anthracene	DETSC 3303	0.03	mg/kg	0.07	0.04	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	0.17	0.07	0.20
Pyrene	DETSC 3303#	0.03	mg/kg	0.36	0.17	0.06	0.18
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.18	0.08	< 0.03	0.09
Chrysene	DETSC 3303	0.03	mg/kg	0.20	0.20	< 0.03	0.10
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.22	0.13	0.04	0.12
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	0.04	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.19	0.08	< 0.03	0.09
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.11	0.08	< 0.03	0.06
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.10	0.05	< 0.03	0.05
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	2.1	1.3	0.17	1.1
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-27519
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
769704	S26	SOIL	NAD	none	Jeff Cruddas
769705	S27	SOIL	NAD	none	Jeff Cruddas
769706	S28	SOIL	NAD	none	Jeff Cruddas
769707	S29	SOIL	NAD	none	Jeff Cruddas
769708	S30	SOIL	NAD	none	Jeff Cruddas
769709	S31	SOIL	NAD	none	Jeff Cruddas
769710	S32	SOIL	Amosite	Amosite present as fibre bundles	Jeff Cruddas
769711	S33	SOIL	NAD	none	Jeff Cruddas
769712	S34	SOIL	NAD	none	Jeff Cruddas
769713	S35	SOIL	NAD	none	Jeff Cruddas
769714	S36	SOIL	NAD	none	Jeff Cruddas

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 15-27519
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

Lab No	769710
Sample ID	S32
Depth	
Other ID	
Sample Type	SOIL
Sampling Date	16/02/15
Sampling Time	

Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	946.82
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	<0.001
% Serpentine bundles in sample		Mass %	na
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Serpentine fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 15-27519
Client Ref 12032-SP1
Contract Herbert Road Stockpile - Round 1

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
769704	S26 SOIL	16/02/15	GJ 1L, GJ 60ml, PT 1L x2		
769705	S27 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769706	S28 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769707	S29 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769708	S30 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769709	S31 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769710	S32 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769711	S33 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769712	S34 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769713	S35 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769714	S36 SOIL	16/02/15	GJ 250ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

ANNEX B
Remediation Strategy

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-40034-2

05-Aug-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-40034-2

Client Reference 12032

Contract Title Herbert Road

Description 32 Soil samples, 32 Leachate samples.

Date Received 10-Jul-15

Date Started 10-Jul-15

Date Completed 05-Aug-15

Test Procedures Identified by prefix DETSn (details on request).

Notes **This report supersedes 15-40034. Extra testing.**
Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

Sample ID	Depth	Lab No	Completed	Matrix Description
TP1	1	837846	27/07/2015	Brown, gravelly, sandy CLAY
TP1	2	837847	27/07/2015	Dark brown, gravelly, sandy CLAY
TP1	3	837848	27/07/2015	Dark brown, gravelly, sandy CLAY
TP2	1	837849	27/07/2015	Dark brown, gravelly, sandy CLAY
TP2	2	837850	27/07/2015	Dark brown, gravelly, sandy CLAY
TP2	2.9	837851	27/07/2015	Dark brown, gravelly, sandy CLAY
TP3	0.5	837852	27/07/2015	Dark brown, gravelly, sandy CLAY
TP3	1.5	837853	27/07/2015	Dark brown, gravelly, sandy CLAY
TP3	3.5	837854	27/07/2015	Dark brown, gravelly, sandy CLAY
TP4	0.5	837855	27/07/2015	Dark brown, gravelly, sandy CLAY
TP4	2	837856	27/07/2015	Dark brown, gravelly, sandy CLAY
TP4	3	837857	27/07/2015	Dark brown, gravelly, sandy CLAY
TP5	1	837858	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets (Made ground - ceramic)
TP5	2	837859	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets
TP5	3	837860	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets (Made ground - brick)
TP6	0.5	837861	27/07/2015	Dark brown, gravelly, sandy CLAY
TP6	2	837862	27/07/2015	Dark brown, gravelly, sandy CLAY
TP6	3	837863	27/07/2015	Dark brown, gravelly, sandy CLAY
TP7	0.3	837864	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets
TP7	0.6	837865	27/07/2015	Dark brown, gravelly, sandy CLAY
TP7	2	837866	27/07/2015	Dark brown, gravelly, sandy CLAY
TP8	0.5	837867	27/07/2015	Dark brown, gravelly, sandy CLAY
TP8	2	837868	27/07/2015	Dark brown, gravelly, sandy CLAY
TP8	2.5	837869	27/07/2015	Very dark brown gravelly, sandy CLAY including odd rootlets
TP9	0.3	837870	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets
TP9	1	837871	27/07/2015	Brown, gravelly, sandy CLAY including odd rootlets
TP9	1.6	837872	27/07/2015	Dark brown, gravelly, sandy CLAY (Made ground -brick)
TP10	0.5	837873	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets (Made ground - brick)
TP10	1.4	837874	27/07/2015	Brown, gravelly, sandy CLAY
TP10	2.2	837875	27/07/2015	Dark brown, gravelly, sandy CLAY
TP11	0.5	837876	27/07/2015	Dark brown, gravelly, sandy CLAY
TP11	1	837877	27/07/2015	Dark brown, gravelly, sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837846	837847	837848	837849	837850	837851
			Sample ID	TP1	TP1	TP1	TP2	TP2	TP2
			Depth	1.00	2.00	3.00	1.00	2.00	2.90
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0				Y		Y	Y
Preparation									
Moisture Content	DETSC 1004*	0.1	%	15	18	18	15	21	17
Metals									
Antimony	DETSC 2301*	1	mg/kg	1.7	3.0	2.2	2.0	2.6	2.0
Arsenic	DETSC 2301#	0.2	mg/kg	6.2	9.9	7.5	11	9.9	7.4
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	1.1	1.2	1.2	1.1	1.2
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.1	1.2	1.0	1.2	1.2	1.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.6	0.8	0.4	0.5	0.4
Chromium	DETSC 2301#	0.15	mg/kg	23	65	39	33	29	23
Chromium III	DETSC 2301*	0.15	mg/kg	23	65	39	33	29	23
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	14	41	33	23	32	40
Lead	DETSC 2301#	0.3	mg/kg	53	39	34	31	60	59
Manganese	DETSC 2301#	20	mg/kg	730	940	1100	860	770	600
Mercury	DETSC 2325#	0.05	mg/kg	0.06	0.14	0.10	0.11	0.27	0.19
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1	4.9	1.2	0.9	1.9	1.0
Nickel	DETSC 2301#	1	mg/kg	17	44	30	21	26	29
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.8	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	55	100	89	74	90	78
Inorganics									
pH	DETSC 2008#			8.8	8.9	8.8	10.4	8.9	8.7
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.1	0.2	0.2	0.1	0.2	0.1
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	1.4	5.3	1.6	6.6	5.8	7.7
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.09	0.09	0.19	0.41	0.12	0.06

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837846	837847	837848	837849	837850	837851
			Sample ID	TP1	TP1	TP1	TP2	TP2	TP2
			Depth	1.00	2.00	3.00	1.00	2.00	2.90
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	2.0	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	4.1	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	19	11	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	19	11	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.12
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	1.7	4.4	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	35	37	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	37	41	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	56	53	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	1.3
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.09
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.09
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.06	0.09	0.09	0.03	0.06	0.44
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.09
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.13	0.18	0.22	0.05	0.08	0.43
Pyrene	DETSC 3303#	0.03	mg/kg	0.10	0.13	0.20	0.05	0.07	0.34
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05	0.06	0.11	< 0.03	< 0.03	0.13
Chrysene	DETSC 3303	0.03	mg/kg	0.06	0.08	0.12	< 0.03	< 0.03	0.13
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.07	0.14	< 0.03	< 0.03	0.10
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.05	< 0.03	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.03	0.05	0.09	< 0.03	< 0.03	0.07
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.07	< 0.03	< 0.03	0.04
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.07	< 0.03	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.50	0.73	1.2	0.13	0.22	3.3
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

				Lab No	837852	837853	837854	837855	837856	837857
				Sample ID	TP3	TP3	TP3	TP4	TP4	TP4
				Depth	0.50	1.50	3.50	0.50	2.00	3.00
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Asbestos Quantification OHR	DETSC 1102	0						Y	Y	Y
Preparation										
Moisture Content	DETSC 1004*	0.1	%	15	20	15	17	15	19
Metals										
Antimony	DETSC 2301*	1	mg/kg	2.1	2.4	1.6	2.2	1.7	2.4
Arsenic	DETSC 2301#	0.2	mg/kg	9.9	13	8.3	22	8.1	8.6
Beryllium	DETSC 2301#	0.2	mg/kg	0.8	1.1	1.1	0.7	0.7	0.8
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	0.5	1.1	1.2	1.2	1.2	1.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.6	3.0	0.6	1.1	0.4
Chromium	DETSC 2301#	0.15	mg/kg	21	25	20	19	20	30
Chromium III	DETSC 2301*	0.15	mg/kg	21	25	20	19	20	30
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	21	31	39	36	26	19
Lead	DETSC 2301#	0.3	mg/kg	27	45	130	59	37	330
Manganese	DETSC 2301#	20	mg/kg	550	890	980	630	640	730
Mercury	DETSC 2325#	0.05	mg/kg	0.07	0.14	0.20	0.17	0.10	0.10
Molybdenum	DETSC 2301#	0.4	mg/kg	0.9	1.1	0.8	1.2	0.8	0.9
Nickel	DETSC 2301#	1	mg/kg	24	25	16	20	20	30
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	70	96	180	110	83	89
Inorganics										
pH	DETSC 2008#			8.4	8.7	9.1	8.4	8.9	8.6
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.1	0.2	0.1	0.2	0.1	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.4	7.2	5.2	3.1	3.1	1.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.06	0.10	0.28	0.08	0.08	0.07

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837852	837853	837854	837855	837856	837857
			Sample ID	TP3	TP3	TP3	TP4	TP4	TP4
			Depth	0.50	1.50	3.50	0.50	2.00	3.00
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	12	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	12	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	5.2	< 0.6	< 0.6	2.2
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	50	< 1.4	< 1.4	10
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	55	< 10	< 10	13
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	67	< 10	< 10	13
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	0.18	0.06	0.27	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.06	< 0.03	0.06	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.13	0.77	0.06	0.52	0.23
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11	0.62	0.05	0.40	0.24
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	0.31	< 0.03	0.15	0.12
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.06	0.35	< 0.03	0.16	0.14
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	0.38	< 0.03	0.13	0.26
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.15	< 0.03	0.05	0.08
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.26	< 0.03	0.08	0.21
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.17	< 0.03	0.06	0.13
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.06	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.21	< 0.03	0.05	0.17
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	< 0.10	0.53	3.5	0.16	2.0	1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

				Lab No	837858	837859	837860	837861	837862	837863
				Sample ID	TP5	TP5	TP5	TP6	TP6	TP6
				Depth	1.00	2.00	3.00	0.50	2.00	3.00
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Asbestos Quantification OHR	DETSC 1102	0				Y		Y	Y
Preparation										
Moisture Content	DETSC 1004*	0.1	%	17	23	30	17	21	21
Metals										
Antimony	DETSC 2301*	1	mg/kg	2.7	2.5	2.8	2.0	3.3	2.4
Arsenic	DETSC 2301#	0.2	mg/kg	7.1	23	15	9.6	13	12
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.8	0.7	0.8	0.7	0.7
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	2.7	1.6	2.1	1.6	1.7	1.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.9	0.7	0.6	0.5	0.5	0.5
Chromium	DETSC 2301#	0.15	mg/kg	130	25	28	25	20	25
Chromium III	DETSC 2301*	0.15	mg/kg	130	25	28	25	20	25
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	16	71	37	24	140	48
Lead	DETSC 2301#	0.3	mg/kg	31	81	64	38	130	76
Manganese	DETSC 2301#	20	mg/kg	1700	660	920	780	670	680
Mercury	DETSC 2325#	0.05	mg/kg	0.18	0.23	0.23	0.09	0.34	0.21
Molybdenum	DETSC 2301#	0.4	mg/kg	1.2	1.3	1.3	0.8	1.3	1.2
Nickel	DETSC 2301#	1	mg/kg	14	19	19	23	22	18
Selenium	DETSC 2301#	0.5	mg/kg	0.8	< 0.5	0.5	< 0.5	0.6	< 0.5
Zinc	DETSC 2301#	1	mg/kg	130	150	110	70	140	110
Inorganics										
pH	DETSC 2008#			9.6	8.3	8.3	9.2	9.2	8.6
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.3	0.5	0.2	0.2	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	0.3	< 0.2	0.2	0.2
Organic matter	DETSC 2002#	0.1	%	2.5	5.8	5.0	2.1	4.5	3.8
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.23	0.09	0.12	0.11	0.12	0.09

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837858	837859	837860	837861	837862	837863
			Sample ID	TP5	TP5	TP5	TP6	TP6	TP6
			Depth	1.00	2.00	3.00	0.50	2.00	3.00
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.10	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.12	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	1.8	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	3.7	8.8	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	6.7	7.7	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	19	17	< 3.4	9.6	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	8.8	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	19	28	19	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.12	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	12	1.7	< 0.6	< 0.6	1.9	5.8
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	90	16	< 1.4	< 1.4	3.6	8.8
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	38	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	100	18	< 10	< 10	< 10	15
TPH Ali/Aro	DETSC 3072*	10	mg/kg	120	46	19	< 10	< 10	15
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.20	0.09	0.16	< 0.03	0.29	0.19
Anthracene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	0.06	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.36	0.18	0.29	< 0.03	0.52	0.41
Pyrene	DETSC 3303#	0.03	mg/kg	0.26	0.16	0.22	< 0.03	0.43	0.33
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.12	0.09	0.10	< 0.03	0.19	0.16
Chrysene	DETSC 3303	0.03	mg/kg	0.14	0.10	0.16	< 0.03	0.23	0.18
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.12	0.16	< 0.03	0.24	0.22
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.04	0.05	< 0.03	0.07	0.07
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.08	0.09	0.09	< 0.03	0.15	0.13
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.05	0.05	< 0.03	0.09	0.07
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.05	0.05	0.06	< 0.03	0.09	0.07
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.6	0.96	1.3	< 0.10	2.4	1.9
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837864	837865	837866	837867	837868	837869
			Sample ID	TP7	TP7	TP7	TP8	TP8	TP8
			Depth	0.30	0.60	2.00	0.50	2.00	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0		Y	Y				Y
Preparation									
Moisture Content	DETSC 1004*	0.1	%	16	12	29	16	16	14
Metals									
Antimony	DETSC 2301*	1	mg/kg	2.0	1.3	1.9	2.3	1.9	1.6
Arsenic	DETSC 2301#	0.2	mg/kg	10	4.3	10	13	6.7	9.1
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.5	1.1	1.2	0.8	0.9
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.4	1.5	2.0	1.5	1.2	1.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.6	0.5	0.4	1.6	0.3
Chromium	DETSC 2301#	0.15	mg/kg	25	19	26	35	27	31
Chromium III	DETSC 2301*	0.15	mg/kg	25	19	26	35	27	31
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	24	11	32	34	17	24
Lead	DETSC 2301#	0.3	mg/kg	43	20	20	90	95	20
Manganese	DETSC 2301#	20	mg/kg	820	510	590	690	830	930
Mercury	DETSC 2325#	0.05	mg/kg	0.15	< 0.05	0.07	0.20	0.09	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.5	3.6	1.2	0.6	0.9
Nickel	DETSC 2301#	1	mg/kg	27	18	30	27	24	22
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	97	52	77	95	130	60
Inorganics									
pH	DETSC 2008#			8.8	11.5	8.5	8.7	9.4	10.2
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	0.1	0.2	< 0.1	< 0.1
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.4	1.6	1.5	5.8	0.9	10
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.11	0.22	0.10	0.11	0.12	0.10

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837864	837865	837866	837867	837868	837869
			Sample ID	TP7	TP7	TP7	TP8	TP8	TP8
			Depth	0.30	0.60	2.00	0.50	2.00	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.17
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.05
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	2.7
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	5.9	< 3.4	< 3.4	< 3.4	< 3.4	66
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	15
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	69
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.05
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	9.1
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	140
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	41
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	150
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	220
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	0.05
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.23	0.18	< 0.03	0.10	< 0.03	0.14
Anthracene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.34	0.21	< 0.03	0.16	< 0.03	0.13
Pyrene	DETSC 3303#	0.03	mg/kg	0.27	0.17	< 0.03	0.14	< 0.03	0.13
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.13	0.10	< 0.03	0.07	< 0.03	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.15	0.11	< 0.03	0.07	< 0.03	0.14
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.16	0.10	< 0.03	0.09	< 0.03	0.09
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.06	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.09	0.07	< 0.03	0.06	< 0.03	0.05
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.03	< 0.03	0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.06	0.04	< 0.03	0.03	< 0.03	0.05
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.6	1.1	< 0.10	0.77	< 0.10	0.81
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

				Lab No	837870	837871	837872	837873	837874	837875
				Sample ID	TP9	TP9	TP9	TP10	TP10	TP10
				Depth	0.30	1.00	1.60	0.50	1.40	2.20
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Asbestos Quantification OHR	DETSC 1102	0		Y		Y	Y		Y
Preparation										
Moisture Content	DETSC 1004*	0.1	%	14	15	21	13	17	21
Metals										
Antimony	DETSC 2301*	1	mg/kg	1.7	2.9	2.9	2.2	1.5	1.9
Arsenic	DETSC 2301#	0.2	mg/kg	7.1	6.8	9.3	8.8	4.2	8.7
Beryllium	DETSC 2301#	0.2	mg/kg	1.3	1.0	0.8	1.0	0.8	0.9
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	2.1	1.4	1.9	1.3	1.5	2.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.5	0.5	0.4	0.6	0.3
Chromium	DETSC 2301#	0.15	mg/kg	34	36	27	31	29	29
Chromium III	DETSC 2301*	0.15	mg/kg	34	36	27	31	29	29
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	24	15	21	18	8.9	25
Lead	DETSC 2301#	0.3	mg/kg	28	43	69	35	30	70
Manganese	DETSC 2301#	20	mg/kg	1200	810	570	820	530	830
Mercury	DETSC 2325#	0.05	mg/kg	0.07	< 0.05	0.09	0.09	< 0.05	0.24
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.5	0.7	0.8	0.6	0.9
Nickel	DETSC 2301#	1	mg/kg	20	29	22	26	25	20
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	77	86	110	110	68	85
Inorganics										
pH	DETSC 2008#			10.0	9.0	9.7	8.4	11.2	9.8
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	0.2	0.2	< 0.1	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	6.4	1.3	1.5	2.3	0.5	6.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.41	0.09	0.18	0.07	0.21	0.17

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837870	837871	837872	837873	837874	837875
			Sample ID	TP9	TP9	TP9	TP10	TP10	TP10
			Depth	0.30	1.00	1.60	0.50	1.40	2.20
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	9.9	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	140	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	36	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	150	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	25	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	290	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	94	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	320	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	470	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	0.25	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.08	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.58	0.08	0.13	0.20	0.25	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.10	< 0.03	< 0.03	0.06	0.05	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.51	0.20	0.31	0.41	0.49	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.40	0.16	0.27	0.33	0.44	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.18	0.07	0.11	0.16	0.19	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.24	0.07	0.13	0.19	0.20	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.22	0.07	0.18	0.23	0.27	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03	0.07	0.08	0.08	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.16	0.05	0.13	0.12	0.19	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	0.08	0.08	0.11	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.20	< 0.03	0.10	0.08	0.12	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	3.2	0.69	1.5	1.9	2.4	< 0.10
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	0.8

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837876	837877
			Sample ID	TP11	TP11
			Depth	0.50	1.00
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Asbestos Quantification OHR	DETSC 1102	0		Y	
Preparation					
Moisture Content	DETSC 1004*	0.1	%	14	18
Metals					
Antimony	DETSC 2301*	1	mg/kg	1.8	2.8
Arsenic	DETSC 2301#	0.2	mg/kg	9.4	6.2
Beryllium	DETSC 2301#	0.2	mg/kg	0.7	0.9
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.3	1.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.6
Chromium	DETSC 2301#	0.15	mg/kg	18	29
Chromium III	DETSC 2301*	0.15	mg/kg	18	29
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	20	28
Lead	DETSC 2301#	0.3	mg/kg	47	35
Manganese	DETSC 2301#	20	mg/kg	690	800
Mercury	DETSC 2325#	0.05	mg/kg	0.13	0.06
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.5
Nickel	DETSC 2301#	1	mg/kg	20	29
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	85	96
Inorganics					
pH	DETSC 2008#			9.3	8.4
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.0	1.4
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.16	0.06

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837876	837877
			Sample ID	TP11	TP11
			Depth	0.50	1.00
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	57	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	14	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	57	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	1.9	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	110	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	33	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	110	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	170	< 10
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.13	0.05
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.26	0.09
Pyrene	DETSC 3303#	0.03	mg/kg	0.24	0.08
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.11	0.04
Chrysene	DETSC 3303	0.03	mg/kg	0.14	0.04
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.16	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.4	0.30
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837878	837879	837880	837881	837882	837883
			Sample ID	TP1	TP1	TP1	TP2	TP2	TP2
			Depth	1.00	2.00	3.00	1.00	2.00	2.90
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.5	2.3	1.3	1.1	1.3	1.3
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	0.09	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	1.0	0.26	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	3.3	2.8	1.9	1.2	2.0	1.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.72	0.70	0.37	0.13	0.66	0.57
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.9	0.8	< 0.5	0.6	0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.33	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.67	1.42	1.29	2.45	1.52	1.38
Inorganics									
pH	DETSC 2008			8.2	7.7	7.6	7.5	7.7	7.6
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.1	0.81	0.93	1.2	0.95	0.93
Fluoride	DETSC 2055	0.1	mg/l	0.13	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	8.8	5.3	5.6	8.2	6.2	3.0
Total Organic Carbon	DETSC 2085	1	mg/l	4.1	3.7	2.5	1.8	2.8	2.2
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837878	837879	837880	837881	837882	837883
			Sample ID	TP1	TP1	TP1	TP2	TP2	TP2
			Depth	1.00	2.00	3.00	1.00	2.00	2.90
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.03	0.03	0.04	0.04	0.04	0.04
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	0.01	0.02
Phenanthrene	DETSC 3304	0.01	ug/l	0.03	0.02	0.07	0.05	0.05	0.06
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	0.01	0.02	0.01	0.01	0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.04	0.05	0.06	0.06	0.05	0.06
Pyrene	DETSC 3304	0.01	ug/l	0.05	0.05	0.05	0.06	0.05	0.05
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.03	0.05	0.04	0.03	0.02	0.04
Chrysene	DETSC 3304	0.01	ug/l	0.03	0.05	0.06	0.04	0.03	0.04
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.12	0.09	0.03	0.03	0.04
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.04	0.03	0.01	< 0.01	0.02
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.11	0.06	0.03	0.02	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.02	0.09	0.06	0.02	< 0.01	0.02
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.05	0.20	0.08	0.02	< 0.01	0.04
PAH	DETSC 3304	0.04	ug/l	0.30	0.81	0.71	0.41	0.33	0.43
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837884	837885	837886	837887	837888	837889
			Sample ID	TP3	TP3	TP3	TP4	TP4	TP4
			Depth	0.50	1.50	3.50	0.50	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.90	1.5	0.68	1.2	1.6	1.5
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	0.07	< 0.03	< 0.03	0.47
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.40	< 0.25	< 0.25	0.55	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.3	2.1	1.1	2.4	1.6	0.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.47	0.81	0.65	0.96	0.40	0.30
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	2.20	< 1.25	2.61	3.09	< 1.25	3.26
Inorganics									
pH	DETSC 2008			7.6	7.7	7.6	7.6	7.5	7.5
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.1	0.89	0.83	0.94	0.94	0.73
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	6.2	3.1	4.8	8.0	9.6	5.1
Total Organic Carbon	DETSC 2085	1	mg/l	2.5	2.5	1.6	3.9	3.0	1.7
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837884	837885	837886	837887	837888	837889
			Sample ID	TP3	TP3	TP3	TP4	TP4	TP4
			Depth	0.50	1.50	3.50	0.50	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.03	0.04	0.04	0.04	0.05	0.03
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.01	< 0.01	0.01	0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	0.01	0.03
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.01	< 0.01	0.02	0.02
Phenanthrene	DETSC 3304	0.01	ug/l	0.02	0.06	0.06	0.03	0.07	0.04
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	0.01	0.02	< 0.01	0.02	0.02
Fluoranthene	DETSC 3304	0.01	ug/l	0.02	0.07	0.11	0.03	0.07	0.08
Pyrene	DETSC 3304	0.01	ug/l	0.02	0.07	0.12	0.03	0.08	0.11
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	0.02	0.10	0.02	0.04	0.05
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	0.05	0.11	0.02	0.04	0.05
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.07	0.11	0.03	0.05	0.13
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.04	0.05	0.01	0.02	0.05
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.05	0.11	0.02	0.03	0.10
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	< 0.01	0.03	0.15	0.02	0.03	0.17
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.05	< 0.01	0.01	0.03
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	< 0.01	0.03	0.22	0.02	0.04	0.21
PAH	DETSC 3304	0.04	ug/l	0.10	0.53	1.3	0.27	0.58	1.1
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837890	837891	837892	837893	837894	837895
			Sample ID	TP5	TP5	TP5	TP6	TP6	TP6
			Depth	1.00	2.00	3.00	0.50	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	5.0	1.4	3.7	0.61	2.7	1.8
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	0.12	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	0.37	< 0.25	0.29	0.81
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	5.7	2.6	9.2	2.0	4.2	3.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.67	1.1	3.3	0.66	2.4	1.4
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.8	0.6	1.0	0.7	0.7	0.6
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.67	< 0.25	0.35	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	1.55	2.32	1.43	3.11	1.69
Inorganics									
pH	DETSC 2008			7.7	7.7	7.6	7.7	7.5	7.3
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.5	1.8	1.3	1.2	1.2	1.2
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	3.5	6.2	8.8	9.1	4.7	5.8
Total Organic Carbon	DETSC 2085	1	mg/l	5.0	3.9	6.6	4.1	3.1	6.8
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	0.6	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837890	837891	837892	837893	837894	837895
			Sample ID	TP5	TP5	TP5	TP6	TP6	TP6
			Depth	1.00	2.00	3.00	0.50	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.07	0.04	0.05	0.03	0.04	0.04
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.10	0.01	0.02	< 0.01	0.01	0.01
Fluorene	DETSC 3304	0.01	ug/l	0.04	0.01	0.02	< 0.01	0.01	0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.06	0.04	0.07	0.03	0.06	0.06
Anthracene	DETSC 3304	0.01	ug/l	0.02	0.01	0.02	< 0.01	0.02	0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.07	0.06	0.11	0.04	0.07	0.08
Pyrene	DETSC 3304	0.01	ug/l	0.07	0.05	0.11	0.04	0.07	0.06
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.04	0.03	0.07	0.02	0.04	0.04
Chrysene	DETSC 3304	0.01	ug/l	0.04	0.04	0.06	0.02	0.05	0.05
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.05	0.06	0.09	0.03	0.10	0.08
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.02	0.02	0.03	0.01	0.03	0.03
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.03	0.03	0.05	0.02	0.06	0.04
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.04	0.04	0.06	0.01	0.07	0.06
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	0.02	0.02
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.05	0.04	0.08	0.02	0.07	0.06
PAH	DETSC 3304	0.04	ug/l	0.70	0.48	0.86	0.28	0.70	0.64
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837896	837897	837898	837899	837900	837901
			Sample ID	TP7	TP7	TP7	TP8	TP8	TP8
			Depth	0.30	0.60	2.00	0.50	2.00	2.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.6	0.82	0.35	0.97	1.9	3.4
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	2.4	< 0.25	< 0.25	1.1	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	2.4	< 1.0	< 1.0	1.1	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.9	5.3	0.6	1.1	1.9	3.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.35	< 0.09	0.20	0.18	0.35	0.18
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	0.6	< 0.5	< 0.5	< 0.5	1.4
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	0.66
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.42	< 1.25	< 1.25	4.08	< 1.25	< 1.25
Inorganics									
pH	DETSC 2008			7.3	10.7	8.9	8.3	8.3	7.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.3	3.3	1.4	0.77	1.4	1.3
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	9.5	2.3	15	8.5	6.2	4.7
Total Organic Carbon	DETSC 2085	1	mg/l	2.6	1.7	4.0	1.6	1.5	3.3
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837896	837897	837898	837899	837900	837901
			Sample ID	TP7	TP7	TP7	TP8	TP8	TP8
			Depth	0.30	0.60	2.00	0.50	2.00	2.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.04	0.07	0.04	0.03	0.03	0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.01
Fluorene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.05	0.03	0.02	0.04	0.02	0.08
Anthracene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.05	0.02	0.01	0.04	0.02	0.05
Pyrene	DETSC 3304	0.01	ug/l	0.04	0.02	0.02	0.04	0.02	3.9
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	0.02	< 0.01	0.02
Chrysene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	0.02	< 0.01	0.03
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	0.03	< 0.01	0.03
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	0.02	< 0.01	0.02
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.02	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.02	< 0.01	< 0.01	0.02	< 0.01	0.02
PAH	DETSC 3304	0.04	ug/l	0.35	0.14	0.10	0.26	0.08	4.3
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837902	837903	837904	837905	837906	837907
			Sample ID	TP9	TP9	TP9	TP10	TP10	TP10
			Depth	0.30	1.00	1.60	0.50	1.40	2.20
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	3.9	1.7	1.7	0.56	3.7	1.1
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	4.3	2.1	2.6	2.3	2.9	1.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.46	0.38	0.69	< 0.09	2.9	0.36
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.1	0.6	0.7	0.6	0.9	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.66	< 0.25	0.37	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	1.61	1.26	< 1.25	1.39	< 1.25
Inorganics									
pH	DETSC 2008			7.6	7.4	7.2	10.5	8.7	8.2
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.1	1.0	1.3	1.3	0.85	0.66
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	5.8	6.2	8.6	2.9	3.9	7.2
Total Organic Carbon	DETSC 2085	1	mg/l	4.1	2.1	2.7	1.8	3.3	2.0
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837902	837903	837904	837905	837906	837907
			Sample ID	TP9	TP9	TP9	TP10	TP10	TP10
			Depth	0.30	1.00	1.60	0.50	1.40	2.20
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.08	0.03	0.03	0.05	0.03	0.03
Acenaphthylene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.04	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.21	0.02	0.02	0.02	0.04	0.03
Anthracene	DETSC 3304	0.01	ug/l	0.05	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.31	0.02	0.02	0.01	0.07	0.03
Pyrene	DETSC 3304	0.01	ug/l	0.35	0.02	0.02	0.01	0.06	0.02
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.25	0.01	0.01	< 0.01	0.03	0.01
Chrysene	DETSC 3304	0.01	ug/l	0.20	0.01	0.01	< 0.01	0.05	0.02
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.25	0.03	0.02	< 0.01	0.07	0.02
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.09	0.01	< 0.01	< 0.01	0.03	0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.17	0.02	< 0.01	< 0.01	0.05	0.02
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.16	< 0.01	< 0.01	< 0.01	0.06	0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.04	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.19	0.01	0.01	< 0.01	0.07	0.02
PAH	DETSC 3304	0.04	ug/l	2.5	0.20	0.16	0.09	0.59	0.22
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837908	837909
			Sample ID	TP11	TP11
			Depth	0.50	1.00
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
NRA Leachate Preparation	DETS 036*			Y	Y
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.72	0.56
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.8	2.2
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.19	0.19
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25
Inorganics					
pH	DETSC 2008			8.1	7.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	0.69	0.57
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.9	4.3
Total Organic Carbon	DETSC 2085	1	mg/l	1.5	1.9
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837908	837909
			Sample ID	TP11	TP11
			Depth	0.50	1.00
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETSC 3304	0.01	ug/l	0.03	0.03
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.03	0.02
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.03	0.02
Pyrene	DETSC 3304	0.01	ug/l	0.02	0.02
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.02	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.02	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.01	< 0.01
PAH	DETSC 3304	0.04	ug/l	0.17	0.08
Phenols					
Phenol	*	0.5	ug/l	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
837846	TP1 1.00	SOIL	NAD	none	D Wilkinson
837847	TP1 2.00	SOIL	NAD	none	D Wilkinson
837848	TP1 3.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837849	TP2 1.00	SOIL	NAD	none	D Wilkinson
837850	TP2 2.00	SOIL	Chrysotile	Chrysotile present as small fibre bundles	D Wilkinson
837851	TP2 2.90	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837852	TP3 0.50	SOIL	NAD	none	D Wilkinson
837853	TP3 1.50	SOIL	NAD	none	D Wilkinson
837854	TP3 3.50	SOIL	NAD	none	D Wilkinson
837855	TP4 0.50	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837856	TP4 2.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837857	TP4 3.00	SOIL	Chrysotile	Chrysotile present as small fibre bundle	D Wilkinson
837858	TP5 1.00	SOIL	NAD	none	D Wilkinson
837859	TP5 2.00	SOIL	NAD	none	D Wilkinson
837860	TP5 3.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837861	TP6 0.50	SOIL	NAD	none	D Wilkinson
837862	TP6 2.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837863	TP6 3.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837864	TP7 0.30	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837865	TP7 0.60	SOIL	Chrysotile	Chrysotile present as small fibre bundle	D Wilkinson
837866	TP7 2.00	SOIL	NAD	none	D Wilkinson
837867	TP8 0.50	SOIL	NAD	none	D Wilkinson
837868	TP8 2.00	SOIL	NAD	none	D Wilkinson
837869	TP8 2.50	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837870	TP9 0.30	SOIL	Chrysotile Amosite	Chrysotile present as fibre bundles Amosite also present as small bundle	D Wilkinson
837871	TP9 1.00	SOIL	NAD	none	D Wilkinson
837872	TP9 1.60	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837873	TP10 0.50	SOIL	Amosite	Amosite present as small fibre bundle	D Wilkinson
837874	TP10 1.40	SOIL	NAD	none	D Wilkinson
837875	TP10 2.20	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837876	TP11 0.50	SOIL	Chrysotile	Chrysotile present as small fibre bundle	D Wilkinson
837877	TP11 1.00	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

Lab No	Sample ID	Material Type	Result	Comment*	Analyst

a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837848	837850	837851	837855
		Sample ID	TP1	TP2	TP2	TP4
		Depth	3.00	2.00	2.90	0.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	1036.29	1075.16	1046.26	989.45
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	<0.001	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837856	837857	837860	837862
		Sample ID	TP4	TP4	TP5	TP6
		Depth	2.00	3.00	3.00	2.00
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**0.005**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	0.005	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	769.83	1181.87	1123.10	1055.83
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	0.005	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837863	837864	837865	837869
		Sample ID	TP6	TP7	TP7	TP8
		Depth	3.00	0.30	0.60	2.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.003**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.003	<0.001	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	997.47	460.41	502.83	664.80
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	0.003	<0.001	<0.001	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837870	837872	837873	837875
		Sample ID	TP9	TP9	TP10	TP10
		Depth	0.30	1.60	0.50	2.20
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**0.002**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	0.002	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	983.64	1171.10	576.91	695.43
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	<0.001	na
% Serpentine bundles in sample		Mass %	<0.001	0.002	na	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837876
		Sample ID	TP11
		Depth	0.50
		Other ID	
		Sample Type	SOIL
		Sampling Date	08/07/15
		Sampling Time	
Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	457.75
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Serpentine bundles in sample		Mass %	<0.001
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Serpentine fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 15-40034-2
Client Ref 12032
Contract Herbert Road

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
837846	TP1 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837847	TP1 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837848	TP1 3.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837849	TP2 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837850	TP2 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837851	TP2 2.90 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837852	TP3 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837853	TP3 1.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837854	TP3 3.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837855	TP4 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837856	TP4 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837857	TP4 3.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837858	TP5 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837859	TP5 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837860	TP5 3.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837861	TP6 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837862	TP6 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837863	TP6 3.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837864	TP7 0.30 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837865	TP7 0.60 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837866	TP7 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837867	TP8 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837868	TP8 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837869	TP8 2.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837870	TP9 0.30 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837871	TP9 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837872	TP9 1.60 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837873	TP10 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837874	TP10 1.40 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837875	TP10 2.20 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837876	TP11 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837877	TP11 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837878	TP1 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837879	TP1 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837880	TP1 3.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837881	TP2 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837882	TP2 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837883	TP2 2.90 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837884	TP3 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837885	TP3 1.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837886	TP3 3.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837887	TP4 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837888	TP4 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837889	TP4 3.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837890	TP5 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837891	TP5 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837892	TP5 3.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837893	TP6 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837894	TP6 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		

Information in Support of the Analytical Results

Our Ref 15-40034-2
Client Ref 12032
Contract Herbert Road

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
837895	TP6 3.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837896	TP7 0.30 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837897	TP7 0.60 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837898	TP7 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837899	TP8 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837900	TP8 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837901	TP8 2.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837902	TP9 0.30 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837903	TP9 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837904	TP9 1.60 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837905	TP10 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837906	TP10 1.40 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837907	TP10 2.20 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837908	TP11 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837909	TP11 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-40314

03-Aug-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-40314

Client Reference 12032

Contract Title Herbert Road

Description 24 Soil samples, 24 Leachate samples.

Date Received 15-Jul-15

Date Started 15-Jul-15

Date Completed 03-Aug-15

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

Sample ID	Depth	Lab No	Completed	Matrix Description
TP12	1	839276	03/08/2015	Brown, gravelly, sandy CLAY
TP12	2	839277	03/08/2015	Brown, gravelly, sandy CLAY
TP12	3	839278	03/08/2015	Brown, gravelly, sandy CLAY
TP13	1	839279	03/08/2015	Brown, gravelly, sandy CLAY
TP13	2	839280	03/08/2015	Brown, gravelly, sandy CLAY
TP13	3	839281	03/08/2015	Brown, gravelly, sandy CLAY
TP14	1	839282	03/08/2015	Brown, gravelly, sandy CLAY
TP14	2	839283	03/08/2015	Brown, gravelly, sandy CLAY
TP14	3	839284	03/08/2015	Brown, gravelly, sandy CLAY
TP15	0.3	839285	03/08/2015	Brown, gravelly, sandy CLAY
TP15	1	839286	03/08/2015	Brown, gravelly, sandy CLAY
TP15	2.2	839287	03/08/2015	Brown, gravelly, sandy CLAY
TP16	0.5	839288	03/08/2015	Brown, gravelly, sandy CLAY
TP16	1.5	839289	03/08/2015	Brown, gravelly, sandy CLAY
TP16	2.5	839290	03/08/2015	Brown, gravelly, sandy CLAY
TP17	0.5	839291	03/08/2015	Brown, gravelly, sandy CLAY
TP17	1.5	839292	03/08/2015	Brown, gravelly, sandy CLAY
TP17	2.5	839293	03/08/2015	Brown, gravelly, sandy CLAY
TP18	0.5	839294	03/08/2015	Brown, gravelly, sandy CLAY
TP18	1.5	839295	03/08/2015	Brown, gravelly, sandy CLAY
TP18	2.5	839296	03/08/2015	Brown, gravelly, sandy CLAY
TP19	0.5	839297	03/08/2015	Brown, gravelly, sandy CLAY
TP19	1.5	839298	03/08/2015	Brown, gravelly, sandy CLAY
TP19	2.5	839299	03/08/2015	Brown, gravelly, sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839276	839277	839278	839279	839280	839281
			Sample ID	TP12	TP12	TP12	TP13	TP13	TP13
			Depth	1.00	2.00	3.00	1.00	2.00	3.00
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0			Y				
Preparation									
Moisture Content	DETSC 1004*	0.1	%	16	21	23	13	19	16
Metals									
Antimony	DETSC 2301*	1	mg/kg	2.3	2.8	1.5	2.6	3.5	1.5
Arsenic	DETSC 2301#	0.2	mg/kg	6.7	12	9.6	16	23	7.5
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	0.8	0.5	1.2	0.9	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.5	1.7	1.6	1.6	1.5	1.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	1.8	0.6	0.6	0.7	0.5
Chromium	DETSC 2301#	0.15	mg/kg	120	40	16	26	23	25
Chromium III	DETSC 2301*	0.15	mg/kg	120	40	16	26	23	25
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	25	54	20	37	56	17
Lead	DETSC 2301#	0.3	mg/kg	35	84	70	110	180	35
Manganese	DETSC 2301#	20	mg/kg	1200	960	630	850	710	830
Mercury	DETSC 2325#	0.05	mg/kg	0.10	0.36	0.22	0.29	0.66	0.14
Molybdenum	DETSC 2301#	0.4	mg/kg	1.6	1.1	0.8	1.5	1.8	0.6
Nickel	DETSC 2301#	1	mg/kg	19	21	14	22	25	17
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	73	150	90	130	190	97
Inorganics									
pH	DETSC 2008#			10.1	10.7	11.1	10.2	10.0	10.4
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.1	< 0.1	< 0.1	< 0.1	0.5
Cyanide complex	DETSC 2130*	0.2	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.5
Organic matter	DETSC 2002#	0.1	%	2.2	4.2	3.3	2.1	2.5	2.1
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.12	0.16	0.25	0.23	0.16	0.17

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839276	839277	839278	839279	839280	839281
			Sample ID	TP12	TP12	TP12	TP13	TP13	TP13
			Depth	1.00	2.00	3.00	1.00	2.00	3.00
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	4.0	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	13	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	47	< 3.4	14
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	13	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	64	< 10	14
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	3.1	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	22	2.8	19
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	84	4.3	67
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	25	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	110	< 10	86
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	170	< 10	100
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	0.22	0.19	0.17
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.22	0.12	0.17
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.18	0.10	0.17
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.08	0.21	0.20	1.4	0.99	1.4
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.04	0.05	0.35	0.23	0.34
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.36	0.20	2.1	1.6	2.1
Pyrene	DETSC 3303#	0.03	mg/kg	0.13	0.30	0.15	1.9	1.3	1.8
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.07	0.15	0.06	0.82	0.57	0.78
Chrysene	DETSC 3303	0.03	mg/kg	0.08	0.18	0.07	0.92	0.61	0.85
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	0.19	0.06	0.94	0.61	0.89
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	< 0.03	0.31	0.23	0.30
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.05	0.12	0.05	0.69	0.44	0.63
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.03	0.07	< 0.03	0.32	0.19	0.29
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.10	0.07	0.10
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	< 0.03	0.37	0.22	0.32
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.66	1.8	0.84	11	7.5	10
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839282	839283	839284	839285	839286	839287
			Sample ID	TP14	TP14	TP14	TP15	TP15	TP15
			Depth	1.00	2.00	3.00	0.30	1.00	2.20
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0			Y				Y
Preparation									
Moisture Content	DETSC 1004*	0.1	%	19	10	28	14	15	19
Metals									
Antimony	DETSC 2301*	1	mg/kg	2.3	2.2	1.8	1.9	2.3	2.4
Arsenic	DETSC 2301#	0.2	mg/kg	11	13	8.5	8.1	11	9.5
Beryllium	DETSC 2301#	0.2	mg/kg	0.4	0.6	1.0	0.7	1.8	0.8
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.6	1.6	1.2	1.2	1.4	1.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.6	0.5	0.5	0.5	0.6
Chromium	DETSC 2301#	0.15	mg/kg	17	20	35	22	25	32
Chromium III	DETSC 2301*	0.15	mg/kg	17	20	35	22	25	32
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	65	30	33	21	31	34
Lead	DETSC 2301#	0.3	mg/kg	85	43	42	52	61	39
Manganese	DETSC 2301#	20	mg/kg	540	660	760	880	1600	800
Mercury	DETSC 2325#	0.05	mg/kg	0.50	0.17	0.17	0.07	0.17	0.10
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1	1.1	1.3	0.6	1.0	1.2
Nickel	DETSC 2301#	1	mg/kg	17	17	32	21	16	27
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	1.0	< 0.5
Zinc	DETSC 2301#	1	mg/kg	110	95	90	67	96	92
Inorganics									
pH	DETSC 2008#			10.1	7.6	8.5	8.7	8.8	9.6
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.4	0.4	0.2	0.3	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	0.4	< 0.2	0.3	< 0.2
Organic matter	DETSC 2002#	0.1	%	3.4	4.0	3.3	1.5	4.1	2.3
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.19	0.09	0.06	0.09	0.27	0.14

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

				Lab No	839282	839283	839284	839285	839286	839287
				Sample ID	TP14	TP14	TP14	TP15	TP15	TP15
				Depth	1.00	2.00	3.00	0.30	1.00	2.20
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	0.08	0.07	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	0.01	0.01	0.01	< 0.01	0.01	0.02
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	0.05	0.07	< 0.03	< 0.03	0.15	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	< 0.03	< 0.03	0.09	0.06
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.08	< 0.03	< 0.03	0.08	0.06
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.19	0.62	0.08	0.05	0.40	0.25
Anthracene	DETSC 3303	0.03	mg/kg	0.05	0.13	< 0.03	< 0.03	0.09	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.30	0.96	0.15	0.08	0.53	0.21
Pyrene	DETSC 3303#	0.03	mg/kg	0.24	0.76	0.12	0.07	0.50	0.17
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.11	0.33	0.06	0.03	0.17	0.05
Chrysene	DETSC 3303	0.03	mg/kg	0.13	0.40	0.09	0.03	0.20	0.05
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.42	0.09	< 0.03	0.17	0.05
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.12	< 0.03	< 0.03	0.07	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.08	0.26	0.05	< 0.03	0.12	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.14	0.04	< 0.03	0.06	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.05	0.14	< 0.03	< 0.03	0.06	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.4	4.5	0.68	0.26	2.7	0.93
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	< 0.3	< 0.3	< 0.3	< 0.3	0.4

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839288	839289	839290	839291	839292	839293
			Sample ID	TP16	TP16	TP16	TP17	TP17	TP17
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0							
Preparation									
Moisture Content	DETSC 1004*	0.1	%	23	16	22	17	22	18
Metals									
Antimony	DETSC 2301*	1	mg/kg	3.3	1.8	2.4	2.2	2.0	1.6
Arsenic	DETSC 2301#	0.2	mg/kg	9.4	5.1	7.1	8.3	8.9	7.1
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.9	1.0	0.7	0.7	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.7	2.1	2.2	1.5	2.3	1.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.8	0.5	0.8	0.8	0.7	1.0
Chromium	DETSC 2301#	0.15	mg/kg	39	59	64	25	35	24
Chromium III	DETSC 2301*	0.15	mg/kg	39	59	64	25	35	24
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	43	13	21	21	24	19
Lead	DETSC 2301#	0.3	mg/kg	52	22	49	81	66	84
Manganese	DETSC 2301#	20	mg/kg	960	2000	1400	700	760	880
Mercury	DETSC 2325#	0.05	mg/kg	0.15	< 0.05	0.13	0.08	0.15	0.13
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.6	1.0	0.7	1.0	0.6
Nickel	DETSC 2301#	1	mg/kg	23	24	26	27	20	19
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	110	56	99	110	110	99
Inorganics									
pH	DETSC 2008#			9.9	11.2	10.4	9.8	9.9	10.9
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.1	0.2	0.2	0.2	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.5	1.1	2.2	1.6	2.5	1.8
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.14	0.16	0.13	0.10	0.14	0.12

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839288	839289	839290	839291	839292	839293
			Sample ID	TP16	TP16	TP16	TP17	TP17	TP17
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.23	0.10	0.07	0.11	0.12	0.12
Anthracene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.38	0.21	0.15	0.29	0.34	0.27
Pyrene	DETSC 3303#	0.03	mg/kg	0.31	0.17	0.12	0.55	0.53	0.45
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.12	0.07	0.06	0.08	0.09	0.07
Chrysene	DETSC 3303	0.03	mg/kg	0.16	0.08	0.07	0.09	0.10	0.08
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.17	0.10	0.09	0.11	0.10	0.09
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.03	< 0.03	< 0.03	< 0.03	0.05
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.10	0.07	0.06	0.08	0.09	0.08
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.05	0.05	0.06	0.05	0.06
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.06	0.05	0.04	0.09	0.09	0.09
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.8	0.94	0.71	1.5	1.5	1.4
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

	Lab No	839294	839295	839296	839297	839298	839299
	Sample ID	TP18	TP18	TP18	TP19	TP19	TP19
	Depth	0.50	1.50	2.50	0.50	1.50	2.50
	Other ID						
	Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
	Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Asbestos Quantification OHR	DETSC 1102	0		Y					
Preparation									
Moisture Content	DETSC 1004*	0.1	%	17	23	24	15	19	21
Metals									
Antimony	DETSC 2301*	1	mg/kg	2.1	1.9	2.5	1.5	2.0	2.6
Arsenic	DETSC 2301#	0.2	mg/kg	8.7	7.7	9.3	7.2	11	7.7
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	0.6	0.8	0.7	0.8	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.9	2.1	2.3	1.3	1.3	2.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.6	0.8	1.2	0.8	0.7
Chromium	DETSC 2301#	0.15	mg/kg	19	23	49	19	32	100
Chromium III	DETSC 2301*	0.15	mg/kg	19	23	49	19	32	100
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	19	19	24	18	19	48
Lead	DETSC 2301#	0.3	mg/kg	93	48	74	39	120	38
Manganese	DETSC 2301#	20	mg/kg	460	600	870	870	1200	1300
Mercury	DETSC 2325#	0.05	mg/kg	0.08	0.09	0.07	< 0.05	0.05	0.06
Molybdenum	DETSC 2301#	0.4	mg/kg	0.7	0.6	0.9	0.6	0.6	1.1
Nickel	DETSC 2301#	1	mg/kg	18	18	21	19	27	16
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	93	90	130	96	120	98
Inorganics									
pH	DETSC 2008#			11.5	10.8	9.9	10.2	11.2	10.6
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.1	0.2	0.1	0.1	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	1.7	1.8	1.6	4.2	3.3	2.1
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.19	0.21	0.14	0.11	0.14	0.24

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839294	839295	839296	839297	839298	839299
			Sample ID	TP18	TP18	TP18	TP19	TP19	TP19
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	0.22	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	0.26	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	0.14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	0.02	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	0.15	< 0.01	< 0.01	0.01	0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.16	0.22	0.17	0.05	0.07	0.34
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.04	< 0.03	< 0.03	< 0.03	0.05
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.29	0.49	0.36	0.10	0.11	0.52
Pyrene	DETSC 3303#	0.03	mg/kg	0.43	0.60	0.48	0.24	0.25	0.57
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.07	0.16	0.10	< 0.03	< 0.03	0.17
Chrysene	DETSC 3303	0.03	mg/kg	0.09	0.21	0.12	< 0.03	< 0.03	0.23
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.20	0.11	< 0.03	< 0.03	0.21
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	0.05	< 0.03	< 0.03	0.07
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.16	< 0.03	< 0.03	< 0.03	0.16
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.05	0.10	0.07	< 0.03	< 0.03	0.10
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.07	0.14	0.10	< 0.03	0.06	0.14
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.3	2.4	1.6	0.39	0.49	2.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839300	839301	839302	839303	839304	839305
			Sample ID	TP12	TP12	TP12	TP13	TP13	TP13
			Depth	1.00	2.00	3.00	1.00	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.4	4.7	2.0	7.4	5.0	2.3
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.28	< 0.25	0.41	0.31	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.4	4.3	2.5	5.4	2.8	1.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.67	2.4	0.39	1.0	0.94	0.26
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.01	< 0.01	0.02	0.02	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.8	1.1	0.9	1.0	0.6	0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.54	0.56	0.44	0.71	1.2	0.71
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.52	2.12	2.20	2.46	1.41	2.08
Inorganics									
pH	DETSC 2008			7.1	7.1	7.1	9.0	8.4	8.0
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	15	82	130	1.5	1.7	1.0
Fluoride	DETSC 2055	0.1	mg/l	0.14	0.14	0.17	< 0.10	0.11	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	19	6.2	7.0	5.8	11	51
Total Organic Carbon	DETSC 2033	2	mg/l	6.4	6.4	6.6	5.5	5.1	3.7
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	14	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	14	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	14	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839300	839301	839302	839303	839304	839305
			Sample ID	TP12	TP12	TP12	TP13	TP13	TP13
			Depth	1.00	2.00	3.00	1.00	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.04	< 0.01	0.42
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.58
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.04	0.04	0.56
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.06	0.05	0.30
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	0.03	0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02	0.03	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.03	0.03	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	0.02	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.03	0.03	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	0.24	0.24	2.0
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839306	839307	839308	839309	839310	839311
			Sample ID	TP14	TP14	TP14	TP15	TP15	TP15
			Depth	1.00	2.00	3.00	0.30	1.00	2.20
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	4.2	7.2	2.6	0.70	3.3	5.0
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.42	0.29	0.30	< 0.25	0.29
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	6.8	16	3.4	3.1	3.1	4.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.27	1.5	1.1	0.50	1.2	0.61
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01	0.03	0.01	< 0.01	0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.0	2.1	1.3	22	1.1	1.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.1	1.0	0.80	0.70	0.45	0.75
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25	1.53	6.20	1.96	< 1.25
Inorganics									
pH	DETSC 2008			8.7	8.6	8.1	8.0	7.9	7.8
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.8	20	17	2.0	1.3	2.7
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	0.13	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	10	8.9	26	19	3.9	5.2
Total Organic Carbon	DETSC 2033	2	mg/l	3.8	13	5.7	4.7	4.6	9.7
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839306	839307	839308	839309	839310	839311
			Sample ID	TP14	TP14	TP14	TP15	TP15	TP15
			Depth	1.00	2.00	3.00	0.30	1.00	2.20
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.04	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.04	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

				Lab No	839312	839313	839314	839315	839316	839317
				Sample ID	TP16	TP16	TP16	TP17	TP17	TP17
				Depth	0.50	1.50	2.50	0.50	1.50	2.50
				Other ID						
				Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
				Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Preparation										
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.7	2.0	2.9	5.6	7.5	4.8
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.31	< 0.25	< 0.25	< 0.25	0.27
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.1	1.3	3.0	2.1	6.7	2.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.86	< 0.09	0.12	1.3	1.1	3.1
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.6	0.8	1.0	0.8	2.1	1.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.57	0.56	0.64	0.46	0.76	0.54
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	1.67	< 1.25	< 1.25	< 1.25	2.14
Inorganics										
pH	DETSC 2008			7.7	8.9	9.3	8.2	8.2	7.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.8	1.1	0.99	1.6	2.0	2.2
Fluoride	DETSC 2055	0.1	mg/l	0.17	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.4	7.0	5.8	4.8	6.6	6.7
Total Organic Carbon	DETSC 2033	2	mg/l	10	17	3.7	16	7.5	11
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	4.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839312	839313	839314	839315	839316	839317
			Sample ID	TP16	TP16	TP16	TP17	TP17	TP17
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	4.0	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.47	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	4.5	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	2.2	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	11	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	1.8	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

				Lab No	839318	839319	839320	839321	839322	839323
				Sample ID	TP18	TP18	TP18	TP19	TP19	TP19
				Depth	0.50	1.50	2.50	0.50	1.50	2.50
				Other ID						
				Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
				Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Preparation										
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	7.4	1.8	6.0	2.5	3.6	4.2
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.30	0.35	0.35	0.32	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	5.0	9.1	3.6	2.7	3.4	5.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.52	0.13	1.3	0.68	0.35	0.24
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.5	2.6	1.5	0.6	1.3	2.6
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.3	1.2	0.63	0.83	0.78	1.4
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25	1.27	< 1.25	< 1.25	< 1.25
Inorganics										
pH	DETSC 2008			7.7	9.4	8.5	8.2	7.8	8.5
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.5	1.3	2.2	1.6	1.2	1.4
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	0.11	0.11	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	3.6	3.9	11	7.0	2.0	3.9
Total Organic Carbon	DETSC 2033	2	mg/l	4.5	8.8	7.6	7.2	5.9	6.7
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	6.7	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	6.1	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	14	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839318	839319	839320	839321	839322	839323
			Sample ID	TP18	TP18	TP18	TP19	TP19	TP19
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	0.11	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	0.08	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
839276	TP12 1.00	SOIL	NAD	none	Colin Patrick
839277	TP12 2.00	SOIL	Chrysotile	small bundle of Chrysotile	Colin Patrick
839278	TP12 3.00	SOIL	NAD	none	Colin Patrick
839279	TP13 1.00	SOIL	NAD	none	Colin Patrick
839280	TP13 2.00	SOIL	NAD	none	Colin Patrick
839281	TP13 3.00	SOIL	NAD	none	Colin Patrick
839282	TP14 1.00	SOIL	NAD	none	Colin Patrick
839283	TP14 2.00	SOIL	Chrysotile	small bundle of Chrysotile	Colin Patrick
839284	TP14 3.00	SOIL	NAD	none	Colin Patrick
839285	TP15 0.30	SOIL	NAD	none	Colin Patrick
839286	TP15 1.00	SOIL	NAD	none	Colin Patrick
839287	TP15 2.20	SOIL	Chrysotile	small bundle of Chrysotile	Colin Patrick
839288	TP16 0.50	SOIL	NAD	none	Colin Patrick
839289	TP16 1.50	SOIL	NAD	none	Colin Patrick
839290	TP16 2.50	SOIL	NAD	none	Colin Patrick
839291	TP17 0.50	SOIL	NAD	none	Colin Patrick
839292	TP17 1.50	SOIL	NAD	none	Colin Patrick
839293	TP17 2.50	SOIL	NAD	none	Colin Patrick
839294	TP18 0.50	SOIL	Chrysotile	small bundle of Chrysotile	Colin Patrick
839295	TP18 1.50	SOIL	NAD	none	Colin Patrick
839296	TP18 2.50	SOIL	NAD	none	Colin Patrick
839297	TP19 0.50	SOIL	NAD	none	Colin Patrick
839298	TP19 1.50	SOIL	NAD	none	Colin Patrick
839299	TP19 2.50	SOIL	NAD	none	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

	Lab No	839277	839283	839287	839294
	Sample ID	TP12	TP14	TP15	TP18
	Depth	2.00	2.00	2.20	0.50
	Other ID				
	Sample Type	SOIL	SOIL	SOIL	SOIL
	Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15
	Sampling Time				
Test	**Method**	**Units**			
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.001**	**0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.001	0.001	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	712.36	609.14	657.71	579.34
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	0.001	0.001	<0.001	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 15-40314
Client Ref 12032
Contract Herbert Road

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
839276	TP12 1.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839277	TP12 2.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839278	TP12 3.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839279	TP13 1.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839280	TP13 2.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839281	TP13 3.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839282	TP14 1.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839283	TP14 2.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839284	TP14 3.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839285	TP15 0.30 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839286	TP15 1.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839287	TP15 2.20 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839288	TP16 0.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839289	TP16 1.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839290	TP16 2.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839291	TP17 0.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839292	TP17 1.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839293	TP17 2.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839294	TP18 0.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839295	TP18 1.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839296	TP18 2.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839297	TP19 0.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839298	TP19 1.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839299	TP19 2.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839300	TP12 1.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839301	TP12 2.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839302	TP12 3.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839303	TP13 1.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839304	TP13 2.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839305	TP13 3.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839306	TP14 1.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839307	TP14 2.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839308	TP14 3.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839309	TP15 0.30 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839310	TP15 1.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839311	TP15 2.20 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839312	TP16 0.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839313	TP16 1.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839314	TP16 2.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839315	TP17 0.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839316	TP17 1.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839317	TP17 2.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839318	TP18 0.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839319	TP18 1.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839320	TP18 2.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839321	TP19 0.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839322	TP19 1.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839323	TP19 2.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		

Information in Support of the Analytical Results

Our Ref 15-40314
Client Ref 12032
Contract Herbert Road

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

ANNEX C
Upper Half of Riversee Limited Stockpile
DETS test certificates 27313-1 & 27519-2

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-27313-2

01-Apr-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-27313-2

Client Reference 12032-SP1

Contract Title Herbet Road Stockpile - Round 1

Description 25 Soil samples, 25 Leachate samples, 1 Misc sample.

Date Received 16-Feb-15

Date Started 16-Feb-15

Date Completed 01-Apr-15

Test Procedures Identified by prefix DETSn (details on request), Asbestos Analysis DETSC 1101.

Notes **This report supersedes 15-27313-1, Extra Testing**

Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Sample ID	Depth	Lab No	Completed	Matrix Description
S1	0.5	768693	26/02/2015	Dark brown gravelly sandy CLAY
S2	1.7	768694	26/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S3	3	768695	26/02/2015	Dark brown gravelly sandy CLAY
S4	2	768696	26/02/2015	Dark brown gravelly sandy CLAY
S5	3	768697	26/02/2015	Dark brown gravelly sandy CLAY
S6	0.5	768698	26/02/2015	Dark brown gravelly sandy CLAY
S7	3	768699	26/02/2015	Dark brown gravelly sandy CLAY
S8	0.8	768700	26/02/2015	Dark brown gravelly sandy CLAY
S9	0.5	768701	26/02/2015	Dark brown gravelly sandy CLAY
S10	2	768702	26/02/2015	Dark brown gravelly sandy CLAY with odd rootlets
S11	3	768703	26/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S12	0.5	768704	26/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S13	2.3	768705	26/02/2015	Dark brown gravelly sandy CLAY
S14	3	768706	26/02/2015	Dark brown gravelly sandy CLAY with odd rootlets
S15	2	768707	26/02/2015	Dark brown gravelly sandy CLAY
S16	3	768708	26/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S17	0.3	768709	26/02/2015	Dark brown gravelly sandy CLAY
S18	1.3	768710	26/02/2015	Dark brown gravelly sandy CLAY with odd rootlets (Made Ground includes brick)
S19	2.8	768711	26/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S20	0.5	768712	26/02/2015	Dark brown gravelly sandy CLAY
S21	1.3	768713	26/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S22	2.5	768714	26/02/2015	Dark brown gravelly sandy CLAY (Made Ground includes brick)
S23	0.5	768715	26/02/2015	Dark brown gravelly sandy CLAY
S24	1.4	768716	26/02/2015	Dark brown gravelly sandy CLAY
S25	2.5	768717	26/02/2015	Dark brown gravelly sandy CLAY

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768693	768694	768695	768696	768697	768698
			Sample ID	S1	S2	S3	S4	S5	S6
			Depth	0.50	1.70	3.00	2.00	3.00	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	5.8	13	12	< 0.2	12	10
Antimony	DETSC 2301*	1	mg/kg	2.3	1.3	1.6	2.2	2.0	1.8
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	0.6	0.7	0.7	0.7	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.1	1.1	1.2	1.2	1.3	1.0
Cadmium	DETSC 2301#	0.1	mg/kg	1.1	0.7	0.7	< 0.1	0.7	0.6
Chromium	DETSC 2301#	0.15	mg/kg	53	25	20	< 0.15	18	18
Chromium III	DETSC 2301*	0.15	mg/kg	53	25	20	< 0.15	18	18
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	39	31	25	< 0.2	26	53
Lead	DETSC 2301#	0.3	mg/kg	51	47	43	< 0.3	43	93
Manganese	DETSC 2301#	20	mg/kg	730	540	650	840	740	670
Mercury	DETSC 2325#	0.05	mg/kg	0.09	0.09	< 0.05	0.05	0.06	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.5	0.8	0.8	0.8	0.6
Nickel	DETSC 2301#	1	mg/kg	53	21	22	< 1.0	20	16
Selenium	DETSC 2301#	0.5	mg/kg	0.7	< 0.5	1.2	< 0.5	0.9	1.1
Zinc	DETSC 2301#	1	mg/kg	140	89	80	< 1.0	85	110
Inorganics									
pH	DETSC 2008#			10.0	9.1	8.7	9.6	8.5	8.4
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2
Organic matter	DETSC 2002#	0.1	%	3.0	2.4	2.0	2.7	2.6	2.5
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.11	0.16	0.13	0.10	0.06	0.06
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768693	768694	768695	768696	768697	768698
			Sample ID	S1	S2	S3	S4	S5	S6
			Depth	0.50	1.70	3.00	2.00	3.00	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	0.06	< 0.03	0.05
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	0.07	0.10	0.04	0.07
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	0.05	0.08	0.04	0.06
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	0.04	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.06	0.04	0.04	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03	0.04	< 0.03	0.04
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	< 0.10	0.33	0.16	0.36	< 0.10	0.22
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	0.4

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768699	768700	768701	768702	768703	768704
			Sample ID	S7	S8	S9	S10	S11	S12
			Depth	3.00	0.80	0.50	2.00	3.00	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	9.8	14	< 0.2	17	9.0	9.2
Antimony	DETSC 2301*	1	mg/kg	1.5	2.3	2.4	2.0	1.9	< 1.0
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	0.7	0.7	0.7	1.1	0.3
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	0.9	0.8	0.9	0.9	1.1	1.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	2.1	< 0.1	1.0	0.6	0.5
Chromium	DETSC 2301#	0.15	mg/kg	20	48	< 0.15	22	19	18
Chromium III	DETSC 2301*	0.15	mg/kg	20	48	< 0.15	22	19	18
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	25	140	< 0.2	48	20	29
Lead	DETSC 2301#	0.3	mg/kg	37	110	< 0.3	74	36	45
Manganese	DETSC 2301#	20	mg/kg	520	670	890	640	720	640
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.16	0.10	0.13	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	0.6	0.6	1.3	0.6	1.2	< 0.4
Nickel	DETSC 2301#	1	mg/kg	27	41	< 1.0	23	20	22
Selenium	DETSC 2301#	0.5	mg/kg	1.2	43	< 0.5	1.4	0.7	1.4
Zinc	DETSC 2301#	1	mg/kg	93	200	< 1.0	160	130	82
Inorganics									
pH	DETSC 2008#			8.6	8.1	8.2	11.0	9.0	8.6
Cyanide total	DETSC 2130#	0.1	mg/kg	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.2	2.2	3.5	2.2	9.7	2.5
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.07	0.06	0.06	0.17	0.10	0.07
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768699	768700	768701	768702	768703	768704
			Sample ID	S7	S8	S9	S10	S11	S12
			Depth	3.00	0.80	0.50	2.00	3.00	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.09	0.04	0.06	0.11	0.06	0.09
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.11	0.05	0.10	0.18	0.07	0.14
Pyrene	DETSC 3303#	0.03	mg/kg	0.09	0.04	0.09	0.15	0.06	0.11
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	0.04	0.07	< 0.03	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	0.06	0.09	< 0.03	0.07
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	0.07	0.10	< 0.03	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.05	0.06	< 0.03	0.05
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.43	0.14	0.47	0.85	0.19	0.60
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.3	< 0.3	< 0.3	2.2	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

				Lab No	768705	768706	768707	768708	768709	768710
				Sample ID	S13	S14	S15	S16	S17	S18
				Depth	2.30	3.00	2.00	3.00	0.30	1.30
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	10	3.9	4.4	3.9	4.9	19
Antimony	DETSC 2301*	1	mg/kg	1.7	6.3	2.3	2.0	2.7	1.7
Beryllium	DETSC 2301#	0.2	mg/kg	0.7	0.8	0.8	0.8	0.9	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.3	1.1	1.6	1.4	1.2	1.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.7	0.5	0.4	0.5	0.5	1.2
Chromium	DETSC 2301#	0.15	mg/kg	24	17	24	20	29	25
Chromium III	DETSC 2301*	0.15	mg/kg	24	17	24	20	29	25
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	17	15	19	16	16	47
Lead	DETSC 2301#	0.3	mg/kg	26	11	8.4	27	25	130
Manganese	DETSC 2301#	20	mg/kg	700	940	810	760	770	820
Mercury	DETSC 2325#	0.05	mg/kg	0.05	< 0.05	0.13	0.27	0.08	0.13
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.9	0.9	0.7	0.9	0.9
Nickel	DETSC 2301#	1	mg/kg	20	23	27	19	25	26
Selenium	DETSC 2301#	0.5	mg/kg	1.0	1.0	0.6	0.7	0.6	2.8
Zinc	DETSC 2301#	1	mg/kg	77	72	51	56	64	1200
Inorganics										
pH	DETSC 2008#			8.6	8.5	10.3	10.5	8.8	8.0
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Organic matter	DETSC 2002#	0.1	%	2.4	2.7	2.0	4.5	2.0	4.9
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.07	0.08	0.16	0.27	0.07	0.07
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.06	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.01	0.14	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.12	0.01	0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.01	0.01	< 0.01	0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.07	0.01	0.12	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768705	768706	768707	768708	768709	768710
			Sample ID	S13	S14	S15	S16	S17	S18
			Depth	2.30	3.00	2.00	3.00	0.30	1.30
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	0.13	0.04	0.31	0.09	0.06
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.07	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.20	0.05	0.43	0.11	0.12
Pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.16	0.04	0.36	0.09	0.09
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	< 0.03	0.16	0.04	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.04	0.08	< 0.03	0.19	0.05	0.08
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	0.08	< 0.03	0.19	0.05	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.08	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03	0.13	< 0.03	0.04
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.09	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.08	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.24	0.77	0.14	2.1	0.42	0.54
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.3	0.5	0.6	0.7	0.6	0.6

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768711	768712	768713	768714	768715	768716
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	< 0.2	9.1	11	9.8	15	7.0
Antimony	DETSC 2301*	1	mg/kg	2.3	2.0	2.2	2.0	2.1	1.3
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.8	0.9	0.9	0.8	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.2	1.4	1.6	1.4	1.5	1.3
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	1.0	0.8	1.0	0.8	1.1
Chromium	DETSC 2301#	0.15	mg/kg	< 0.15	21	25	36	17	22
Chromium III	DETSC 2301*	0.15	mg/kg	< 0.15	21	25	36	17	22
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	< 0.2	25	25	40	40	19
Lead	DETSC 2301#	0.3	mg/kg	< 0.3	51	35	52	34	48
Manganese	DETSC 2301#	20	mg/kg	760	1100	780	1300	1100	1000
Mercury	DETSC 2325#	0.05	mg/kg	0.17	0.05	0.08	< 0.05	0.07	0.06
Molybdenum	DETSC 2301#	0.4	mg/kg	0.9	0.9	1.4	1.2	0.8	0.8
Nickel	DETSC 2301#	1	mg/kg	< 1.0	21	24	28	22	18
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.7	< 0.5	< 0.5	0.8
Zinc	DETSC 2301#	1	mg/kg	< 1.0	100	91	180	110	110
Inorganics									
pH	DETSC 2008#			10.2	8.4	9.8	9.7	8.5	10.6
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.2	2.7	3.5	2.6	2.3	2.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.15	0.06	0.12	0.11	0.05	0.17
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.02	< 0.01	0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.04	< 0.01	0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	768711	768712	768713	768714	768715	768716
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.50	0.05	0.09	0.06	0.04	0.16
Anthracene	DETSC 3303	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.2	0.10	0.11	0.07	0.09	0.21
Pyrene	DETSC 3303#	0.03	mg/kg	0.86	0.08	0.09	0.06	0.08	0.19
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.38	0.04	0.05	< 0.03	0.05	0.08
Chrysene	DETSC 3303	0.03	mg/kg	0.41	0.06	0.04	0.04	0.07	0.09
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.31	0.06	0.05	0.04	0.07	0.10
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.22	< 0.03	0.04	< 0.03	0.04	0.07
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	0.04	0.04
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	4.3	0.38	0.47	0.27	0.48	1.1
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.5	0.5	0.4	0.6	0.6

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	768717
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	SOIL
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	7.5
Antimony	DETSC 2301*	1	mg/kg	2.1
Beryllium	DETSC 2301#	0.2	mg/kg	0.5
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.6
Cadmium	DETSC 2301#	0.1	mg/kg	1.0
Chromium	DETSC 2301#	0.15	mg/kg	24
Chromium III	DETSC 2301*	0.15	mg/kg	24
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	27
Lead	DETSC 2301#	0.3	mg/kg	63
Manganese	DETSC 2301#	20	mg/kg	720
Mercury	DETSC 2325#	0.05	mg/kg	0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1
Nickel	DETSC 2301#	1	mg/kg	21
Selenium	DETSC 2301#	0.5	mg/kg	0.6
Zinc	DETSC 2301#	1	mg/kg	95
Inorganics				
pH	DETSC 2008#			10.7
Cyanide total	DETSC 2130#	0.1	mg/kg	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.18
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	30
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	30
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	53
Aromatic C5-C35	DETSC 3072*	10	mg/kg	53
TPH Ali/Aro	DETSC 3072*	10	mg/kg	83

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	768717
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	SOIL
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.08
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.13
Pyrene	DETSC 3303#	0.03	mg/kg	0.12
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05
Chrysene	DETSC 3303	0.03	mg/kg	0.05
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.05
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.05
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.04
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.65
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.5

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785692	785693	785694	785695	785696	785697
			Sample ID	S1	S2	S3	S4	S5	S6
			Depth	0.50	1.70	3.00	2.00	3.00	0.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.51	0.50	0.38	0.42	0.65	0.30
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.32	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.3	1.3	1.6	1.2	1.2	0.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.28	0.33	0.17	0.26	0.16	0.12
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.0	0.81	0.53	0.46	0.64	0.36
Zinc, Dissolved	DETSC 2306	1.25	ug/l	2.14	1.44	1.30	1.89	1.29	1.47
Inorganics									
pH	DETSC 2008			8.2	7.9	7.8	7.8	7.7	7.6
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	0.73	0.79	1.3	1.3	1.3	0.79
Fluoride	DETSC 2055	0.1	mg/l	0.22	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.7	6.2	13	9.0	11	4.4
Total Organic Carbon	DETSC 2085	1	mg/l	1.7	1.5	2.2	1.8	2.3	2.3
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785692	785693	785694	785695	785696	785697
			Sample ID	S1	S2	S3	S4	S5	S6
			Depth	0.50	1.70	3.00	2.00	3.00	0.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785698	785699	785700	785701	785702	785703
			Sample ID	S7	S8	S9	S10	S11	S12
			Depth	3.00	0.80	0.50	2.00	3.00	0.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.43	0.51	0.85	0.52	1.3	0.44
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	0.36	0.38	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.0	0.8	1.5	1.3	1.4	1.0
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.22	0.23	1.0	0.33	0.29	0.24
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.36	0.31	0.32	0.41	0.47	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.59	1.43	2.12	2.26	< 1.25	1.53
Inorganics									
pH	DETSC 2008			7.7	7.6	7.6	7.6	7.5	7.5
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.2	1.3	1.0	1.4	1.2	0.79
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	13	12	6.1	9.2	11	3.9
Total Organic Carbon	DETSC 2085	1	mg/l	2.5	3.8	3.2	3.9	3.2	2.5
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785698	785699	785700	785701	785702	785703
			Sample ID	S7	S8	S9	S10	S11	S12
			Depth	3.00	0.80	0.50	2.00	3.00	0.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785704	785705	785706	785707	785708	785709
			Sample ID	S13	S14	S15	S16	S17	S18
			Depth	2.30	3.00	2.00	3.00	0.30	1.30
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.45	0.55	0.53	0.43	0.34	1.0
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.53	< 0.25	< 0.25	< 0.25	0.46	0.66
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.0	1.3	1.6	1.2	0.9	2.3
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.32	0.45	0.34	0.24	0.29	0.51
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	0.03	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.8	< 0.5	< 0.5	< 0.5	< 0.5	0.8
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	2.5
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.41	1.50	2.05	1.52	3.89	2.67
Inorganics									
pH	DETSC 2008			7.5	7.5	7.4	7.4	7.4	7.4
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.4	0.95	1.1	1.4	0.69	1.6
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	12	4.9	9.1	13	8.0	10
Total Organic Carbon	DETSC 2085	1	mg/l	2.4	1.9	2.7	3.1	1.6	5.4
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785704	785705	785706	785707	785708	785709
			Sample ID	S13	S14	S15	S16	S17	S18
			Depth	2.30	3.00	2.00	3.00	0.30	1.30
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785710	785711	785712	785713	785714	785715
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.9	0.76	1.7	1.1	0.68	2.4
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.93	0.30	0.55	< 0.25	0.26	0.97
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.9	1.3	5.1	1.8	1.5	4.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	1.0	0.37	0.25	0.21	0.18	0.51
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.7	< 0.5	1.0	< 0.5	< 0.5	0.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.7	0.85	1.7	0.78	0.49	1.8
Zinc, Dissolved	DETSC 2306	1.25	ug/l	2.41	2.11	< 1.25	< 1.25	1.40	1.73
Inorganics									
pH	DETSC 2008			8.1	7.9	9.6	8.9	8.5	8.3
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.2	0.88	1.6	2.3	2.9	1.7
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	0.16	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	13	9.4	4.0	9.5	6.7	5.2
Total Organic Carbon	DETSC 2085	1	mg/l	4.5	2.5	4.2	3.4	2.7	2.8
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

			Lab No	785710	785711	785712	785713	785714	785715
			Sample ID	S19	S20	S21	S22	S23	S24
			Depth	2.80	0.50	1.30	2.50	0.50	1.40
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15	12/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	0.02	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	785716
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	LEACHATE
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
NRA Leachate Preparation	DETS 036*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.82
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.99
Chromium III Dissolved	DETSC 2302*	5	ug/l	< 5.0
Hexavalent Chromium	DETSC 2203	10	ug/l	< 10
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.7
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.89
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25
Inorganics				
pH	DETSC 2008			10.1
Cyanide total	DETSC 2130	40	ug/l	< 40
Chloride	DETSC 2055	0.1	mg/l	2.4
Fluoride	DETSC 2055	0.1	mg/l	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	5.9
Total Organic Carbon	DETSC 2085	1	mg/l	3.6
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	785716
Sample ID	S25
Depth	2.50
Other ID	
Sample Type	LEACHATE
Sampling Date	12/02/15
Sampling Time	n/s

Test	Method	LOD	Units	
PAHs				
Naphthalene	DETS 074*	0.01	ug/l	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20
Phenols				
Phenol	*	0.5	ug/l	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Bulk & Soil Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

Lab No	Sample ID	Sample Location	Material Type*	Result	Comment*	Analyst
768693	S1 0.50		SOIL	NAD	none	Andrew Little
768694	S2 1.70		SOIL	NAD	none	Andrew Little
768695	S3 3.00		SOIL	NAD	none	Andrew Little
768696	S4 2.00		SOIL	NAD	none	Andrew Little
768697	S5 3.00		SOIL	NAD	none	Andrew Little
768698	S6 0.50		SOIL	Chrysotile	Clumps of Chrysotile fibres present	Andrew Little
768699	S7 3.00		SOIL	Chrysotile	Bundle of chrysotile fibre present	Andrew Little
768700	S8 0.80		SOIL	NAD	none	Andrew Little
768701	S9 0.50		SOIL	NAD	none	Andrew Little
768702	S10 2.00		SOIL	NAD	none	Andrew Little
768703	S11 3.00		SOIL	Chrysotile	Small bundles of chrysotile fibres present	Andrew Little
768704	S12 0.50		SOIL	Amosite	Free Amosite fibres present	Andrew Little
768705	S13 2.30		SOIL	Amosite Chrysotile	Clump of Amosite/Chrysotile present	Andrew Little
768706	S14 3.00		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768707	S15 2.00		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768708	S16 3.00		SOIL	Chrysotile	Bundle of chrysotile fibre present	Andrew Little
768709	S17 0.30		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768710	S18 1.30		SOIL	Chrysotile	Clump of Chrysotile fibres present	Andrew Little
768711	S19 2.80		SOIL	Chrysotile	Free Chrysotile fibres present	Andrew Little
768712	S20 0.50		SOIL	Chrysotile	Bundles of Chrysotile fibres present	Andrew Little
768713	S21 1.30		SOIL	Chrysotile	Bundle of chrysotile fibre present	Andrew Little
768714	S22 2.50		SOIL	Chrysotile	Bundles of Chrysotile fibres present	Andrew Little
768715	S23 0.50		SOIL	Chrysotile	Free Chrysotile fibres present	Andrew Little
768716	S24 1.40		SOIL	NAD	none	Andrew Little
768717	S25 2.50		SOIL	Chrysotile	Bundles of Chrysotile fibres present	Andrew Little
768718	S16A 3.00		Cement	Chrysotile	none	Andrew Little

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768698	768699	768703	768704
		Sample ID	S6	S7	S11	S12
		Depth	0.50	3.00	3.00	0.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.001	<0.001	<0.001	na
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	< 0.001
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	645.18	1061.41	748.41	1157.84
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	0.001	<0.001	<0.001	na
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	<0.001
% Serpentine fibres in sample		Mass %	na	na	na	<0.001
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768705	768706	768707	768708
		Sample ID	S13	S14	S15	S16
		Depth	2.30	3.00	2.00	3.00
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.024**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.024	<0.001	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	1226.44	1188.37	1497.67	838.56
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	0.024	na	na	na
% Serpentine bundles in sample		Mass %	na	<0.001	<0.001	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768709	768710	768711	768712
		Sample ID	S17	S18	S19	S20
		Depth	0.30	1.30	2.80	0.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	na	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	< 0.001	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	1345.77	840.34	683.00	1038.48
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	na	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	<0.001	na
% Serpentine fibres in sample		Mass %	na	na	<0.001	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Title Herbet Road Stockpile - Round 1

		Lab No	768713	768714	768715	768717
		Sample ID	S21	S22	S23	S25
		Depth	1.30	2.50	0.50	2.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	12/02/15	12/02/15	12/02/15	12/02/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	na	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	< 0.001	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	960.31	964.16	1039.32	1100.66
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	na	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	<0.001	na
% Serpentine fibres in sample		Mass %	na	na	<0.001	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Herbet Road Stockpile - Round 1

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
768693	S1 0.50 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768694	S2 1.70 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768695	S3 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768696	S4 2.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768697	S5 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768698	S6 0.50 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768699	S7 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768700	S8 0.80 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768701	S9 0.50 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768702	S10 2.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768703	S11 3.00 SOIL	12/02/15	GJ 1L, GV, PT 1L x2		
768704	S12 0.50 SOIL	12/02/15	GJ 250ml, PT 1L		
768705	S13 2.30 SOIL	12/02/15	GJ 250ml, PT 1L		
768706	S14 3.00 SOIL	12/02/15	GJ 250ml, PT 1L		
768707	S15 2.00 SOIL	12/02/15	GJ 250ml x2, PT 1L		
768708	S16 3.00 SOIL	12/02/15	GJ 250ml x2, PT 1L		
768709	S17 0.30 SOIL	12/02/15	GJ 250ml, PT 1L x2		
768710	S18 1.30 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768711	S19 2.80 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768712	S20 0.50 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768713	S21 1.30 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768714	S22 2.50 SOIL	12/02/15	GJ 1L, GJ 250ml, PT 1L x2		
768715	S23 0.50 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768716	S24 1.40 SOIL	12/02/15	GJ 250ml, PT 1L x2		
768717	S25 2.50 SOIL	12/02/15	GJ 250ml x2, PT 1L x2		
768718	S16A 3.00 MISC	12/02/15	PT 1L x2		
785692	S1 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785693	S2 1.70 LEACHATE	12/02/15	GJ 1L (1L)		
785694	S3 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785695	S4 2.00 LEACHATE	12/02/15	GJ 1L (1L)		
785696	S5 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785697	S6 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785698	S7 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785699	S8 0.80 LEACHATE	12/02/15	GJ 1L (1L)		
785700	S9 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785701	S10 2.00 LEACHATE	12/02/15	GJ 1L (1L)		
785702	S11 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785703	S12 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785704	S13 2.30 LEACHATE	12/02/15	GJ 1L (1L)		
785705	S14 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785706	S15 2.00 LEACHATE	12/02/15	GJ 1L (1L)		
785707	S16 3.00 LEACHATE	12/02/15	GJ 1L (1L)		
785708	S17 0.30 LEACHATE	12/02/15	GJ 1L (1L)		
785709	S18 1.30 LEACHATE	12/02/15	GJ 1L (1L)		
785710	S19 2.80 LEACHATE	12/02/15	GJ 1L (1L)		
785711	S20 0.50 LEACHATE	12/02/15	GJ 1L (1L)		
785712	S21 1.30 LEACHATE	12/02/15	GJ 1L (1L)		
785713	S22 2.50 LEACHATE	12/02/15	GJ 1L (1L)		
785714	S23 0.50 LEACHATE	12/02/15	GJ 1L (1L)		

Information in Support of the Analytical Results

Our Ref 15-27313-2
Client Ref 12032-SP1
Contract Herbet Road Stockpile - Round 1

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
785715	S24 1.40 LEACHATE	12/02/15	GJ 1L (1L)		
785716	S25 2.50 LEACHATE	12/02/15	GJ 1L (1L)		

Key: G-Glass P-Plastic J-Jar V-Vial T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-27519-2

19-Jun-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference	15-27519-2
Client Reference	12032-SP1
Contract Title	Herbert Road Stockpile - Round 1
Description	11 Soil samples, 11 Leachate samples.
Date Received	17-Feb-15
Date Started	17-Feb-15
Date Completed	19-Jun-15
Test Procedures	Identified by prefix DETSn (details on request).

Notes **This report supersedes 15-27519. Extra testing.**

Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

Sample ID	Lab No	Completed	Matrix Description
S26	769704	10/06/2015	Dark brown gravelly sandy CLAY with odd rootlets
S27	769705	10/06/2015	Dark brown gravelly sandy CLAY
S28	769706	10/06/2015	Dark brown gravelly sandy CLAY with odd rootlets (Made Ground includes brick)
S29	769707	10/06/2015	Dark brown gravelly sandy CLAY with odd rootlets
S30	769708	10/06/2015	Dark brown gravelly sandy CLAY
S31	769709	10/06/2015	Dark brown gravelly sandy CLAY
S32	769710	10/06/2015	Dark brown gravelly sandy CLAY with odd rootlets
S33	769711	10/06/2015	Dark brown gravelly sandy CLAY
S34	769712	10/06/2015	Dark grey gravelly sandy CLAY
S35	769713	10/06/2015	Dark gravelly sandy CLAY
S36	769714	10/06/2015	Brown gravelly sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769704	769705	769706	769707	769708	769709	769710
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	8.2	8.4	7.4	9.0	8.5	9.2	7.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.5	1.4	0.6	0.6	2.0	0.6
Chromium	DETSC 2301#	0.15	mg/kg	21	19	21	25	19	21	22
Chromium III	DETSC 2301*	0.15	mg/kg	21	19	21	25	19	21	22
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	26	21	31	27	25	21	23
Lead	DETSC 2301#	0.3	mg/kg	40	38	78	41	42	82	33
Mercury	DETSC 2325#	0.05	mg/kg	0.07	< 0.05	0.12	0.10	0.07	0.10	0.09
Nickel	DETSC 2301#	1	mg/kg	24	21	21	25	19	20	26
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	120	80	130	92	80	140	74
Inorganics										
pH	DETSC 2008#			8.7	9.3	9.5	8.6	8.7	11.3	8.8
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.1	0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1
Organic matter	DETSC 2002#	0.1	%	3.1	2.6	2.1	3.8	3.1	2.5	2.8
Chloride	DETSC 2055	1	mg/kg	I/S	I/S	I/S	I/S	I/S	I/S	I/S
Fluoride	DETSC 2055	1	mg/kg	I/S	I/S	I/S	I/S	I/S	I/S	I/S
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.07	0.07	0.08	0.16	0.27	0.07	0.07
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	15	< 3.4	< 3.4	< 3.4	9.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	15	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	8.5	10
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	15	< 10	< 10	< 10	18	10

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769704	769705	769706	769707	769708	769709	769710
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	0.06	0.06	0.06	0.12	0.17	0.06
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.05	0.04	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	0.10	0.12	0.09	0.25	0.12	0.08
Pyrene	DETSC 3303#	0.03	mg/kg	0.07	0.09	0.10	0.07	0.22	0.10	0.07
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.04	0.04	0.05	< 0.03	0.11	0.04	0.04
Chrysene	DETSC 3303	0.03	mg/kg	0.05	0.06	0.06	0.05	0.12	0.06	0.04
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	0.06	0.06	0.04	0.13	0.05	0.04
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.05	< 0.03	0.09	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.06	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.05	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.33	0.45	0.50	0.30	1.2	0.61	0.33
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.4	< 0.3	< 0.3	0.4	0.4	< 0.3

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769711	769712	769713	769714
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	6.5	4.7	8.5	4.8
Cadmium	DETSC 2301#	0.1	mg/kg	1.2	0.6	0.6	1.0
Chromium	DETSC 2301#	0.15	mg/kg	14	21	15	18
Chromium III	DETSC 2301*	0.15	mg/kg	14	21	15	18
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	14	11	20	13
Lead	DETSC 2301#	0.3	mg/kg	39	21	26	41
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	16	12	20	16
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	97	48	63	85
Inorganics							
pH	DETSC 2008#			11.5	10.9	9.0	11.5
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.7	4.5	1.9	1.0
Chloride	DETSC 2055	1	mg/kg	I/S	I/S	I/S	I/S
Fluoride	DETSC 2055	1	mg/kg	I/S	I/S	I/S	I/S
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.15	0.06	0.12	0.11
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	7.1	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	15	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	9.8	150	17	19
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	180	17	19
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.03	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	0.10	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	2.5	14	< 0.6	0.8
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	19	260	< 1.4	15
Aromatic C5-C35	DETSC 3072*	10	mg/kg	22	270	< 10	16
TPH Ali/Aro	DETSC 3072*	10	mg/kg	32	450	17	34

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied. I/S -insufficient.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	769711	769712	769713	769714
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.21	0.22	< 0.03	0.10
Anthracene	DETSC 3303	0.03	mg/kg	0.07	0.04	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	0.17	0.07	0.20
Pyrene	DETSC 3303#	0.03	mg/kg	0.36	0.17	0.06	0.18
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.18	0.08	< 0.03	0.09
Chrysene	DETSC 3303	0.03	mg/kg	0.20	0.20	< 0.03	0.10
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.22	0.13	0.04	0.12
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	0.04	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.19	0.08	< 0.03	0.09
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.11	0.08	< 0.03	0.06
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.10	0.05	< 0.03	0.05
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	2.1	1.3	0.17	1.1
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.3	< 0.3	< 0.3

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	824969	824970	824971	824972	824973	824974	824975
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Preparation										
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y	Y
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.78	0.87	1.7	0.63	0.65	1.2	0.56
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.27	< 0.25	0.31	< 0.25	0.26	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.7	1.3	2.1	0.9	1.1	1.2	1.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.20	0.20	0.81	0.24	0.32	0.33	0.25
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.27	0.28	0.47	< 0.25	< 0.25	0.34	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	3.89	1.41	1.76	< 1.25	< 1.25	< 1.25	< 1.25
Inorganics										
pH	DETSC 2008			6.6	6.5	6.5	6.5	6.5	6.6	8.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.0	1.2	1.2	0.83	1.0	2.5	0.97
Fluoride	DETSC 2055	0.1	mg/l	0.11	0.12	< 0.10	0.11	0.10	0.12	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	7.9	11	15	8.8	6.6	10	7.6
Total Organic Carbon	DETSC 2085	1	mg/l	4.1	3.0	4.4	2.1	2.8	4.4	2.2
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	1.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	824969	824970	824971	824972	824973	824974	824975
			Sample ID	S26	S27	S28	S29	S30	S31	S32
			Depth							
			Other ID							
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
PAHs										
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
PAH	DETSC 3304	0.04	ug/l	1.4	0.79	0.92	0.57	1.9	0.76	0.58
Phenols										
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	824976	824977	824978	824979
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.8	6.5	1.2	1.2
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	2.9	1.4	0.53	3.1
Chromium III Dissolved	DETSC 2302*	1	ug/l	2.9	1.4	< 1.0	3.1
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	7.9	11	1.5	9.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.37	0.94	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.8	2.5	< 0.5	1.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.75	1.5	< 0.25	0.61
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25	3.42	< 1.25
Inorganics							
pH	DETSC 2008			8.8	8.6	7.8	9.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	3.5	2.5	1.1	3.9
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	0.11	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	11	15	12	5.8
Total Organic Carbon	DETSC 2085	1	mg/l	3.6	7.6	3.0	3.0
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

			Lab No	824976	824977	824978	824979
			Sample ID	S33	S34	S35	S36
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	16/02/15	16/02/15	16/02/15	16/02/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20
PAH	DETSC 3304	0.04	ug/l	0.19	1.3	0.81	0.24
Phenols							
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
769704	S26	SOIL	NAD	none	Jeff Cruddas
769705	S27	SOIL	NAD	none	Jeff Cruddas
769706	S28	SOIL	NAD	none	Jeff Cruddas
769707	S29	SOIL	NAD	none	Jeff Cruddas
769708	S30	SOIL	NAD	none	Jeff Cruddas
769709	S31	SOIL	NAD	none	Jeff Cruddas
769710	S32	SOIL	Amosite	Amosite present as fibre bundles	Jeff Cruddas
769711	S33	SOIL	NAD	none	Jeff Cruddas
769712	S34	SOIL	NAD	none	Jeff Cruddas
769713	S35	SOIL	NAD	none	Jeff Cruddas
769714	S36	SOIL	NAD	none	Jeff Cruddas

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Title Herbert Road Stockpile - Round 1

Lab No	769710
Sample ID	S32
Depth	
Other ID	
Sample Type	SOIL
Sampling Date	16/02/15
Sampling Time	

Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	946.82
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	<0.001
% Serpentine bundles in sample		Mass %	na
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Serpentine fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 15-27519-2
Client Ref 12032-SP1
Contract Herbert Road Stockpile - Round 1

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
769704	S26 SOIL	16/02/15	GJ 1L, GJ 60ml, PT 1L x2		
769705	S27 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769706	S28 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769707	S29 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769708	S30 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769709	S31 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769710	S32 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769711	S33 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769712	S34 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769713	S35 SOIL	16/02/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
769714	S36 SOIL	16/02/15	GJ 250ml x2, PT 1L x2		
824969	S26 LEACHATE	16/02/15	GJ 1L		
824970	S27 LEACHATE	16/02/15	GJ 1L		
824971	S28 LEACHATE	16/02/15	GJ 1L		
824972	S29 LEACHATE	16/02/15	GJ 1L		
824973	S30 LEACHATE	16/02/15	GJ 1L		
824974	S31 LEACHATE	16/02/15	GJ 1L		
824975	S32 LEACHATE	16/02/15	GJ 1L		
824976	S33 LEACHATE	16/02/15	GJ 1L		
824977	S34 LEACHATE	16/02/15	GJ 1L		
824978	S35 LEACHATE	16/02/15	GJ 1L		
824979	S36 LEACHATE	16/02/15	GJ 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

ANNEX D
Lower Half of Riversee Limited Stockpile
DETS test certificates 40034-2 & 40314

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-40034-2

05-Aug-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-40034-2

Client Reference 12032

Contract Title Herbert Road

Description 32 Soil samples, 32 Leachate samples.

Date Received 10-Jul-15

Date Started 10-Jul-15

Date Completed 05-Aug-15

Test Procedures Identified by prefix DETSn (details on request).

Notes **This report supersedes 15-40034. Extra testing.**
Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

Sample ID	Depth	Lab No	Completed	Matrix Description
TP1	1	837846	27/07/2015	Brown, gravelly, sandy CLAY
TP1	2	837847	27/07/2015	Dark brown, gravelly, sandy CLAY
TP1	3	837848	27/07/2015	Dark brown, gravelly, sandy CLAY
TP2	1	837849	27/07/2015	Dark brown, gravelly, sandy CLAY
TP2	2	837850	27/07/2015	Dark brown, gravelly, sandy CLAY
TP2	2.9	837851	27/07/2015	Dark brown, gravelly, sandy CLAY
TP3	0.5	837852	27/07/2015	Dark brown, gravelly, sandy CLAY
TP3	1.5	837853	27/07/2015	Dark brown, gravelly, sandy CLAY
TP3	3.5	837854	27/07/2015	Dark brown, gravelly, sandy CLAY
TP4	0.5	837855	27/07/2015	Dark brown, gravelly, sandy CLAY
TP4	2	837856	27/07/2015	Dark brown, gravelly, sandy CLAY
TP4	3	837857	27/07/2015	Dark brown, gravelly, sandy CLAY
TP5	1	837858	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets (Made ground - ceramic)
TP5	2	837859	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets
TP5	3	837860	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets (Made ground - brick)
TP6	0.5	837861	27/07/2015	Dark brown, gravelly, sandy CLAY
TP6	2	837862	27/07/2015	Dark brown, gravelly, sandy CLAY
TP6	3	837863	27/07/2015	Dark brown, gravelly, sandy CLAY
TP7	0.3	837864	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets
TP7	0.6	837865	27/07/2015	Dark brown, gravelly, sandy CLAY
TP7	2	837866	27/07/2015	Dark brown, gravelly, sandy CLAY
TP8	0.5	837867	27/07/2015	Dark brown, gravelly, sandy CLAY
TP8	2	837868	27/07/2015	Dark brown, gravelly, sandy CLAY
TP8	2.5	837869	27/07/2015	Very dark brown gravelly, sandy CLAY including odd rootlets
TP9	0.3	837870	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets
TP9	1	837871	27/07/2015	Brown, gravelly, sandy CLAY including odd rootlets
TP9	1.6	837872	27/07/2015	Dark brown, gravelly, sandy CLAY (Made ground -brick)
TP10	0.5	837873	27/07/2015	Dark brown, gravelly, sandy CLAY including odd rootlets (Made ground - brick)
TP10	1.4	837874	27/07/2015	Brown, gravelly, sandy CLAY
TP10	2.2	837875	27/07/2015	Dark brown, gravelly, sandy CLAY
TP11	0.5	837876	27/07/2015	Dark brown, gravelly, sandy CLAY
TP11	1	837877	27/07/2015	Dark brown, gravelly, sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837846	837847	837848	837849	837850	837851
			Sample ID	TP1	TP1	TP1	TP2	TP2	TP2
			Depth	1.00	2.00	3.00	1.00	2.00	2.90
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0				Y		Y	Y
Preparation									
Moisture Content	DETSC 1004*	0.1	%	15	18	18	15	21	17
Metals									
Antimony	DETSC 2301*	1	mg/kg	1.7	3.0	2.2	2.0	2.6	2.0
Arsenic	DETSC 2301#	0.2	mg/kg	6.2	9.9	7.5	11	9.9	7.4
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	1.1	1.2	1.2	1.1	1.2
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.1	1.2	1.0	1.2	1.2	1.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.6	0.8	0.4	0.5	0.4
Chromium	DETSC 2301#	0.15	mg/kg	23	65	39	33	29	23
Chromium III	DETSC 2301*	0.15	mg/kg	23	65	39	33	29	23
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	14	41	33	23	32	40
Lead	DETSC 2301#	0.3	mg/kg	53	39	34	31	60	59
Manganese	DETSC 2301#	20	mg/kg	730	940	1100	860	770	600
Mercury	DETSC 2325#	0.05	mg/kg	0.06	0.14	0.10	0.11	0.27	0.19
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1	4.9	1.2	0.9	1.9	1.0
Nickel	DETSC 2301#	1	mg/kg	17	44	30	21	26	29
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.8	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	55	100	89	74	90	78
Inorganics									
pH	DETSC 2008#			8.8	8.9	8.8	10.4	8.9	8.7
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.1	0.2	0.2	0.1	0.2	0.1
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	1.4	5.3	1.6	6.6	5.8	7.7
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.09	0.09	0.19	0.41	0.12	0.06

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837846	837847	837848	837849	837850	837851
			Sample ID	TP1	TP1	TP1	TP2	TP2	TP2
			Depth	1.00	2.00	3.00	1.00	2.00	2.90
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	2.0	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	4.1	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	19	11	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	19	11	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.12
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	1.7	4.4	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	35	37	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	37	41	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	56	53	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	1.3
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.09
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.09
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.06	0.09	0.09	0.03	0.06	0.44
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.09
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.13	0.18	0.22	0.05	0.08	0.43
Pyrene	DETSC 3303#	0.03	mg/kg	0.10	0.13	0.20	0.05	0.07	0.34
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05	0.06	0.11	< 0.03	< 0.03	0.13
Chrysene	DETSC 3303	0.03	mg/kg	0.06	0.08	0.12	< 0.03	< 0.03	0.13
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.07	0.14	< 0.03	< 0.03	0.10
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.05	< 0.03	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.03	0.05	0.09	< 0.03	< 0.03	0.07
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.07	< 0.03	< 0.03	0.04
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.07	< 0.03	< 0.03	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.50	0.73	1.2	0.13	0.22	3.3
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

				Lab No	837852	837853	837854	837855	837856	837857
				Sample ID	TP3	TP3	TP3	TP4	TP4	TP4
				Depth	0.50	1.50	3.50	0.50	2.00	3.00
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Asbestos Quantification OHR	DETSC 1102	0						Y	Y	Y
Preparation										
Moisture Content	DETSC 1004*	0.1	%	15	20	15	17	15	19
Metals										
Antimony	DETSC 2301*	1	mg/kg	2.1	2.4	1.6	2.2	1.7	2.4
Arsenic	DETSC 2301#	0.2	mg/kg	9.9	13	8.3	22	8.1	8.6
Beryllium	DETSC 2301#	0.2	mg/kg	0.8	1.1	1.1	0.7	0.7	0.8
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	0.5	1.1	1.2	1.2	1.2	1.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.6	3.0	0.6	1.1	0.4
Chromium	DETSC 2301#	0.15	mg/kg	21	25	20	19	20	30
Chromium III	DETSC 2301*	0.15	mg/kg	21	25	20	19	20	30
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	21	31	39	36	26	19
Lead	DETSC 2301#	0.3	mg/kg	27	45	130	59	37	330
Manganese	DETSC 2301#	20	mg/kg	550	890	980	630	640	730
Mercury	DETSC 2325#	0.05	mg/kg	0.07	0.14	0.20	0.17	0.10	0.10
Molybdenum	DETSC 2301#	0.4	mg/kg	0.9	1.1	0.8	1.2	0.8	0.9
Nickel	DETSC 2301#	1	mg/kg	24	25	16	20	20	30
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	70	96	180	110	83	89
Inorganics										
pH	DETSC 2008#			8.4	8.7	9.1	8.4	8.9	8.6
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.1	0.2	0.1	0.2	0.1	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.4	7.2	5.2	3.1	3.1	1.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.06	0.10	0.28	0.08	0.08	0.07

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837852	837853	837854	837855	837856	837857
			Sample ID	TP3	TP3	TP3	TP4	TP4	TP4
			Depth	0.50	1.50	3.50	0.50	2.00	3.00
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	12	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	12	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	5.2	< 0.6	< 0.6	2.2
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	50	< 1.4	< 1.4	10
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	55	< 10	< 10	13
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	67	< 10	< 10	13
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	0.18	0.06	0.27	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.06	< 0.03	0.06	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.13	0.77	0.06	0.52	0.23
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11	0.62	0.05	0.40	0.24
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	0.31	< 0.03	0.15	0.12
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.06	0.35	< 0.03	0.16	0.14
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	0.38	< 0.03	0.13	0.26
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.15	< 0.03	0.05	0.08
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.26	< 0.03	0.08	0.21
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.17	< 0.03	0.06	0.13
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.06	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.21	< 0.03	0.05	0.17
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	< 0.10	0.53	3.5	0.16	2.0	1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

				Lab No	837858	837859	837860	837861	837862	837863
				Sample ID	TP5	TP5	TP5	TP6	TP6	TP6
				Depth	1.00	2.00	3.00	0.50	2.00	3.00
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Asbestos Quantification OHR	DETSC 1102	0				Y		Y	Y
Preparation										
Moisture Content	DETSC 1004*	0.1	%	17	23	30	17	21	21
Metals										
Antimony	DETSC 2301*	1	mg/kg	2.7	2.5	2.8	2.0	3.3	2.4
Arsenic	DETSC 2301#	0.2	mg/kg	7.1	23	15	9.6	13	12
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.8	0.7	0.8	0.7	0.7
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	2.7	1.6	2.1	1.6	1.7	1.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.9	0.7	0.6	0.5	0.5	0.5
Chromium	DETSC 2301#	0.15	mg/kg	130	25	28	25	20	25
Chromium III	DETSC 2301*	0.15	mg/kg	130	25	28	25	20	25
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	16	71	37	24	140	48
Lead	DETSC 2301#	0.3	mg/kg	31	81	64	38	130	76
Manganese	DETSC 2301#	20	mg/kg	1700	660	920	780	670	680
Mercury	DETSC 2325#	0.05	mg/kg	0.18	0.23	0.23	0.09	0.34	0.21
Molybdenum	DETSC 2301#	0.4	mg/kg	1.2	1.3	1.3	0.8	1.3	1.2
Nickel	DETSC 2301#	1	mg/kg	14	19	19	23	22	18
Selenium	DETSC 2301#	0.5	mg/kg	0.8	< 0.5	0.5	< 0.5	0.6	< 0.5
Zinc	DETSC 2301#	1	mg/kg	130	150	110	70	140	110
Inorganics										
pH	DETSC 2008#			9.6	8.3	8.3	9.2	9.2	8.6
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.3	0.5	0.2	0.2	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	0.3	< 0.2	0.2	0.2
Organic matter	DETSC 2002#	0.1	%	2.5	5.8	5.0	2.1	4.5	3.8
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.23	0.09	0.12	0.11	0.12	0.09

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837858	837859	837860	837861	837862	837863
			Sample ID	TP5	TP5	TP5	TP6	TP6	TP6
			Depth	1.00	2.00	3.00	0.50	2.00	3.00
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.10	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.12	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	1.8	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	3.7	8.8	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	6.7	7.7	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	19	17	< 3.4	9.6	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	8.8	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	19	28	19	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.12	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	12	1.7	< 0.6	< 0.6	1.9	5.8
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	90	16	< 1.4	< 1.4	3.6	8.8
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	38	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	100	18	< 10	< 10	< 10	15
TPH Ali/Aro	DETSC 3072*	10	mg/kg	120	46	19	< 10	< 10	15
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.20	0.09	0.16	< 0.03	0.29	0.19
Anthracene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	0.06	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.36	0.18	0.29	< 0.03	0.52	0.41
Pyrene	DETSC 3303#	0.03	mg/kg	0.26	0.16	0.22	< 0.03	0.43	0.33
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.12	0.09	0.10	< 0.03	0.19	0.16
Chrysene	DETSC 3303	0.03	mg/kg	0.14	0.10	0.16	< 0.03	0.23	0.18
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.12	0.16	< 0.03	0.24	0.22
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.04	0.05	< 0.03	0.07	0.07
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.08	0.09	0.09	< 0.03	0.15	0.13
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.05	0.05	< 0.03	0.09	0.07
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.05	0.05	0.06	< 0.03	0.09	0.07
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.6	0.96	1.3	< 0.10	2.4	1.9
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837864	837865	837866	837867	837868	837869
			Sample ID	TP7	TP7	TP7	TP8	TP8	TP8
			Depth	0.30	0.60	2.00	0.50	2.00	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0		Y	Y				Y
Preparation									
Moisture Content	DETSC 1004*	0.1	%	16	12	29	16	16	14
Metals									
Antimony	DETSC 2301*	1	mg/kg	2.0	1.3	1.9	2.3	1.9	1.6
Arsenic	DETSC 2301#	0.2	mg/kg	10	4.3	10	13	6.7	9.1
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.5	1.1	1.2	0.8	0.9
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.4	1.5	2.0	1.5	1.2	1.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.6	0.5	0.4	1.6	0.3
Chromium	DETSC 2301#	0.15	mg/kg	25	19	26	35	27	31
Chromium III	DETSC 2301*	0.15	mg/kg	25	19	26	35	27	31
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	24	11	32	34	17	24
Lead	DETSC 2301#	0.3	mg/kg	43	20	20	90	95	20
Manganese	DETSC 2301#	20	mg/kg	820	510	590	690	830	930
Mercury	DETSC 2325#	0.05	mg/kg	0.15	< 0.05	0.07	0.20	0.09	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.5	3.6	1.2	0.6	0.9
Nickel	DETSC 2301#	1	mg/kg	27	18	30	27	24	22
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	97	52	77	95	130	60
Inorganics									
pH	DETSC 2008#			8.8	11.5	8.5	8.7	9.4	10.2
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	0.1	0.2	< 0.1	< 0.1
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.4	1.6	1.5	5.8	0.9	10
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.11	0.22	0.10	0.11	0.12	0.10

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837864	837865	837866	837867	837868	837869
			Sample ID	TP7	TP7	TP7	TP8	TP8	TP8
			Depth	0.30	0.60	2.00	0.50	2.00	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.17
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.05
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	2.7
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	5.9	< 3.4	< 3.4	< 3.4	< 3.4	66
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	15
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	69
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.05
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	9.1
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	140
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	41
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	150
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	220
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	0.05
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.23	0.18	< 0.03	0.10	< 0.03	0.14
Anthracene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.34	0.21	< 0.03	0.16	< 0.03	0.13
Pyrene	DETSC 3303#	0.03	mg/kg	0.27	0.17	< 0.03	0.14	< 0.03	0.13
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.13	0.10	< 0.03	0.07	< 0.03	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.15	0.11	< 0.03	0.07	< 0.03	0.14
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.16	0.10	< 0.03	0.09	< 0.03	0.09
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.06	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.09	0.07	< 0.03	0.06	< 0.03	0.05
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.03	< 0.03	0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.06	0.04	< 0.03	0.03	< 0.03	0.05
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.6	1.1	< 0.10	0.77	< 0.10	0.81
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

				Lab No	837870	837871	837872	837873	837874	837875
				Sample ID	TP9	TP9	TP9	TP10	TP10	TP10
				Depth	0.30	1.00	1.60	0.50	1.40	2.20
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Asbestos Quantification OHR	DETSC 1102	0		Y		Y	Y		Y
Preparation										
Moisture Content	DETSC 1004*	0.1	%	14	15	21	13	17	21
Metals										
Antimony	DETSC 2301*	1	mg/kg	1.7	2.9	2.9	2.2	1.5	1.9
Arsenic	DETSC 2301#	0.2	mg/kg	7.1	6.8	9.3	8.8	4.2	8.7
Beryllium	DETSC 2301#	0.2	mg/kg	1.3	1.0	0.8	1.0	0.8	0.9
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	2.1	1.4	1.9	1.3	1.5	2.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.5	0.5	0.4	0.6	0.3
Chromium	DETSC 2301#	0.15	mg/kg	34	36	27	31	29	29
Chromium III	DETSC 2301*	0.15	mg/kg	34	36	27	31	29	29
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	24	15	21	18	8.9	25
Lead	DETSC 2301#	0.3	mg/kg	28	43	69	35	30	70
Manganese	DETSC 2301#	20	mg/kg	1200	810	570	820	530	830
Mercury	DETSC 2325#	0.05	mg/kg	0.07	< 0.05	0.09	0.09	< 0.05	0.24
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.5	0.7	0.8	0.6	0.9
Nickel	DETSC 2301#	1	mg/kg	20	29	22	26	25	20
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	77	86	110	110	68	85
Inorganics										
pH	DETSC 2008#			10.0	9.0	9.7	8.4	11.2	9.8
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	0.2	0.2	< 0.1	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	6.4	1.3	1.5	2.3	0.5	6.2
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.41	0.09	0.18	0.07	0.21	0.17

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837870	837871	837872	837873	837874	837875
			Sample ID	TP9	TP9	TP9	TP10	TP10	TP10
			Depth	0.30	1.00	1.60	0.50	1.40	2.20
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	9.9	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	140	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	36	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	150	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	25	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	290	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	94	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	320	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	470	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	0.25	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.08	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.58	0.08	0.13	0.20	0.25	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.10	< 0.03	< 0.03	0.06	0.05	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.51	0.20	0.31	0.41	0.49	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.40	0.16	0.27	0.33	0.44	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.18	0.07	0.11	0.16	0.19	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.24	0.07	0.13	0.19	0.20	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.22	0.07	0.18	0.23	0.27	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03	0.07	0.08	0.08	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.16	0.05	0.13	0.12	0.19	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	0.08	0.08	0.11	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.20	< 0.03	0.10	0.08	0.12	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	3.2	0.69	1.5	1.9	2.4	< 0.10
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	0.8

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837876	837877
			Sample ID	TP11	TP11
			Depth	0.50	1.00
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Asbestos Quantification OHR	DETSC 1102	0		Y	
Preparation					
Moisture Content	DETSC 1004*	0.1	%	14	18
Metals					
Antimony	DETSC 2301*	1	mg/kg	1.8	2.8
Arsenic	DETSC 2301#	0.2	mg/kg	9.4	6.2
Beryllium	DETSC 2301#	0.2	mg/kg	0.7	0.9
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.3	1.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.6
Chromium	DETSC 2301#	0.15	mg/kg	18	29
Chromium III	DETSC 2301*	0.15	mg/kg	18	29
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	20	28
Lead	DETSC 2301#	0.3	mg/kg	47	35
Manganese	DETSC 2301#	20	mg/kg	690	800
Mercury	DETSC 2325#	0.05	mg/kg	0.13	0.06
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.5
Nickel	DETSC 2301#	1	mg/kg	20	29
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	85	96
Inorganics					
pH	DETSC 2008#			9.3	8.4
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.0	1.4
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.16	0.06

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837876	837877
			Sample ID	TP11	TP11
			Depth	0.50	1.00
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	08/07/15	08/07/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	57	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	14	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	57	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	1.9	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	110	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	33	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	110	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	170	< 10
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.13	0.05
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.26	0.09
Pyrene	DETSC 3303#	0.03	mg/kg	0.24	0.08
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.11	0.04
Chrysene	DETSC 3303	0.03	mg/kg	0.14	0.04
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.16	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.4	0.30
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837878	837879	837880	837881	837882	837883
			Sample ID	TP1	TP1	TP1	TP2	TP2	TP2
			Depth	1.00	2.00	3.00	1.00	2.00	2.90
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.5	2.3	1.3	1.1	1.3	1.3
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	0.09	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	1.0	0.26	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	3.3	2.8	1.9	1.2	2.0	1.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.72	0.70	0.37	0.13	0.66	0.57
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.9	0.8	< 0.5	0.6	0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.33	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.67	1.42	1.29	2.45	1.52	1.38
Inorganics									
pH	DETSC 2008			8.2	7.7	7.6	7.5	7.7	7.6
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.1	0.81	0.93	1.2	0.95	0.93
Fluoride	DETSC 2055	0.1	mg/l	0.13	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	8.8	5.3	5.6	8.2	6.2	3.0
Total Organic Carbon	DETSC 2085	1	mg/l	4.1	3.7	2.5	1.8	2.8	2.2
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837878	837879	837880	837881	837882	837883
			Sample ID	TP1	TP1	TP1	TP2	TP2	TP2
			Depth	1.00	2.00	3.00	1.00	2.00	2.90
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.03	0.03	0.04	0.04	0.04	0.04
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	0.01	0.02
Phenanthrene	DETSC 3304	0.01	ug/l	0.03	0.02	0.07	0.05	0.05	0.06
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	0.01	0.02	0.01	0.01	0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.04	0.05	0.06	0.06	0.05	0.06
Pyrene	DETSC 3304	0.01	ug/l	0.05	0.05	0.05	0.06	0.05	0.05
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.03	0.05	0.04	0.03	0.02	0.04
Chrysene	DETSC 3304	0.01	ug/l	0.03	0.05	0.06	0.04	0.03	0.04
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.12	0.09	0.03	0.03	0.04
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.04	0.03	0.01	< 0.01	0.02
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.11	0.06	0.03	0.02	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.02	0.09	0.06	0.02	< 0.01	0.02
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.05	0.20	0.08	0.02	< 0.01	0.04
PAH	DETSC 3304	0.04	ug/l	0.30	0.81	0.71	0.41	0.33	0.43
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837884	837885	837886	837887	837888	837889
			Sample ID	TP3	TP3	TP3	TP4	TP4	TP4
			Depth	0.50	1.50	3.50	0.50	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.90	1.5	0.68	1.2	1.6	1.5
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	0.07	< 0.03	< 0.03	0.47
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.40	< 0.25	< 0.25	0.55	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.3	2.1	1.1	2.4	1.6	0.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.47	0.81	0.65	0.96	0.40	0.30
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	2.20	< 1.25	2.61	3.09	< 1.25	3.26
Inorganics									
pH	DETSC 2008			7.6	7.7	7.6	7.6	7.5	7.5
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.1	0.89	0.83	0.94	0.94	0.73
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	6.2	3.1	4.8	8.0	9.6	5.1
Total Organic Carbon	DETSC 2085	1	mg/l	2.5	2.5	1.6	3.9	3.0	1.7
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837884	837885	837886	837887	837888	837889
			Sample ID	TP3	TP3	TP3	TP4	TP4	TP4
			Depth	0.50	1.50	3.50	0.50	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.03	0.04	0.04	0.04	0.05	0.03
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.01	< 0.01	0.01	0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	0.01	0.03
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.01	< 0.01	0.02	0.02
Phenanthrene	DETSC 3304	0.01	ug/l	0.02	0.06	0.06	0.03	0.07	0.04
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	0.01	0.02	< 0.01	0.02	0.02
Fluoranthene	DETSC 3304	0.01	ug/l	0.02	0.07	0.11	0.03	0.07	0.08
Pyrene	DETSC 3304	0.01	ug/l	0.02	0.07	0.12	0.03	0.08	0.11
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	0.02	0.10	0.02	0.04	0.05
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	0.05	0.11	0.02	0.04	0.05
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.07	0.11	0.03	0.05	0.13
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.04	0.05	0.01	0.02	0.05
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.05	0.11	0.02	0.03	0.10
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	< 0.01	0.03	0.15	0.02	0.03	0.17
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.05	< 0.01	0.01	0.03
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	< 0.01	0.03	0.22	0.02	0.04	0.21
PAH	DETSC 3304	0.04	ug/l	0.10	0.53	1.3	0.27	0.58	1.1
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837890	837891	837892	837893	837894	837895
			Sample ID	TP5	TP5	TP5	TP6	TP6	TP6
			Depth	1.00	2.00	3.00	0.50	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	5.0	1.4	3.7	0.61	2.7	1.8
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	0.12	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	0.37	< 0.25	0.29	0.81
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	5.7	2.6	9.2	2.0	4.2	3.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.67	1.1	3.3	0.66	2.4	1.4
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.8	0.6	1.0	0.7	0.7	0.6
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.67	< 0.25	0.35	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	1.55	2.32	1.43	3.11	1.69
Inorganics									
pH	DETSC 2008			7.7	7.7	7.6	7.7	7.5	7.3
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.5	1.8	1.3	1.2	1.2	1.2
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	3.5	6.2	8.8	9.1	4.7	5.8
Total Organic Carbon	DETSC 2085	1	mg/l	5.0	3.9	6.6	4.1	3.1	6.8
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	0.6	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837890	837891	837892	837893	837894	837895
			Sample ID	TP5	TP5	TP5	TP6	TP6	TP6
			Depth	1.00	2.00	3.00	0.50	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.07	0.04	0.05	0.03	0.04	0.04
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.10	0.01	0.02	< 0.01	0.01	0.01
Fluorene	DETSC 3304	0.01	ug/l	0.04	0.01	0.02	< 0.01	0.01	0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.06	0.04	0.07	0.03	0.06	0.06
Anthracene	DETSC 3304	0.01	ug/l	0.02	0.01	0.02	< 0.01	0.02	0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.07	0.06	0.11	0.04	0.07	0.08
Pyrene	DETSC 3304	0.01	ug/l	0.07	0.05	0.11	0.04	0.07	0.06
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.04	0.03	0.07	0.02	0.04	0.04
Chrysene	DETSC 3304	0.01	ug/l	0.04	0.04	0.06	0.02	0.05	0.05
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.05	0.06	0.09	0.03	0.10	0.08
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.02	0.02	0.03	0.01	0.03	0.03
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.03	0.03	0.05	0.02	0.06	0.04
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.04	0.04	0.06	0.01	0.07	0.06
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	0.02	0.02
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.05	0.04	0.08	0.02	0.07	0.06
PAH	DETSC 3304	0.04	ug/l	0.70	0.48	0.86	0.28	0.70	0.64
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837896	837897	837898	837899	837900	837901
			Sample ID	TP7	TP7	TP7	TP8	TP8	TP8
			Depth	0.30	0.60	2.00	0.50	2.00	2.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.6	0.82	0.35	0.97	1.9	3.4
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	2.4	< 0.25	< 0.25	1.1	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	2.4	< 1.0	< 1.0	1.1	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.9	5.3	0.6	1.1	1.9	3.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.35	< 0.09	0.20	0.18	0.35	0.18
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	0.6	< 0.5	< 0.5	< 0.5	1.4
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	0.66
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.42	< 1.25	< 1.25	4.08	< 1.25	< 1.25
Inorganics									
pH	DETSC 2008			7.3	10.7	8.9	8.3	8.3	7.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.3	3.3	1.4	0.77	1.4	1.3
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	9.5	2.3	15	8.5	6.2	4.7
Total Organic Carbon	DETSC 2085	1	mg/l	2.6	1.7	4.0	1.6	1.5	3.3
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837896	837897	837898	837899	837900	837901
			Sample ID	TP7	TP7	TP7	TP8	TP8	TP8
			Depth	0.30	0.60	2.00	0.50	2.00	2.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.04	0.07	0.04	0.03	0.03	0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.01
Fluorene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.05	0.03	0.02	0.04	0.02	0.08
Anthracene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.05	0.02	0.01	0.04	0.02	0.05
Pyrene	DETSC 3304	0.01	ug/l	0.04	0.02	0.02	0.04	0.02	3.9
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	0.02	< 0.01	0.02
Chrysene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	0.02	< 0.01	0.03
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	0.03	< 0.01	0.03
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	0.02	< 0.01	0.02
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.02	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.02	< 0.01	< 0.01	0.02	< 0.01	0.02
PAH	DETSC 3304	0.04	ug/l	0.35	0.14	0.10	0.26	0.08	4.3
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837902	837903	837904	837905	837906	837907
			Sample ID	TP9	TP9	TP9	TP10	TP10	TP10
			Depth	0.30	1.00	1.60	0.50	1.40	2.20
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	3.9	1.7	1.7	0.56	3.7	1.1
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	4.3	2.1	2.6	2.3	2.9	1.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.46	0.38	0.69	< 0.09	2.9	0.36
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.1	0.6	0.7	0.6	0.9	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.66	< 0.25	0.37	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	1.61	1.26	< 1.25	1.39	< 1.25
Inorganics									
pH	DETSC 2008			7.6	7.4	7.2	10.5	8.7	8.2
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.1	1.0	1.3	1.3	0.85	0.66
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	5.8	6.2	8.6	2.9	3.9	7.2
Total Organic Carbon	DETSC 2085	1	mg/l	4.1	2.1	2.7	1.8	3.3	2.0
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837902	837903	837904	837905	837906	837907
			Sample ID	TP9	TP9	TP9	TP10	TP10	TP10
			Depth	0.30	1.00	1.60	0.50	1.40	2.20
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15	08/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.08	0.03	0.03	0.05	0.03	0.03
Acenaphthylene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.04	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.21	0.02	0.02	0.02	0.04	0.03
Anthracene	DETSC 3304	0.01	ug/l	0.05	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.31	0.02	0.02	0.01	0.07	0.03
Pyrene	DETSC 3304	0.01	ug/l	0.35	0.02	0.02	0.01	0.06	0.02
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.25	0.01	0.01	< 0.01	0.03	0.01
Chrysene	DETSC 3304	0.01	ug/l	0.20	0.01	0.01	< 0.01	0.05	0.02
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.25	0.03	0.02	< 0.01	0.07	0.02
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.09	0.01	< 0.01	< 0.01	0.03	0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.17	0.02	< 0.01	< 0.01	0.05	0.02
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.16	< 0.01	< 0.01	< 0.01	0.06	0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.04	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.19	0.01	0.01	< 0.01	0.07	0.02
PAH	DETSC 3304	0.04	ug/l	2.5	0.20	0.16	0.09	0.59	0.22
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837908	837909
			Sample ID	TP11	TP11
			Depth	0.50	1.00
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
NRA Leachate Preparation	DETS 036*			Y	Y
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.72	0.56
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.8	2.2
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.19	0.19
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25
Inorganics					
pH	DETSC 2008			8.1	7.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	0.69	0.57
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.9	4.3
Total Organic Carbon	DETSC 2085	1	mg/l	1.5	1.9
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

			Lab No	837908	837909
			Sample ID	TP11	TP11
			Depth	0.50	1.00
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	08/07/15	08/07/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETSC 3304	0.01	ug/l	0.03	0.03
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.03	0.02
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.03	0.02
Pyrene	DETSC 3304	0.01	ug/l	0.02	0.02
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.02	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.02	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.01	< 0.01
PAH	DETSC 3304	0.04	ug/l	0.17	0.08
Phenols					
Phenol	*	0.5	ug/l	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
837846	TP1 1.00	SOIL	NAD	none	D Wilkinson
837847	TP1 2.00	SOIL	NAD	none	D Wilkinson
837848	TP1 3.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837849	TP2 1.00	SOIL	NAD	none	D Wilkinson
837850	TP2 2.00	SOIL	Chrysotile	Chrysotile present as small fibre bundles	D Wilkinson
837851	TP2 2.90	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837852	TP3 0.50	SOIL	NAD	none	D Wilkinson
837853	TP3 1.50	SOIL	NAD	none	D Wilkinson
837854	TP3 3.50	SOIL	NAD	none	D Wilkinson
837855	TP4 0.50	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837856	TP4 2.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837857	TP4 3.00	SOIL	Chrysotile	Chrysotile present as small fibre bundle	D Wilkinson
837858	TP5 1.00	SOIL	NAD	none	D Wilkinson
837859	TP5 2.00	SOIL	NAD	none	D Wilkinson
837860	TP5 3.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837861	TP6 0.50	SOIL	NAD	none	D Wilkinson
837862	TP6 2.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837863	TP6 3.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837864	TP7 0.30	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837865	TP7 0.60	SOIL	Chrysotile	Chrysotile present as small fibre bundle	D Wilkinson
837866	TP7 2.00	SOIL	NAD	none	D Wilkinson
837867	TP8 0.50	SOIL	NAD	none	D Wilkinson
837868	TP8 2.00	SOIL	NAD	none	D Wilkinson
837869	TP8 2.50	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837870	TP9 0.30	SOIL	Chrysotile Amosite	Chrysotile present as fibre bundles Amosite also present as small bundle	D Wilkinson
837871	TP9 1.00	SOIL	NAD	none	D Wilkinson
837872	TP9 1.60	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837873	TP10 0.50	SOIL	Amosite	Amosite present as small fibre bundle	D Wilkinson
837874	TP10 1.40	SOIL	NAD	none	D Wilkinson
837875	TP10 2.20	SOIL	Chrysotile	Chrysotile present as fibre bundles	D Wilkinson
837876	TP11 0.50	SOIL	Chrysotile	Chrysotile present as small fibre bundle	D Wilkinson
837877	TP11 1.00	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

Lab No	Sample ID	Material Type	Result	Comment*	Analyst

a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837848	837850	837851	837855
		Sample ID	TP1	TP2	TP2	TP4
		Depth	3.00	2.00	2.90	0.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	1036.29	1075.16	1046.26	989.45
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	<0.001	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837856	837857	837860	837862
		Sample ID	TP4	TP4	TP5	TP6
		Depth	2.00	3.00	3.00	2.00
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**	**0.005**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001	0.005	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	769.83	1181.87	1123.10	1055.83
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	<0.001	<0.001	0.005	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837863	837864	837865	837869
		Sample ID	TP6	TP7	TP7	TP8
		Depth	3.00	0.30	0.60	2.50
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.003**	**< 0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.003	<0.001	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	997.47	460.41	502.83	664.80
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	0.003	<0.001	<0.001	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837870	837872	837873	837875
		Sample ID	TP9	TP9	TP10	TP10
		Depth	0.30	1.60	0.50	2.20
		Other ID				
		Sample Type	SOIL	SOIL	SOIL	SOIL
		Sampling Date	08/07/15	08/07/15	08/07/15	08/07/15
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**0.002**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	0.002	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	983.64	1171.10	576.91	695.43
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	<0.001	na
% Serpentine bundles in sample		Mass %	<0.001	0.002	na	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 15-40034-2
Client Ref 12032
Contract Title Herbert Road

		Lab No	837876
		Sample ID	TP11
		Depth	0.50
		Other ID	
		Sample Type	SOIL
		Sampling Date	08/07/15
		Sampling Time	
Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	457.75
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Serpentine bundles in sample		Mass %	<0.001
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Serpentine fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 15-40034-2
Client Ref 12032
Contract Herbert Road

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
837846	TP1 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837847	TP1 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837848	TP1 3.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837849	TP2 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837850	TP2 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837851	TP2 2.90 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837852	TP3 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837853	TP3 1.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837854	TP3 3.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837855	TP4 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837856	TP4 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837857	TP4 3.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837858	TP5 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837859	TP5 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837860	TP5 3.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837861	TP6 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837862	TP6 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837863	TP6 3.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837864	TP7 0.30 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837865	TP7 0.60 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837866	TP7 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837867	TP8 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837868	TP8 2.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837869	TP8 2.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837870	TP9 0.30 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837871	TP9 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837872	TP9 1.60 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837873	TP10 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837874	TP10 1.40 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837875	TP10 2.20 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837876	TP11 0.50 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837877	TP11 1.00 SOIL	08/07/15	GJ 250ml x2, PT 1L x2		
837878	TP1 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837879	TP1 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837880	TP1 3.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837881	TP2 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837882	TP2 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837883	TP2 2.90 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837884	TP3 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837885	TP3 1.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837886	TP3 3.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837887	TP4 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837888	TP4 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837889	TP4 3.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837890	TP5 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837891	TP5 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837892	TP5 3.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837893	TP6 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837894	TP6 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		

Information in Support of the Analytical Results

Our Ref 15-40034-2
Client Ref 12032
Contract Herbert Road

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
837895	TP6 3.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837896	TP7 0.30 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837897	TP7 0.60 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837898	TP7 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837899	TP8 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837900	TP8 2.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837901	TP8 2.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837902	TP9 0.30 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837903	TP9 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837904	TP9 1.60 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837905	TP10 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837906	TP10 1.40 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837907	TP10 2.20 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837908	TP11 0.50 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		
837909	TP11 1.00 LEACHATE	08/07/15	GJ 250ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-40314

03-Aug-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-40314

Client Reference 12032

Contract Title Herbert Road

Description 24 Soil samples, 24 Leachate samples.

Date Received 15-Jul-15

Date Started 15-Jul-15

Date Completed 03-Aug-15

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

Sample ID	Depth	Lab No	Completed	Matrix Description
TP12	1	839276	03/08/2015	Brown, gravelly, sandy CLAY
TP12	2	839277	03/08/2015	Brown, gravelly, sandy CLAY
TP12	3	839278	03/08/2015	Brown, gravelly, sandy CLAY
TP13	1	839279	03/08/2015	Brown, gravelly, sandy CLAY
TP13	2	839280	03/08/2015	Brown, gravelly, sandy CLAY
TP13	3	839281	03/08/2015	Brown, gravelly, sandy CLAY
TP14	1	839282	03/08/2015	Brown, gravelly, sandy CLAY
TP14	2	839283	03/08/2015	Brown, gravelly, sandy CLAY
TP14	3	839284	03/08/2015	Brown, gravelly, sandy CLAY
TP15	0.3	839285	03/08/2015	Brown, gravelly, sandy CLAY
TP15	1	839286	03/08/2015	Brown, gravelly, sandy CLAY
TP15	2.2	839287	03/08/2015	Brown, gravelly, sandy CLAY
TP16	0.5	839288	03/08/2015	Brown, gravelly, sandy CLAY
TP16	1.5	839289	03/08/2015	Brown, gravelly, sandy CLAY
TP16	2.5	839290	03/08/2015	Brown, gravelly, sandy CLAY
TP17	0.5	839291	03/08/2015	Brown, gravelly, sandy CLAY
TP17	1.5	839292	03/08/2015	Brown, gravelly, sandy CLAY
TP17	2.5	839293	03/08/2015	Brown, gravelly, sandy CLAY
TP18	0.5	839294	03/08/2015	Brown, gravelly, sandy CLAY
TP18	1.5	839295	03/08/2015	Brown, gravelly, sandy CLAY
TP18	2.5	839296	03/08/2015	Brown, gravelly, sandy CLAY
TP19	0.5	839297	03/08/2015	Brown, gravelly, sandy CLAY
TP19	1.5	839298	03/08/2015	Brown, gravelly, sandy CLAY
TP19	2.5	839299	03/08/2015	Brown, gravelly, sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839276	839277	839278	839279	839280	839281
			Sample ID	TP12	TP12	TP12	TP13	TP13	TP13
			Depth	1.00	2.00	3.00	1.00	2.00	3.00
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0			Y				
Preparation									
Moisture Content	DETSC 1004*	0.1	%	16	21	23	13	19	16
Metals									
Antimony	DETSC 2301*	1	mg/kg	2.3	2.8	1.5	2.6	3.5	1.5
Arsenic	DETSC 2301#	0.2	mg/kg	6.7	12	9.6	16	23	7.5
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	0.8	0.5	1.2	0.9	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.5	1.7	1.6	1.6	1.5	1.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	1.8	0.6	0.6	0.7	0.5
Chromium	DETSC 2301#	0.15	mg/kg	120	40	16	26	23	25
Chromium III	DETSC 2301*	0.15	mg/kg	120	40	16	26	23	25
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	25	54	20	37	56	17
Lead	DETSC 2301#	0.3	mg/kg	35	84	70	110	180	35
Manganese	DETSC 2301#	20	mg/kg	1200	960	630	850	710	830
Mercury	DETSC 2325#	0.05	mg/kg	0.10	0.36	0.22	0.29	0.66	0.14
Molybdenum	DETSC 2301#	0.4	mg/kg	1.6	1.1	0.8	1.5	1.8	0.6
Nickel	DETSC 2301#	1	mg/kg	19	21	14	22	25	17
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	73	150	90	130	190	97
Inorganics									
pH	DETSC 2008#			10.1	10.7	11.1	10.2	10.0	10.4
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.1	< 0.1	< 0.1	< 0.1	0.5
Cyanide complex	DETSC 2130*	0.2	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.5
Organic matter	DETSC 2002#	0.1	%	2.2	4.2	3.3	2.1	2.5	2.1
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.12	0.16	0.25	0.23	0.16	0.17

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839276	839277	839278	839279	839280	839281
			Sample ID	TP12	TP12	TP12	TP13	TP13	TP13
			Depth	1.00	2.00	3.00	1.00	2.00	3.00
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	4.0	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	13	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	47	< 3.4	14
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	13	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	64	< 10	14
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	3.1	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	22	2.8	19
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	84	4.3	67
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	25	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	110	< 10	86
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	170	< 10	100
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	0.22	0.19	0.17
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.22	0.12	0.17
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.18	0.10	0.17
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.08	0.21	0.20	1.4	0.99	1.4
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.04	0.05	0.35	0.23	0.34
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.36	0.20	2.1	1.6	2.1
Pyrene	DETSC 3303#	0.03	mg/kg	0.13	0.30	0.15	1.9	1.3	1.8
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.07	0.15	0.06	0.82	0.57	0.78
Chrysene	DETSC 3303	0.03	mg/kg	0.08	0.18	0.07	0.92	0.61	0.85
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	0.19	0.06	0.94	0.61	0.89
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	< 0.03	0.31	0.23	0.30
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.05	0.12	0.05	0.69	0.44	0.63
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.03	0.07	< 0.03	0.32	0.19	0.29
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.10	0.07	0.10
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	< 0.03	0.37	0.22	0.32
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	0.66	1.8	0.84	11	7.5	10
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839282	839283	839284	839285	839286	839287
			Sample ID	TP14	TP14	TP14	TP15	TP15	TP15
			Depth	1.00	2.00	3.00	0.30	1.00	2.20
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0			Y				Y
Preparation									
Moisture Content	DETSC 1004*	0.1	%	19	10	28	14	15	19
Metals									
Antimony	DETSC 2301*	1	mg/kg	2.3	2.2	1.8	1.9	2.3	2.4
Arsenic	DETSC 2301#	0.2	mg/kg	11	13	8.5	8.1	11	9.5
Beryllium	DETSC 2301#	0.2	mg/kg	0.4	0.6	1.0	0.7	1.8	0.8
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.6	1.6	1.2	1.2	1.4	1.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.6	0.5	0.5	0.5	0.6
Chromium	DETSC 2301#	0.15	mg/kg	17	20	35	22	25	32
Chromium III	DETSC 2301*	0.15	mg/kg	17	20	35	22	25	32
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	65	30	33	21	31	34
Lead	DETSC 2301#	0.3	mg/kg	85	43	42	52	61	39
Manganese	DETSC 2301#	20	mg/kg	540	660	760	880	1600	800
Mercury	DETSC 2325#	0.05	mg/kg	0.50	0.17	0.17	0.07	0.17	0.10
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1	1.1	1.3	0.6	1.0	1.2
Nickel	DETSC 2301#	1	mg/kg	17	17	32	21	16	27
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	1.0	< 0.5
Zinc	DETSC 2301#	1	mg/kg	110	95	90	67	96	92
Inorganics									
pH	DETSC 2008#			10.1	7.6	8.5	8.7	8.8	9.6
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.4	0.4	0.2	0.3	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	0.4	< 0.2	0.3	< 0.2
Organic matter	DETSC 2002#	0.1	%	3.4	4.0	3.3	1.5	4.1	2.3
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.19	0.09	0.06	0.09	0.27	0.14

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

				Lab No	839282	839283	839284	839285	839286	839287
				Sample ID	TP14	TP14	TP14	TP15	TP15	TP15
				Depth	1.00	2.00	3.00	0.30	1.00	2.20
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	0.08	0.07	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	0.01	0.01	0.01	< 0.01	0.01	0.02
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	0.05	0.07	< 0.03	< 0.03	0.15	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	< 0.03	< 0.03	0.09	0.06
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.08	< 0.03	< 0.03	0.08	0.06
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.19	0.62	0.08	0.05	0.40	0.25
Anthracene	DETSC 3303	0.03	mg/kg	0.05	0.13	< 0.03	< 0.03	0.09	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.30	0.96	0.15	0.08	0.53	0.21
Pyrene	DETSC 3303#	0.03	mg/kg	0.24	0.76	0.12	0.07	0.50	0.17
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.11	0.33	0.06	0.03	0.17	0.05
Chrysene	DETSC 3303	0.03	mg/kg	0.13	0.40	0.09	0.03	0.20	0.05
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.42	0.09	< 0.03	0.17	0.05
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.12	< 0.03	< 0.03	0.07	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.08	0.26	0.05	< 0.03	0.12	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.14	0.04	< 0.03	0.06	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.05	0.14	< 0.03	< 0.03	0.06	< 0.03
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.4	4.5	0.68	0.26	2.7	0.93
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	< 0.3	< 0.3	< 0.3	< 0.3	0.4

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839288	839289	839290	839291	839292	839293
			Sample ID	TP16	TP16	TP16	TP17	TP17	TP17
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification OHR	DETSC 1102	0							
Preparation									
Moisture Content	DETSC 1004*	0.1	%	23	16	22	17	22	18
Metals									
Antimony	DETSC 2301*	1	mg/kg	3.3	1.8	2.4	2.2	2.0	1.6
Arsenic	DETSC 2301#	0.2	mg/kg	9.4	5.1	7.1	8.3	8.9	7.1
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.9	1.0	0.7	0.7	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.7	2.1	2.2	1.5	2.3	1.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.8	0.5	0.8	0.8	0.7	1.0
Chromium	DETSC 2301#	0.15	mg/kg	39	59	64	25	35	24
Chromium III	DETSC 2301*	0.15	mg/kg	39	59	64	25	35	24
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	43	13	21	21	24	19
Lead	DETSC 2301#	0.3	mg/kg	52	22	49	81	66	84
Manganese	DETSC 2301#	20	mg/kg	960	2000	1400	700	760	880
Mercury	DETSC 2325#	0.05	mg/kg	0.15	< 0.05	0.13	0.08	0.15	0.13
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	0.6	1.0	0.7	1.0	0.6
Nickel	DETSC 2301#	1	mg/kg	23	24	26	27	20	19
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	110	56	99	110	110	99
Inorganics									
pH	DETSC 2008#			9.9	11.2	10.4	9.8	9.9	10.9
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.1	0.2	0.2	0.2	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.5	1.1	2.2	1.6	2.5	1.8
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.14	0.16	0.13	0.10	0.14	0.12

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839288	839289	839290	839291	839292	839293
			Sample ID	TP16	TP16	TP16	TP17	TP17	TP17
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.23	0.10	0.07	0.11	0.12	0.12
Anthracene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.38	0.21	0.15	0.29	0.34	0.27
Pyrene	DETSC 3303#	0.03	mg/kg	0.31	0.17	0.12	0.55	0.53	0.45
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.12	0.07	0.06	0.08	0.09	0.07
Chrysene	DETSC 3303	0.03	mg/kg	0.16	0.08	0.07	0.09	0.10	0.08
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.17	0.10	0.09	0.11	0.10	0.09
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.03	< 0.03	< 0.03	< 0.03	0.05
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.10	0.07	0.06	0.08	0.09	0.08
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.05	0.05	0.06	0.05	0.06
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.06	0.05	0.04	0.09	0.09	0.09
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.8	0.94	0.71	1.5	1.5	1.4
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

	Lab No	839294	839295	839296	839297	839298	839299
	Sample ID	TP18	TP18	TP18	TP19	TP19	TP19
	Depth	0.50	1.50	2.50	0.50	1.50	2.50
	Other ID						
	Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
	Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Asbestos Quantification OHR	DETSC 1102	0		Y					
Preparation									
Moisture Content	DETSC 1004*	0.1	%	17	23	24	15	19	21
Metals									
Antimony	DETSC 2301*	1	mg/kg	2.1	1.9	2.5	1.5	2.0	2.6
Arsenic	DETSC 2301#	0.2	mg/kg	8.7	7.7	9.3	7.2	11	7.7
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	0.6	0.8	0.7	0.8	0.6
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.9	2.1	2.3	1.3	1.3	2.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.6	0.8	1.2	0.8	0.7
Chromium	DETSC 2301#	0.15	mg/kg	19	23	49	19	32	100
Chromium III	DETSC 2301*	0.15	mg/kg	19	23	49	19	32	100
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	19	19	24	18	19	48
Lead	DETSC 2301#	0.3	mg/kg	93	48	74	39	120	38
Manganese	DETSC 2301#	20	mg/kg	460	600	870	870	1200	1300
Mercury	DETSC 2325#	0.05	mg/kg	0.08	0.09	0.07	< 0.05	0.05	0.06
Molybdenum	DETSC 2301#	0.4	mg/kg	0.7	0.6	0.9	0.6	0.6	1.1
Nickel	DETSC 2301#	1	mg/kg	18	18	21	19	27	16
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	93	90	130	96	120	98
Inorganics									
pH	DETSC 2008#			11.5	10.8	9.9	10.2	11.2	10.6
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.2	0.1	0.2	0.1	0.1	0.2
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	1.7	1.8	1.6	4.2	3.3	2.1
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.19	0.21	0.14	0.11	0.14	0.24

Summary of Chemical Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839294	839295	839296	839297	839298	839299
			Sample ID	TP18	TP18	TP18	TP19	TP19	TP19
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	0.22	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	0.26	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	0.14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	0.02	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	0.15	< 0.01	< 0.01	0.01	0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.16	0.22	0.17	0.05	0.07	0.34
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.04	< 0.03	< 0.03	< 0.03	0.05
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.29	0.49	0.36	0.10	0.11	0.52
Pyrene	DETSC 3303#	0.03	mg/kg	0.43	0.60	0.48	0.24	0.25	0.57
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.07	0.16	0.10	< 0.03	< 0.03	0.17
Chrysene	DETSC 3303	0.03	mg/kg	0.09	0.21	0.12	< 0.03	< 0.03	0.23
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.20	0.11	< 0.03	< 0.03	0.21
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	0.05	< 0.03	< 0.03	0.07
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.16	< 0.03	< 0.03	< 0.03	0.16
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.05	0.10	0.07	< 0.03	< 0.03	0.10
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.07	0.14	0.10	< 0.03	0.06	0.14
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.3	2.4	1.6	0.39	0.49	2.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839300	839301	839302	839303	839304	839305
			Sample ID	TP12	TP12	TP12	TP13	TP13	TP13
			Depth	1.00	2.00	3.00	1.00	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.4	4.7	2.0	7.4	5.0	2.3
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.28	< 0.25	0.41	0.31	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.4	4.3	2.5	5.4	2.8	1.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.67	2.4	0.39	1.0	0.94	0.26
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.01	< 0.01	0.02	0.02	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.8	1.1	0.9	1.0	0.6	0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.54	0.56	0.44	0.71	1.2	0.71
Zinc, Dissolved	DETSC 2306	1.25	ug/l	1.52	2.12	2.20	2.46	1.41	2.08
Inorganics									
pH	DETSC 2008			7.1	7.1	7.1	9.0	8.4	8.0
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	15	82	130	1.5	1.7	1.0
Fluoride	DETSC 2055	0.1	mg/l	0.14	0.14	0.17	< 0.10	0.11	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	19	6.2	7.0	5.8	11	51
Total Organic Carbon	DETSC 2033	2	mg/l	6.4	6.4	6.6	5.5	5.1	3.7
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	14	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	14	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	14	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839300	839301	839302	839303	839304	839305
			Sample ID	TP12	TP12	TP12	TP13	TP13	TP13
			Depth	1.00	2.00	3.00	1.00	2.00	3.00
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.04	< 0.01	0.42
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.58
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.04	0.04	0.56
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.06	0.05	0.30
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	0.03	0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02	0.03	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.03	0.03	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	0.02	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.03	0.03	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	0.24	0.24	2.0
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839306	839307	839308	839309	839310	839311
			Sample ID	TP14	TP14	TP14	TP15	TP15	TP15
			Depth	1.00	2.00	3.00	0.30	1.00	2.20
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	4.2	7.2	2.6	0.70	3.3	5.0
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.42	0.29	0.30	< 0.25	0.29
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	6.8	16	3.4	3.1	3.1	4.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.27	1.5	1.1	0.50	1.2	0.61
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01	0.03	0.01	< 0.01	0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.0	2.1	1.3	22	1.1	1.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.1	1.0	0.80	0.70	0.45	0.75
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25	1.53	6.20	1.96	< 1.25
Inorganics									
pH	DETSC 2008			8.7	8.6	8.1	8.0	7.9	7.8
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.8	20	17	2.0	1.3	2.7
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	0.13	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	10	8.9	26	19	3.9	5.2
Total Organic Carbon	DETSC 2033	2	mg/l	3.8	13	5.7	4.7	4.6	9.7
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839306	839307	839308	839309	839310	839311
			Sample ID	TP14	TP14	TP14	TP15	TP15	TP15
			Depth	1.00	2.00	3.00	0.30	1.00	2.20
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.04	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.04	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

				Lab No	839312	839313	839314	839315	839316	839317
				Sample ID	TP16	TP16	TP16	TP17	TP17	TP17
				Depth	0.50	1.50	2.50	0.50	1.50	2.50
				Other ID						
				Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
				Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Preparation										
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.7	2.0	2.9	5.6	7.5	4.8
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.31	< 0.25	< 0.25	< 0.25	0.27
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.1	1.3	3.0	2.1	6.7	2.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.86	< 0.09	0.12	1.3	1.1	3.1
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.6	0.8	1.0	0.8	2.1	1.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.57	0.56	0.64	0.46	0.76	0.54
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	1.67	< 1.25	< 1.25	< 1.25	2.14
Inorganics										
pH	DETSC 2008			7.7	8.9	9.3	8.2	8.2	7.9
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.8	1.1	0.99	1.6	2.0	2.2
Fluoride	DETSC 2055	0.1	mg/l	0.17	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.4	7.0	5.8	4.8	6.6	6.7
Total Organic Carbon	DETSC 2033	2	mg/l	10	17	3.7	16	7.5	11
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	4.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839312	839313	839314	839315	839316	839317
			Sample ID	TP16	TP16	TP16	TP17	TP17	TP17
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	4.0	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.47	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	4.5	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	2.2	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	11	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	1.8	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

				Lab No	839318	839319	839320	839321	839322	839323
				Sample ID	TP18	TP18	TP18	TP19	TP19	TP19
				Depth	0.50	1.50	2.50	0.50	1.50	2.50
				Other ID						
				Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
				Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Preparation										
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	7.4	1.8	6.0	2.5	3.6	4.2
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.30	0.35	0.35	0.32	< 0.25	< 0.25
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	5.0	9.1	3.6	2.7	3.4	5.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.52	0.13	1.3	0.68	0.35	0.24
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.5	2.6	1.5	0.6	1.3	2.6
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.3	1.2	0.63	0.83	0.78	1.4
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25	1.27	< 1.25	< 1.25	< 1.25
Inorganics										
pH	DETSC 2008			7.7	9.4	8.5	8.2	7.8	8.5
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.5	1.3	2.2	1.6	1.2	1.4
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	0.11	0.11	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	3.6	3.9	11	7.0	2.0	3.9
Total Organic Carbon	DETSC 2033	2	mg/l	4.5	8.8	7.6	7.2	5.9	6.7
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	6.7	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	6.1	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	14	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

			Lab No	839318	839319	839320	839321	839322	839323
			Sample ID	TP18	TP18	TP18	TP19	TP19	TP19
			Depth	0.50	1.50	2.50	0.50	1.50	2.50
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15	13/07/15
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	0.11	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	0.08	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
839276	TP12 1.00	SOIL	NAD	none	Colin Patrick
839277	TP12 2.00	SOIL	Chrysotile	small bundle of Chrysotile	Colin Patrick
839278	TP12 3.00	SOIL	NAD	none	Colin Patrick
839279	TP13 1.00	SOIL	NAD	none	Colin Patrick
839280	TP13 2.00	SOIL	NAD	none	Colin Patrick
839281	TP13 3.00	SOIL	NAD	none	Colin Patrick
839282	TP14 1.00	SOIL	NAD	none	Colin Patrick
839283	TP14 2.00	SOIL	Chrysotile	small bundle of Chrysotile	Colin Patrick
839284	TP14 3.00	SOIL	NAD	none	Colin Patrick
839285	TP15 0.30	SOIL	NAD	none	Colin Patrick
839286	TP15 1.00	SOIL	NAD	none	Colin Patrick
839287	TP15 2.20	SOIL	Chrysotile	small bundle of Chrysotile	Colin Patrick
839288	TP16 0.50	SOIL	NAD	none	Colin Patrick
839289	TP16 1.50	SOIL	NAD	none	Colin Patrick
839290	TP16 2.50	SOIL	NAD	none	Colin Patrick
839291	TP17 0.50	SOIL	NAD	none	Colin Patrick
839292	TP17 1.50	SOIL	NAD	none	Colin Patrick
839293	TP17 2.50	SOIL	NAD	none	Colin Patrick
839294	TP18 0.50	SOIL	Chrysotile	small bundle of Chrysotile	Colin Patrick
839295	TP18 1.50	SOIL	NAD	none	Colin Patrick
839296	TP18 2.50	SOIL	NAD	none	Colin Patrick
839297	TP19 0.50	SOIL	NAD	none	Colin Patrick
839298	TP19 1.50	SOIL	NAD	none	Colin Patrick
839299	TP19 2.50	SOIL	NAD	none	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 15-40314
Client Ref 12032
Contract Title Herbert Road

	Lab No	839277	839283	839287	839294
	Sample ID	TP12	TP14	TP15	TP18
	Depth	2.00	2.00	2.20	0.50
	Other ID				
	Sample Type	SOIL	SOIL	SOIL	SOIL
	Sampling Date	13/07/15	13/07/15	13/07/15	13/07/15
	Sampling Time				
Test	**Method**	**Units**			
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.001**	**0.001**	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.001	0.001	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	712.36	609.14	657.71	579.34
ACMs present*		type				
Mass of ACM in sample		g				
% ACM by mass		%				
% asbestos in ACM		%				
% asbestos in sample		%				
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na	na	na
% Serpentine bundles in sample		Mass %	0.001	0.001	<0.001	<0.001
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Serpentine fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 15-40314
Client Ref 12032
Contract Herbert Road

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
839276	TP12 1.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839277	TP12 2.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839278	TP12 3.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839279	TP13 1.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839280	TP13 2.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839281	TP13 3.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839282	TP14 1.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839283	TP14 2.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839284	TP14 3.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839285	TP15 0.30 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839286	TP15 1.00 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839287	TP15 2.20 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839288	TP16 0.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839289	TP16 1.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839290	TP16 2.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839291	TP17 0.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839292	TP17 1.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839293	TP17 2.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839294	TP18 0.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839295	TP18 1.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839296	TP18 2.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839297	TP19 0.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839298	TP19 1.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839299	TP19 2.50 SOIL	13/07/15	GJ 250ml x2, PT 1L x2		
839300	TP12 1.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839301	TP12 2.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839302	TP12 3.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839303	TP13 1.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839304	TP13 2.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839305	TP13 3.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839306	TP14 1.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839307	TP14 2.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839308	TP14 3.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839309	TP15 0.30 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839310	TP15 1.00 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839311	TP15 2.20 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839312	TP16 0.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839313	TP16 1.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839314	TP16 2.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839315	TP17 0.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839316	TP17 1.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839317	TP17 2.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839318	TP18 0.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839319	TP18 1.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839320	TP18 2.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839321	TP19 0.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839322	TP19 1.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		
839323	TP19 2.50 LEACHATE	13/07/15	GJ 250ml x2, PT 1L x2		

Information in Support of the Analytical Results

Our Ref 15-40314
Client Ref 12032
Contract Herbert Road

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

ANNEX E
Citivision Soils
DETS test certificates 47308-1 & 46635

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-46635

11-Oct-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-46635

Client Reference 12032ASP

Contract Title ABERBARGOED

Description 4 Soil samples, 4 Leachate samples.

Date Received 02-Oct-15

Date Started 02-Oct-15

Date Completed 11-Oct-15

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

Sample ID	Lab No	Completed	Matrix Description
AS1	878344	11/10/2015	Dark brown gravelly sandy CLAY (made ground includes brick)
AS2	878345	11/10/2015	Dark brown gravelly sandy CLAY (made ground includes brick)
AS3	878346	11/10/2015	Dark brown gravelly sandy CLAY (made ground includes brick)
AS4	878347	11/10/2015	Dark brown gravelly sandy CLAY (made ground includes brick)

Summary of Chemical Analysis
Soil Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

			Lab No	878344	878345	878346	878347
			Sample ID	AS1	AS2	AS3	AS4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	30/09/15	30/09/15	30/09/15	30/09/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Moisture Content	DETSC 1004*	0.1	%	13	17	8.2	13
Metals							
Antimony	DETSC 2301*	1	mg/kg	1.9	2.4	1.6	2.5
Arsenic	DETSC 2301#	0.2	mg/kg	9.8	13	12	16
Beryllium	DETSC 2301#	0.2	mg/kg	0.4	0.6	0.5	0.4
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	1.7	2.2	1.6	1.9
Cadmium	DETSC 2301#	0.1	mg/kg	1.0	0.7	0.7	1.0
Chromium	DETSC 2301#	0.15	mg/kg	47	46	45	76
Chromium III	DETSC 2301*	0.15	mg/kg	47	46	45	76
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	29	38	26	34
Lead	DETSC 2301#	0.3	mg/kg	66	5000	59	130
Manganese	DETSC 2301#	20	mg/kg	1300	1400	980	2200
Mercury	DETSC 2325#	0.05	mg/kg	0.08	< 0.05	0.10	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	1.6	1.0	1.1	1.2
Nickel	DETSC 2301#	1	mg/kg	15	13	15	17
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	140	140	110	110
Inorganics							
pH	DETSC 2008#			11.2	11.2	11.2	11.7
Cyanide Total	DETSC 2130#	0.1	mg/kg	0.6	0.5	0.6	0.7
Cyanide complex	DETSC 2130*	0.2	mg/kg	0.6	0.5	0.6	0.7
Organic matter	DETSC 2002#	0.1	%	2.6	2.6	2.2	1.8
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.22	0.21	0.22	0.23
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.05	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	38	51	37	63
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	10	13	10	20
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	38	51	38	64
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	13	11	13	13
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	91	93	84	130

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

			Lab No	878344	878345	878346	878347
			Sample ID	AS1	AS2	AS3	AS4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	30/09/15	30/09/15	30/09/15	30/09/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	19	93	84	29
Aromatic C5-C35	DETSC 3072*	10	mg/kg	100	100	97	140
TPH Ali/Aro	DETSC 3072*	10	mg/kg	140	150	130	200
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.12	0.19	0.30	0.19
Anthracene	DETSC 3303	0.03	mg/kg	0.03	0.05	0.08	0.05
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.25	0.35	0.57	0.36
Pyrene	DETSC 3303#	0.03	mg/kg	0.22	0.31	0.49	0.31
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.11	0.15	0.24	0.15
Chrysene	DETSC 3303	0.03	mg/kg	0.13	0.19	0.31	0.19
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.19	0.35	0.22
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.06	0.11	0.07
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.09	0.11	0.21	0.14
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.06	0.11	0.07
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.06	0.07	0.13	0.08
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	1.3	1.7	3.0	1.8
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

			Lab No	878348	878349	878350	878351
			Sample ID	AS1	AS2	AS3	AS4
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	30/09/15	30/09/15	30/09/15	30/09/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.2	2.5	2.1	2.0
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.36	0.37	0.32	0.28
Chromium III Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.8	2.2	2.1	2.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.32	0.39	0.29	0.37
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01	< 0.01	0.01	0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.47	< 0.25	0.37	0.34
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25	1.73	< 1.25
Inorganics							
pH	DETSC 2008			7.4	7.6	7.3	7.4
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.7	1.9	1.7	1.8
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	22	18	21	23
Total Organic Carbon	DETSC 2033	2	mg/l	4.2	4.8	5.0	4.8
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
PAHs							
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	0.11	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

			Lab No	878348	878349	878350	878351
			Sample ID	AS1	AS2	AS3	AS4
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	30/09/15	30/09/15	30/09/15	30/09/15
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	0.07	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	0.14	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	0.13	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	0.45	< 0.20	< 0.20
PAH	DETSC 3304	0.04	ug/l	5.5	4.0	6.5	2.7
Phenols							
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 15-46635
Client Ref 12032ASP
Contract Title ABERBARGOED

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
878344	AS1	SOIL	NAD	none	Colin Patrick
878345	AS2	SOIL	NAD	none	Colin Patrick
878346	AS3	SOIL	NAD	none	Colin Patrick
878347	AS4	SOIL	NAD	none	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 15-46635
Client Ref 12032ASP
Contract ABERBARGOED

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
878344	AS1 SOIL	30/09/15	GJ 250ml x3, PT 1L x2		
878345	AS2 SOIL	30/09/15	GJ 250ml x3, PT 1L x2		
878346	AS3 SOIL	30/09/15	GJ 250ml x3, PT 1L x2		
878347	AS4 SOIL	30/09/15	GJ 250ml x3, PT 1L x2		
878348	AS1 LEACHATE	30/09/15	GJ 250ml x3, PT 1L x2		
878349	AS2 LEACHATE	30/09/15	GJ 250ml x3, PT 1L x2		
878350	AS3 LEACHATE	30/09/15	GJ 250ml x3, PT 1L x2		
878351	AS4 LEACHATE	30/09/15	GJ 250ml x3, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 15-47308

19-Oct-15

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 15-47308

Client Reference 12032

Order No 12032

Contract Title HERBERT ROAD (H.RD)

Description 2 Soil samples, 2 Leachate samples.

Date Received 12-Oct-15

Date Started 12-Oct-15

Date Completed 19-Oct-15

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 15-47308
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

Sample ID	Lab No	Completed	Matrix Description
CITIVISION S1	882282	19/10/2015	Dark brown, gravelly, sandy CLAY
CITIVISION S2	882283	19/10/2015	Dark brown, gravelly, sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 15-47308
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

			Lab No	882282	882283
				CITIVISI	CITIVISI
			Sample ID	ON S1	ON S2
			Depth		
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	08/10/15	08/10/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
Moisture Content	DETSC 1004*	0.1	%	12	8.7
Metals					
Antimony	DETSC 2301*	1	mg/kg	3.5	3.0
Arsenic	DETSC 2301#	0.2	mg/kg	7.0	7.4
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	0.5
Boron (water soluble)	DETSC 2123#	0.2	mg/kg	2.7	2.5
Cadmium	DETSC 2301#	0.1	mg/kg	1.1	1.2
Chromium	DETSC 2301#	0.15	mg/kg	150	100
Chromium III	DETSC 2301*	0.15	mg/kg	150	100
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	27	21
Lead	DETSC 2301#	0.3	mg/kg	72	270
Manganese	DETSC 2301#	20	mg/kg	7400	5600
Mercury	DETSC 2325#	0.05	mg/kg	0.09	0.16
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1	1.0
Nickel	DETSC 2301#	1	mg/kg	14	11
Selenium	DETSC 2301#	0.5	mg/kg	2.2	1.0
Zinc	DETSC 2301#	1	mg/kg	92	85
Inorganics					
pH	DETSC 2008#			11.6	11.5
Cyanide Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Cyanide complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	1.7	2.1
Total Sulphate as SO4	DETSC 2321#	0.01	%	0.22	0.24
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	19
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	130
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	150
TPH Ali/Aro	DETSC 3072*	10	mg/kg	< 10	150

Summary of Chemical Analysis
Soil Samples

Our Ref 15-47308
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

			Lab No	882282	882283
				CITIVISI	CITIVISI
			Sample ID	ON S1	ON S2
			Depth		
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	08/10/15	08/10/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.05	0.07
Fluorene	DETSC 3303	0.03	mg/kg	0.04	0.05
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.37	0.46
Anthracene	DETSC 3303	0.03	mg/kg	0.10	0.12
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.72	1.0
Pyrene	DETSC 3303#	0.03	mg/kg	0.65	0.91
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.28	0.41
Chrysene	DETSC 3303	0.03	mg/kg	0.40	0.53
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	0.63
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.13	0.21
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.22	0.34
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.16	0.23
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.04	0.05
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.16	0.24
Total PAH - USEPA 16	DETSC 3303	0.1	mg/kg	3.8	5.4
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only implied if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-47308
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

			Lab No	882284	882285
			Sample ID	CITIVISION S1	CITIVISION S2
			Depth		
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	08/10/15	08/10/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
NRA Leachate Preparation	DETS 036*			Y	Y
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	3.5	4.0
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	1.4	1.1
Chromium III Dissolved	DETSC 2302*	1	ug/l	1.4	1.1
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.5	1.0
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.53	1.0
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	< 1.25	< 1.25
Inorganics					
pH	DETSC 2008			9.8	8.0
Cyanide Total	DETSC 2130	40	ug/l	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.6	1.6
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	6.3	7.1
Total Organic Carbon	DETSC 2033	2	mg/l	6.6	5.2
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	2.0	2.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	7.3	19
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	29
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	4.9
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	54
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	8.2	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	8.1
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro	DETSC 3072*	10	ug/l	18	63

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 15-47308
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

			Lab No	882284	882285
			Sample ID	CITIVISION S1	CITIVISION S2
			Depth		
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	08/10/15	08/10/15
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
PAHs					
Naphthalene	DETS 074*	0.01	ug/l	0.02	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	0.02	< 0.01
Pyrene	DETS 074*	0.01	ug/l	0.03	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20
Phenols					
Phenol	*	0.5	ug/l	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 15-47308
Client Ref 12032
Contract Title HERBERT ROAD (H.RD)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
882282	CITIVISION S1	SOIL	Chrysotile	Bundles of Chrysotile present	Andrew Little
882283	CITIVISION S2	SOIL	Chrysotile	Bundles of Chrysotile present	Andrew Little

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 15-47308
Client Ref 12032
Contract HERBERT ROAD (H.RD)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
882282	CITIVISION S1 SOIL	08/10/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
882283	CITIVISION S2 SOIL	08/10/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
882284	CITIVISION S1 LEACHATE	08/10/15	GJ 250ml x2, GJ 60ml, PT 1L x2		
882285	CITIVISION S2 LEACHATE	08/10/15	GJ 250ml x2, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

ANNEX F
Soils Sourced From North of Drainage Reen
DETS test certificate 77110

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 16-77110

06-Sep-16

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 16-77110

Client Reference 12032

Order No 12032-REEN

Contract Title Herbert Road (H.Rd) - Reen

Description 6 Soil samples, 6 Leachate samples.

Date Received 29-Aug-16

Date Started 29-Aug-16

Date Completed 06-Sep-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Mark Hughes
Operations Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 16-77110
Client Ref 12032
Contract Title Herbert Road (H.Rd) - Reen

Sample ID	Lab No	Completed	Matrix Description
Reen 1	1044577	06/09/2016	Brown, gravelly, sandy CLAY
Reen 2	1044578	06/09/2016	Brown, gravelly, sandy CLAY
Reen 3	1044579	06/09/2016	Brown, gravelly, sandy CLAY
Reen 4	1044580	06/09/2016	Brown, gravelly, sandy CLAY
Reen 5	1044581	06/09/2016	Brown, gravelly, sandy CLAY
Reen 6	1044582	06/09/2016	Brown, gravelly, sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 16-77110
Client Ref 12032
Contract Title Herbert Road (H.Rd) - Reen

			Lab No	1044577	1044578	1044579	1044580	1044581	1044582
			Sample ID	Reen 1	Reen 2	Reen 3	Reen 4	Reen 5	Reen 6
			Depth						
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	26/08/16	26/08/16	26/08/16	26/08/16	26/08/16	26/08/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
Moisture Content	DETSC 1004*	0.1	%	9.8	7.8	7.1	6.9	7.5	8.7
Metals									
Antimony	DETSC 2301*	1	mg/kg	1.4	2.4	1.2	1.4	1.3	1.3
Arsenic	DETSC 2301#	0.2	mg/kg	14	15	9.4	12	9.8	11
Beryllium	DETSC 2301#	0.2	mg/kg	0.7	0.5	0.6	0.7	0.5	0.6
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	0.5	0.7	< 0.2	< 0.2	< 0.2	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.5	0.4	0.5	2.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg	19	47	18	20	22	21
Chromium III	DETSC 2301*	0.15	mg/kg	17	45	18	20	20	18
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	1.6	1.4	< 1.0	< 1.0	2.6	2.8
Copper	DETSC 2301#	0.2	mg/kg	31	40	18	18	17	20
Lead	DETSC 2301#	0.3	mg/kg	48	77	20	22	44	25
Manganese	DETSC 2301#	20	mg/kg	770	1200	780	880	960	820
Mercury	DETSC 2325#	0.05	mg/kg	0.10	0.14	< 0.05	0.05	0.06	0.07
Molybdenum	DETSC 2301#	0.4	mg/kg	1.0	1.1	0.4	0.6	0.6	0.6
Nickel	DETSC 2301#	1	mg/kg	28	24	31	37	28	33
Selenium	DETSC 2301#	0.5	mg/kg	0.7	< 0.5	< 0.5	< 0.5	0.6	< 0.5
Zinc	DETSC 2301#	1	mg/kg	98	120	100	96	110	92
Inorganics									
pH	DETSC 2008#			9.1	10.3	8.7	8.5	9.7	9.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	< 0.2	0.3	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.5	2.2	1.2	1.9	1.2	1.8
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.08	0.13	0.04	0.05	0.08	0.04

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-77110
Client Ref 12032
Contract Title Herbert Road (H.Rd) - Reen

				Lab No	1044577	1044578	1044579	1044580	1044581	1044582
				Sample ID	Reen 1	Reen 2	Reen 3	Reen 4	Reen 5	Reen 6
				Depth						
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	26/08/16	26/08/16	26/08/16	26/08/16	26/08/16	26/08/16
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	12	15	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	3.5	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	14	17	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	11	21	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	8.6	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	12	21	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	25	39	< 10	< 10	< 10	< 10
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.14	0.21	0.10	0.05	0.06	0.08
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.05	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.22	0.43	0.13	0.04	0.10	0.12
Pyrene	DETSC 3303#	0.03	mg/kg	0.19	0.40	0.12	0.03	0.09	0.10
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.10	0.24	0.06	< 0.03	0.05	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.12	0.27	0.07	0.03	0.06	0.06
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.13	0.38	0.08	< 0.03	0.08	0.08
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	0.11	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.07	0.27	0.05	< 0.03	0.04	0.04
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.04	0.12	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.06	0.16	0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.1	2.7	0.65	0.16	0.48	0.54
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-77110
Client Ref 12032
Contract Title Herbert Road (H.Rd) - Reen

				Lab No	1044583	1044584	1044585	1044586	1044587	1044588
				Sample ID	Reen 1	Reen 2	Reen 3	Reen 4	Reen 5	Reen 6
				Depth						
				Other ID						
				Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
				Sampling Date	26/08/16	26/08/16	26/08/16	26/08/16	26/08/16	26/08/16
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Preparation										
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.2	2.1	0.57	< 0.16	0.60	0.50
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.40	0.36	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III, Dissolved	DETSC 2302*	1	ug/l	< 1.0	1.4	1.9	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.5	1.6	< 0.4	< 0.4	< 0.4	0.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	1.1	0.71	0.28	0.09	0.36	0.26
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.31	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.0	1.5	< 1.3	< 1.3	< 1.3	< 1.3
Inorganics										
pH	DETSC 2008			8.5	8.4	8.4	8.2	8.3	8.4
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	4.4	5.4	4.5	4.8	4.7	4.3
Fluoride	DETSC 2055	0.1	mg/l	0.42	0.34	0.35	0.33	0.34	0.33
Sulphate as SO4	DETSC 2055	0.1	mg/l	10	17	12	16	8.9	9.1
Total Organic Carbon	DETSC 2033	2	mg/l	5.3	4.9	5.0	5.1	4.7	5.1
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-77110
Client Ref 12032
Contract Title Herbert Road (H.Rd) - Reen

			Lab No	1044583	1044584	1044585	1044586	1044587	1044588
			Sample ID	Reen 1	Reen 2	Reen 3	Reen 4	Reen 5	Reen 6
			Depth						
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	26/08/16	26/08/16	26/08/16	26/08/16	26/08/16	26/08/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.47	0.24	0.28	0.29	0.24	0.32
Acenaphthylene	DETSC 3304	0.01	ug/l	0.03	0.06	0.03	0.01	0.03	0.02
Acenaphthene	DETSC 3304	0.01	ug/l	0.08	0.05	0.06	0.08	0.05	0.07
Fluorene	DETSC 3304	0.01	ug/l	0.04	0.04	0.02	0.02	0.03	0.04
Phenanthrene	DETSC 3304	0.01	ug/l	0.41	0.38	0.25	0.26	0.21	0.24
Anthracene	DETSC 3304	0.01	ug/l	0.07	0.10	0.03	0.03	0.03	0.03
Fluoranthene	DETSC 3304	0.01	ug/l	0.43	0.55	0.20	0.17	0.24	0.19
Pyrene	DETSC 3304	0.01	ug/l	0.37	0.49	0.17	0.13	0.22	0.16
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.26	0.38	0.13	0.09	0.17	0.13
Chrysene	DETSC 3304	0.01	ug/l	0.39	0.59	0.24	0.18	0.27	0.24
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.48	0.73	0.23	0.16	0.35	0.28
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.15	0.29	0.08	0.04	0.11	0.09
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.26	0.45	0.14	0.08	0.19	0.16
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.38	0.52	0.23	0.13	0.30	0.27
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.17	0.21	0.08	0.07	0.10	0.06
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.47	0.66	0.28	0.17	0.32	0.29
PAH Total	DETSC 3304	0.04	ug/l	4.5	5.8	2.4	1.9	2.9	2.6
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 16-77110
Client Ref 12032
Contract Title Herbert Road (H.Rd) - Reen

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1044577	Reen 1	SOIL	NAD	none	J Woodmansey
1044578	Reen 2	SOIL	NAD	none	J Woodmansey
1044579	Reen 3	SOIL	NAD	none	J Woodmansey
1044580	Reen 4	SOIL	NAD	none	J Woodmansey
1044581	Reen 5	SOIL	NAD	none	J Woodmansey
1044582	Reen 6	SOIL	NAD	none	J Woodmansey

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 16-77110
Client Ref 12032
Contract Herbert Road (H.Rd) - Reen

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1044577	Reen 1 SOIL	26/08/16	GJ 250ml x2, PT 1L x2		
1044578	Reen 2 SOIL	26/08/16	GJ 250ml x2, PT 1L x2		
1044579	Reen 3 SOIL	26/08/16	GJ 250ml x2, PT 1L x2		
1044580	Reen 4 SOIL	26/08/16	GJ 250ml x2, PT 1L x2		
1044581	Reen 5 SOIL	26/08/16	GJ 250ml x2, PT 1L x2		
1044582	Reen 6 SOIL	26/08/16	GJ 250ml x2, PT 1L x2		
1044583	Reen 1 LEACHATE	26/08/16	GJ 250ml x2, PT 1L x2		
1044584	Reen 2 LEACHATE	26/08/16	GJ 250ml x2, PT 1L x2		
1044585	Reen 3 LEACHATE	26/08/16	GJ 250ml x2, PT 1L x2		
1044586	Reen 4 LEACHATE	26/08/16	GJ 250ml x2, PT 1L x2		
1044587	Reen 5 LEACHATE	26/08/16	GJ 250ml x2, PT 1L x2		
1044588	Reen 6 LEACHATE	26/08/16	GJ 250ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

ANNEX G
Soil and Leachate Test Results Chemical Summary Tables

LOWER HALF OF RIVERSEE LIMITED STOCKPILE

Table 1 Summary of Soil Chemical Test Results Standard Suite					
Substance	**SGV/GAC** (mg/kg)	**Source**	**Measured Concentrations of Tested Substances** (mg/kg)		**Number of Exceedences**
			Minimum	**Maximum**	
Antimony	-	-	1.5	3.5	-
Arsenic	32	CLEA	4.2	23	0
Beryllium	1.7	CIEH	0.4	1.8	**1**
Boron	11000	CIEH	0.5	2.7	0
Cadmium	10	CLEA	0.3	3.0	0
Chromium III	910	CIEH	16	130	0
Chromium VI	6	CIEH	<1.0	<1.0	0
Copper	7100	CIEH	1	65	0
Lead	320	C4SL	20	330	**1**
Manganese	-	-	460	2000	-
Mercury	170	CLEA	<0.05	0.66	0
Molybdenum	-	-	0.6	4.9	-
Nickel	180	CIEH	14	44	0
Selenium	350	CLEA	<0.5	1.0	0
Zinc	40000	CIEH	52	190	0
Cyanide	8	CLEA	<0.1	0.5	0
Phenols	420	CLEA	<0.3	0.8	0
Sulphate	-	-	600	4100	-
Organic Matter	-	-	0.5	10	-
pH	-	-	7.6	11.5	-

Table 2 Summary of Soil Chemical Test Results
Speciated Polyaromatic Hydrocarbons

Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Naphthalene	2.3	CIEH	<0.03	1.3	0
Acenaphthylene	2900	CIEH	<0.03	<0.03	0
Acenaphthene	3000	CIEH	<0.03	0.22	0
Fluorene	2800	CIEH	<0.03	0.18	0
Phenanthrene	1300	CIEH	<0.03	1.4	0
Anthracene	31000	CIEH	<0.03	0.34	0
Fluoranthene	1500	CIEH	<0.03	2.1	0
Pyrene	3700	CIEH	<0.03	1.8	0
Benzo(a)anthracene	11	CIEH	<0.03	0.82	0
Chrysene	30	CIEH	<0.03	0.92	0
Benzo(b)fluoranthene	3.9	CIEH	<0.03	0.94	0
Benzo(k)fluoranthene	110	CIEH	<0.03	0.31	0
Benzo(a)pyrene	3.2	CIEH	<0.03	0.69	0
Indeno(123cd)pyrene	0.31	CIEH	<0.03	0.32	0
Dibenzo(ah)anthracene	46	CIEH	<0.03	0.1	0
Benzo(ghi)perylene	360	CIEH	<0.03	0.37	0

Table 3 Summary of Soil Chemical Test Results
Petroleum Hydrocarbons

Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Aliphatic EC >5-6	42	CIEH	<0.01	0.22	0
Aliphatic EC >6-8	100	CIEH	<0.01	0.26	0
Aliphatic EC >8-10	27	CIEH	<0.01	0.14	0
Aliphatic EC >10-12	130	CIEH	<1.5	1.8	0
Aliphatic EC >12-16	1100	CIEH	<1.2	8.8	0
Aliphatic EC >16-21	65000	CIEH	<1.5	13	0
Aliphatic EC >21-35	65000	CIEH	<3.4	140	0
Aromatic EC >5-7	370	CIEH	<0.01	0.01	0
Aromatic EC >7-8	860	CIEH	<0.01	0.03	0
Aromatic EC >8-10	47	CIEH	<0.01	0.15	0
Aromatic EC >10-12	250	CIEH	<0.9	<0.9	0
Aromatic EC >12-16	1800	CIEH	<05	3.1	0
Aromatic EC >16-21	1900	CIEH	<0.6	22	0
Aromatic EC >21-35	1900	CIEH	<1.4	290	0

Table 4 Summary of Soil Chemical Test Results Asbestos (Where Detected)

Sample Location	Asbestos Type	Form	Total Mass in Soil (%)	Sample Location	Asbestos Type	Form	Total Mass in Soil (%)
TP1 3.00m	Chrysotile	Chrysotile present as fibre bundles	<0.001	TP8 2.50m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP2 2.00m	Chrysotile	Chrysotile present as small fibre bundles	<0.001	TP9 0.30m	Chrysotile Amosite	Chrysotile present as fibre bundles Amosite also present as small bundle	<0.001
TP2 2.90m	Chrysotile	Chrysotile present as fibre bundles	<0.001	TP9 1.60m	Chrysotile	Chrysotile present as fibre bundles	0.002
TP4 0.50m	Chrysotile	Chrysotile present as fibre bundles	<0.001	TP10 0.50m	Amosite	Amosite present as small fibre bundle	<0.001
TP4 2.00m	Chrysotile	Chrysotile present as fibre bundles	<0.001	TP10 2.20m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP4 3.00m	Chrysotile	Chrysotile present as small fibre bundle	<0.001	TP11 0.50m	Chrysotile	Chrysotile present as small fibre bundle	<0.001
TP5 3.00m	Chrysotile	Chrysotile present as fibre bundles	0.005	TP12 2.00	Chrysotile	small bundle of Chrysotile	0.001
TP6 2.00m	Chrysotile	Chrysotile present as fibre bundles	<0.001	TP14 2.00	Chrysotile	small bundle of Chrysotile	0.001
TP6 3.00m	Chrysotile	Chrysotile present as fibre bundles	0.003	TP15 2.20	Chrysotile	small bundle of Chrysotile	<0.001
TP7 0.30m	Chrysotile	Chrysotile present as fibre bundles	<0.001	TP18 0.50	Chrysotile	small bundle of Chrysotile	<0.001
TP7 0.60m	Chrysotile	Chrysotile present as small fibre bundle	<0.001				

Table 5 Summary of Leachate Chemical Test Results Standard Suite and Speciated PAH					
Substance	**Threshold** (ug/l)	**Source**	**Measured Concentrations of Tested Substances** (ug/l)		**Number of Exceedences**
			Minimum	**Maximum**	
Arsenic	25	WFD	0.7	7.5	0
Cadmium	0.2	WFD	<0.03	0.47	**1**
Chromium III	4.7	WFD	<1.0	2.4	0
Chromium VI	3.4	WFD	<3.0	<3.0	0
Copper	3.76	WFD	1.1	92	**23**
Lead	1.2	WFD	<0.09	3.3	**9**
Mercury	0.07	WFD	<0.01	0.03	0
Nickel	8.6	WFD	0.6	2.2	0
Selenium	10	WFD	0.44	0.67	0
Zinc	9.0	WFD	1.25	6.2	0
Cyanide	1.0	WFD	<40	<40	Below laboratory detection limit
Phenols	7.7	WFD	0.5	1.8	0
Sulphate	250000	DWD	2000	51000	0
pH	-	-	7.1	10.7	0
Naphthalene	2.0	WFD	<0.01	4.0	**1**
Acenaphthylene	-	-	<0.01	<0.01	1 Above Laboratory Detection Limit
Acenaphthene	-	-	<0.01	0.02	7 Above Laboratory Detection Limit
Fluorene	-	-	<0.01	0.1	6 Above Laboratory Detection Limit
Phenanthrene	-	-	<0.01	0.58	33 Above Laboratory Detection Limit
Anthracene	0.1	WFD	<0.01	0.02	0
Fluoranthene	0.0063	WFD	<0.01	4.5	All exceeded – Laboratory detection limit above threshold value
Pyrene	-	-	<0.01	3.9	37 Above Laboratory Detection Limit
Benzo(a)anthracene	-	-	<0.01	0.25	25 Above Laboratory Detection Limit
Chrysene	-	-	<0.01	0.2	27 Above Laboratory Detection Limit
Benzo(b)fluoranthene	0.017	WFD	<0.01	0.25	**28**
Benzo(k)fluoranthene	0.017	WFD	<0.01	0.02	0
Benzo(a)pyrene	0.00017	WFD	<0.01	0.17	All exceeded – Laboratory detection limit above threshold value
Indeno(123cd)pyrene	-	-	<0.01	0.04	1 Above Laboratory Detection Limit
Dibenzo(ah)anthracene	0.0082	WFD	<0.01	0.19	All exceeded – Laboratory detection limit above threshold value
Benzo(ghi)perylene	-	-	<0.01	<0.01	-

Table 6 Summary of Leachate Chemical Test Results Petroleum Hydrocarbons

Substance	Threshold (ug/l)	Source	Measured Concentrations of Tested Substances (ug/l)		Number of Exceedences
			Minimum	Maximum	
Aliphatic EC >5-6	-	-	<0.1	<0.1	0
Aliphatic EC >6-8	-	-	<0.1	<0.1	0
Aliphatic EC >8-10	-	-	<0.1	<0.1	0
Aliphatic EC >10-12	-	-	<1.0	<1.0	0
Aliphatic EC >12-16	-	-	<1.0	<1.0	0
Aliphatic EC >16-21	-	-	<1.0	0.067	3 Above Laboratory Detection Limit
Aliphatic EC >21-35	-	-	<1.0	<1.0	0
Aromatic EC >5-7	-	-	<0.1	<0.1	0
Aromatic EC >7-8	-	-	<0.1	<0.1	0
Aromatic EC >8-10	-	-	<0.1	<0.1	0
Aromatic EC >10-12	-	-	<1.0	<1.0	0
Aromatic EC >12-16	-	-	<1.0	<1.0	0
Aromatic EC >16-21	-	-	<1.0	0.0061	1 Above Laboratory Detection Limit
Aromatic EC >21-35	-	-	<1.0	<1.0	0

UPPER HALF OF RIVERSEE LIMITED STOCKPILE

Table 1 Summary of Soil Chemical Test Results Standard Suite					
Substance	**SGV/GAC** (mg/kg)	**Source**	**Measured Concentrations of Tested Substances** (mg/kg)		**Number of Exceedences**
			Minimum	**Maximum**	
Antimony	-	-	<1.0	15	-
Arsenic	32	CLEA	<0.1	19	0
Beryllium	1.7	CIEH	0.6	1.1	0
Boron	11000	CIEH	1.0	1.6	0
Cadmium	10	CLEA	<0.1	2.1	0
Chromium III	910	CIEH	<0.15	53	0
Chromium VI	6	CIEH	<1.0	<1.0	0
Copper	7100	CIEH	<0.2	140	0
Lead	320	C4SL	<0.3	130	0
Manganese	-	-	540	1300	-
Mercury	170	CLEA	<0.05	0.27	0
Molybdenum	-	-	0.5	1.4	-
Nickel	180	CIEH	<1.0	53	0
Selenium	350	CLEA	<0.1	43	0
Zinc	40000	CIEH	<1.0	1200	0
Cyanide	8	CLEA	<0.1	0.2	0
Phenols	420	CLEA	<0.3	2.2	0
Sulphate	-	-	600	2700	-
Organic Matter	-	-	0.7	9.7	-
pH	-	-	8.0	11.5	-

Table 2 Summary of Soil Chemical Test Results
Speciated Polyaromatic Hydrocarbons

Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Naphthalene	2.3	CIEH	<0.03	<0.03	0
Acenaphthylene	2900	CIEH	<0.03	<0.03	0
Acenaphthene	3000	CIEH	<0.03	<0.03	0
Fluorene	2800	CIEH	<0.03	0.04	0
Phenanthrene	1300	CIEH	<0.03	0.5	0
Anthracene	31000	CIEH	<0.03	0.1	0
Fluoranthene	1500	CIEH	<0.03	1.2	0
Pyrene	3700	CIEH	<0.03	0.86	0
Benzo(a)anthracene	11	CIEH	<0.03	0.38	0
Chrysene	30	CIEH	<0.03	0.41	0
Benzo(b)fluoranthene	3.9	CIEH	<0.03	0.31	0
Benzo(k)fluoranthene	110	CIEH	<0.03	0.13	0
Benzo(a)pyrene	3.2	CIEH	<0.03	0.22	0
Indeno(123cd)pyrene	0.31	CIEH	<0.03	0.11	0
Dibenzo(ah)anthracene	46	CIEH	<0.03	<0.03	0
Benzo(ghi)perylene	360	CIEH	<0.03	0.1	0

Table 3 Summary of Soil Chemical Test Results Petroleum Hydrocarbons

Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Aliphatic EC >5-6	42	CIEH	<0.01	<0.01	0
Aliphatic EC >6-8	100	CIEH	<0.01	<0.01	0
Aliphatic EC >8-10	27	CIEH	<0.01	<0.01	0
Aliphatic EC >10-12	130	CIEH	<1.5	<1.5	0
Aliphatic EC >12-16	1100	CIEH	<1.2	7.1	0
Aliphatic EC >16-21	65000	CIEH	<1.5	15	0
Aliphatic EC >21-35	65000	CIEH	<3.4	150	0
Aromatic EC >5-7	370	CIEH	<0.01	<0.01	0
Aromatic EC >7-8	860	CIEH	<0.01	0.01	0
Aromatic EC >8-10	47	CIEH	<0.01	0.12	0
Aromatic EC >10-12	250	CIEH	<0.9	<0.9	0
Aromatic EC >12-16	1800	CIEH	<05	<0.5	0
Aromatic EC >16-21	1900	CIEH	<0.6	14	0
Aromatic EC >21-35	1900	CIEH	<1.4	260	0

Table 4 Summary of Soil Chemical Test Results Asbestos (Where Detected)

Sample Location	Asbestos Type	Form	Total Mass in Soil (%)	Sample Location	Asbestos Type	Form	Total Mass in Soil (%)
S6	Chrysotile	Clumps of fibres	0.001	S17	Chrysotile	Clumps of fibres	<0.001
S7	Chrysotile	Bundle of fibres	<0.001	S18	Chrysotile	Clumps of fibres	<0.001
S11	Chrysotile	Bundles of fibres	<0.001	S19	Chrysotile	Free fibres	<0.001
S12	Amosite	Free fibres	<0.001	S20	Chrysotile	Bundles of fibres	<0.001
S13	Amosite Chrysotile	Clumps of fibres	0.024	S21	Chrysotile	Bundles of fibres	<0.001
S14	Chrysotile	Clumps of fibres	<0.001	S22	Chrysotile	Bundles of fibres	<0.001
S15	Chrysotile	Clumps of fibres	<0.001	S23	Chrysotile	Free fibres	<0.001
S16	Chrysotile	Bundles of fibres	<0.001	S25	Chrysotile	Bundles of fibres	<0.001
S16	Chrysotile	Cement fragment	<0.001	S32	Chrysotile	Bundles of fibres	<0.001

Table 5 Summary of Leachate Chemical Test Results Standard Suite and Speciated PAH

Substance	Threshold (ug/l)	Source	Measured Concentrations of Tested Substances (ug/l)		Number of Exceedences
			Minimum	Maximum	
Arsenic	25	WFD	0.3	6.5	0
Cadmium	0.2	WFD	<0.03	<0.03	0
Chromium III	4.7	WFD	<1.0	3.1	0
Chromium VI	3.4	WFD	<3.0	<10	0
Copper	3.76	WFD	0.8	11	**5**
Lead	1.2	WFD	<0.9	1.0	0
Mercury	0.07	WFD	<0.01	<0.01	0
Nickel	8.6	WFD	<0.5	2.5	0
Selenium	10	WFD	<0.25	1.8	0
Zinc	9.0	WFD	<1.25	3.89	0
Cyanide	1.0	WFD	<40	<40	Below laboratory detection limit
Phenols	7.7	WFD	<0.5	<0.5	0
Sulphate	250000	DWD	4400	15000	0
pH	-	-	6.5	10.1	0
Naphthalene	2.0	WFD	<0.01	0.02	0
Acenaphthylene	-	-	<0.01	<0.01	Below Laboratory Detection Limit
Acenaphthene	-	-	<0.01	<0.01	
Fluorene	-	-	<0.01	<0.01	
Phenanthrene	-	-	<0.01	<0.01	
Anthracene	0.1	WFD	<0.01	<0.01	0
Fluoranthene	0.0063	WFD	<0.01	<0.01	Below Laboratory Detection Limit
Pyrene	-	-	<0.01	<0.01	
Benzo(a)anthracene	-	-	<0.01	<0.01	
Chrysene	-	-	<0.01	<0.01	
Benzo(b)fluoranthene	0.017	WFD	<0.01	<0.01	0
Benzo(k)fluoranthene	0.017	WFD	<0.01	<0.01	0
Benzo(a)pyrene	0.00017	WFD	<0.01	<0.01	Below Laboratory Detection Limit
Indeno(123cd)pyrene	-	-	<0.01	<0.01	
Dibenzo(ah)anthracene	0.0082	WFD	<0.01	<0.01	
Benzo(ghi)perylene	-	-	<0.01	<0.01	

Table 6 Summary of Leachate Chemical Test Results Petroleum Hydrocarbons

Substance	Threshold (ug/l)	Source	Measured Concentrations of Tested Substances (ug/l)		Number of Exceedences
			Minimum	Maximum	
Aliphatic EC >5-6	-	-	<0.1	<0.1	0
Aliphatic EC >6-8	-	-	<0.1	<0.1	0
Aliphatic EC >8-10	-	-	<0.1	<0.1	0
Aliphatic EC >10-12	-	-	<1.0	<1.0	0
Aliphatic EC >12-16	-	-	<1.0	<1.0	0
Aliphatic EC >16-21	-	-	<1.0	<1.0	0
Aliphatic EC >21-35	-	-	<1.0	<1.0	0
Aromatic EC >5-7	-	-	<0.1	<0.1	0
Aromatic EC >7-8	-	-	<0.1	<0.1	0
Aromatic EC >8-10	-	-	<0.1	<0.1	0
Aromatic EC >10-12	-	-	<1.0	<1.0	0
Aromatic EC >12-16	-	-	<1.0	<1.0	0
Aromatic EC >16-21	-	-	<1.0	<1.0	0
Aromatic EC >21-35	-	-	<1.0	<1.0	0

CITIVISION SOURCE SOIL (TOTAL VOLUME)

Table 1 Summary of Soil Chemical Test Results Standard Suite					
Substance	**SGV/GAC** (mg/kg)	**Source**	**Measured Concentrations of Tested Substances** (mg/kg)		**Number of Exceedences**
			Minimum	**Maximum**	
Antimony	-	-	1.6	3.5	-
Arsenic	32	CLEA	7.0	16	0
Beryllium	1.7	CIEH	0.4	0.6	0
Boron	11000	CIEH	1.6	2.7	0
Cadmium	10	CLEA	0.7	1.2	0
Chromium III	910	CIEH	45	150	0
Chromium VI	6	CIEH	<1.0	<1.0	0
Copper	7100	CIEH	21	34	0
Lead	320	C4SL	59	5000	1
Manganese	-	-	980	2200	-
Mercury	170	CLEA	<0.05	0.16	0
Molybdenum	-	-	1.0	1.6	-
Nickel	180	CIEH	11	17	0
Selenium	350	CLEA	<0.5	2.2	0
Zinc	40000	CIEH	110	140	0
Cyanide	8	CLEA	0.5	0.7	0
Phenols	420	CLEA	<0.3	<0.3	0
Sulphate	-	-	2100	2300	-
Organic Matter	-	-	1.8	2.6	-
pH	-	-	11.2	11.7	-

Table 2 Summary of Soil Chemical Test Results
Speciated Polyaromatic Hydrocarbons

Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Naphthalene	2.3	CIEH	<0.03	0.04	0
Acenaphthylene	2900	CIEH	<0.03	0.03	0
Acenaphthene	3000	CIEH	<0.03	0.07	0
Fluorene	2800	CIEH	<0.03	0.05	0
Phenanthrene	1300	CIEH	<0.03	0.46	0
Anthracene	31000	CIEH	<0.03	0.12	0
Fluoranthene	1500	CIEH	<0.03	1.0	0
Pyrene	3700	CIEH	<0.03	0.91	0
Benzo(a)anthracene	11	CIEH	<0.03	0.41	0
Chrysene	30	CIEH	<0.03	0.53	0
Benzo(b)fluoranthene	3.9	CIEH	<0.03	0.63	0
Benzo(k)fluoranthene	110	CIEH	<0.03	0.21	0
Benzo(a)pyrene	3.2	CIEH	<0.03	0.34	0
Indeno(123cd)pyrene	0.31	CIEH	<0.03	0.23	0
Dibenzo(ah)anthracene	46	CIEH	<0.03	0.05	0
Benzo(ghi)perylene	360	CIEH	<0.03	0.24	0

Table 3 Summary of Soil Chemical Test Results Petroleum Hydrocarbons

Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Aliphatic EC >5-6	42	CIEH	<0.01	<0.01	0
Aliphatic EC >6-8	100	CIEH	<0.01	<0.01	0
Aliphatic EC >8-10	27	CIEH	<0.01	<0.01	0
Aliphatic EC >10-12	130	CIEH	<1.5	<1.5	0
Aliphatic EC >12-16	1100	CIEH	<1.2	<1.2	0
Aliphatic EC >16-21	65000	CIEH	<1.5	<1.5	0
Aliphatic EC >21-35	65000	CIEH	37	63	0
Aromatic EC >5-7	370	CIEH	<0.01	<0.01	0
Aromatic EC >7-8	860	CIEH	<0.01	<0.01	0
Aromatic EC >8-10	47	CIEH	<0.01	<0.01	0
Aromatic EC >10-12	250	CIEH	<0.9	<0.9	0
Aromatic EC >12-16	1800	CIEH	<05	<05	0
Aromatic EC >16-21	1900	CIEH	11	13	0
Aromatic EC >21-35	1900	CIEH	84	130	0

Table 4 Summary of Soil Chemical Test Results Asbestos (Where Detected)

Sample Location	Asbestos Type	Form	Total Mass in Soil (%)
S1	Chrysotile	Bundles of fibres	0.003
S2	Chrysotile	Bundles of fibres	0.002

Table 5 Summary of Leachate Chemical Test Results Standard Suite and Speciated PAH

Substance	Threshold (ug/l)	Source	Measured Concentrations of Tested Substances (ug/l)		Number of Exceedences
			Minimum	Maximum	
Arsenic	25	WFD	2.0	4.0	0
Cadmium	0.2	WFD	<0.03	<0.03	0
Chromium III	4.7	WFD	<1.0	1.4	0
Chromium VI	3.4	WFD	<3.0	<3.0	0
Copper	3.76	WFD	1.0	2.8	0
Lead	1.2	WFD	0.29	0.39	0
Mercury	0.07	WFD	<0.01	0.01	0
Nickel	8.6	WFD	<0.5	<0.5	0
Selenium	10	WFD	<0.25	0.47	0
Zinc	9.0	WFD	<1.25	1.73	0
Cyanide	1.0	WFD	<40	<40	Below laboratory detection limit
Phenols	7.7	WFD	<0.5	<0.5	0
Sulphate	250000	DWD	7100	23000	0
pH	-	-	7.3	7.6	0
Naphthalene	2.0	WFD	<0.01	<0.01	0
Acenaphthylene	-	-	<0.01	<0.01	Below laboratory detection limit
Acenaphthene	-	-	<0.01	0.07	1 Above Laboratory Detection Limit
Fluorene	-	-	<0.01	<0.01	Below laboratory detection limit
Phenanthrene	-	-	<0.01	<0.01	
Anthracene	0.1	WFD	<0.01	<0.01	0
Fluoranthene	0.0063	WFD	<0.01	0.14	Below laboratory detection limit
Pyrene	-	-	<0.01	0.13	
Benzo(a)anthracene	-	-	<0.01	<0.01	
Chrysene	-	-	<0.01	<0.01	
Benzo(b)fluoranthene	0.017	WFD	<0.01	<0.01	0
Benzo(k)fluoranthene	0.017	WFD	<0.01	<0.01	0
Benzo(a)pyrene	0.00017	WFD	<0.01	<0.01	Below laboratory detection limit
Indeno(123cd)pyrene	-	-	<0.01	<0.01	
Dibenzo(ah)anthracene	0.0082	WFD	<0.01	<0.01	
Benzo(ghi)perylene	-	-	<0.01	<0.01	

Table 6 Summary of Leachate Chemical Test Results Petroleum Hydrocarbons

Substance	Threshold (ug/l)	Source	Measured Concentrations of Tested Substances (ug/l)		Number of Exceedences
			Minimum	Maximum	
Aliphatic EC >5-6	-	-	<0.1	<0.1	0
Aliphatic EC >6-8	-	-	<0.1	<0.1	0
Aliphatic EC >8-10	-	-	<0.1	<0.1	0
Aliphatic EC >10-12	-	-	<1.0	2.0	2 Above Laboratory Detection Limit
Aliphatic EC >12-16	-	-	7.3	19	2 Above Laboratory Detection Limit
Aliphatic EC >16-21	-	-	<1.0	29	1 Above Laboratory Detection Limit
Aliphatic EC >21-35	-	-	<1.0	4.9	1 Above Laboratory Detection Limit
Aromatic EC >5-7	-	-	<0.1	<0.1	0
Aromatic EC >7-8	-	-	<0.1	<0.1	0
Aromatic EC >8-10	-	-	<0.1	<0.1	0
Aromatic EC >10-12	-	-	<1.0	<1.0	0
Aromatic EC >12-16	-	-	<1.0	8.2	1 Above Laboratory Detection Limit
Aromatic EC >16-21	-	-	<1.0	8.1	1 Above Laboratory Detection Limit
Aromatic EC >21-35	-	-	<1.0	<1.0	0

SOIL SOURCED FROM NORTH OF REEN

Table 1 Summary of Soil Chemical Test Results Standard Suite					
Substance	**SGV/GAC** (mg/kg)	**Source**	**Measured Concentrations of Tested Substances** (mg/kg)		**Number of Exceedences**
			Minimum	**Maximum**	
Antimony	-	-	1.2	2.4	-
Arsenic	32	CLEA	9.4	14	0
Beryllium	1.7	CIEH	0.5	0.7	0
Boron	11000	CIEH	<0.2	07	0
Cadmium	10	CLEA	0.2	2.1	0
Chromium III	910	CIEH	17	45	0
Chromium VI	6	CIEH	<1.0	2.8	0
Copper	7100	CIEH	17	40	0
Lead	320	C4SL	20	77	0
Manganese	-	-	<0.05	0.14	-
Mercury	170	CLEA	770	1200	0
Molybdenum	-	-	0.4	1.1	-
Nickel	180	CIEH	24	37	0
Selenium	350	CLEA	<0.5	0.7	0
Zinc	40000	CIEH	96	120	0
Cyanide	8	CLEA	<0.1	0.3	0
Phenols	420	CLEA	<0.3	<0.3	0
Sulphate	-	-	400	1300	-
Organic Matter	-	-	1.2	2.5	-
pH	-	-	8.5	10.3	-
Asbestos	-	-	Not detected		-

Table 2 Summary of Soil Chemical Test Results
Speciated Polyaromatic Hydrocarbons

Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Naphthalene	2.3	CIEH	<0.03	<0.03	0
Acenaphthylene	2900	CIEH	<0.03	<0.03	0
Acenaphthene	3000	CIEH	<0.03	<0.03	0
Fluorene	2800	CIEH	<0.03	<0.03	0
Phenanthrene	1300	CIEH	<0.03	0.21	0
Anthracene	31000	CIEH	<0.03	0.05	0
Fluoranthene	1500	CIEH	<0.03	0.43	0
Pyrene	3700	CIEH	<0.03	0.4	0
Benzo(a)anthracene	11	CIEH	<0.03	0.24	0
Chrysene	30	CIEH	<0.03	0.27	0
Benzo(b)fluoranthene	3.9	CIEH	<0.03	0.38	0
Benzo(k)fluoranthene	110	CIEH	<0.03	0.11	0
Benzo(a)pyrene	3.2	CIEH	<0.03	0.27	0
Indeno(123cd)pyrene	0.31	CIEH	<0.03	0.12	0
Dibenzo(ah)anthracene	46	CIEH	<0.03	0.03	0
Benzo(ghi)perylene	360	CIEH	<0.03	0.16	0

Table 3 Summary of Soil Chemical Test Results
Petroleum Hydrocarbons

Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Aliphatic EC >5-6	42	CIEH	<0.01	<0.01	0
Aliphatic EC >6-8	100	CIEH	<0.01	<0.01	0
Aliphatic EC >8-10	27	CIEH	<0.01	<0.01	0
Aliphatic EC >10-12	130	CIEH	<1.5	<1.5	0
Aliphatic EC >12-16	1100	CIEH	<1.2	<1.2	0
Aliphatic EC >16-21	65000	CIEH	<1.5	<1.5	0
Aliphatic EC >21-35	65000	CIEH	<3.4	63	0
Aromatic EC >5-7	370	CIEH	<0.01	<0.01	0
Aromatic EC >7-8	860	CIEH	<0.01	<0.01	0
Aromatic EC >8-10	47	CIEH	<0.01	<0.01	0
Aromatic EC >10-12	250	CIEH	<0.9	<0.9	0
Aromatic EC >12-16	1800	CIEH	<0.5	<0.5	0
Aromatic EC >16-21	1900	CIEH	<0.6	<0.6	0
Aromatic EC >21-35	1900	CIEH	<1.4	21	0

Table 4 Summary of Leachate Chemical Test Results Standard Suite and Speciated PAH					
Substance	**Threshold** (ug/l)	**Source**	**Measured Concentrations of Tested Substances** (ug/l)		**Number of Exceedences**
			Minimum	**Maximum**	
Arsenic	25	WFD	<0.16	2.1	0
Cadmium	0.2	WFD	<0.03	<0.03	0
Chromium III	4.7	WFD	<1.0	1.9	0
Chromium VI	3.4	WFD	<7.0	<7.0	0
Copper	3.76	WFD	<0.4	1.6	0
Lead	1.2	WFD	0.09	1.1	0
Mercury	0.07	WFD	<0.01	<0.01	0
Nickel	8.6	WFD	<0.5	0.9	0
Selenium	10	WFD	<0.25	0.31	0
Zinc	9.0	WFD	<1.3	2.0	0
Cyanide	1.0	WFD	<40	<40	Below laboratory detection limit
Phenols	7.7	WFD	<0.5	<0.5	0
Sulphate	250000	DWD	8900	17000	0
pH	-	-	8.2	8.5	0
Naphthalene	2.0	WFD	0.24	0.47	0
Acenaphthylene	-	-	0.01	0.06	6 Above Laboratory Detection Limit
Acenaphthene	-	-	0.05	0.08	
Fluorene	-	-	0.02	0.04	
Phenanthrene	-	-	0.21	0.41	
Anthracene	0.1	WFD	0.03	0.1	0
Fluoranthene	0.0063	WFD	0.17	0.55	**6**
Pyrene	-	-	0.13	0.49	6 Above Laboratory Detection Limit
Benzo(a)anthracene	-	-	0.13	0.38	
Chrysene	-	-	0.18	0.59	
Benzo(b)fluoranthene	0.017	WFD	0.16	0.73	**6**
Benzo(k)fluoranthene	0.017	WFD	0.04	0.29	**6**
Benzo(a)pyrene	0.00017	WFD	0.08	0.45	**6**
Indeno(123cd)pyrene	-	-	0.13	0.52	6 Above Laboratory Detection Limit
Dibenzo(ah)anthracene	-	-	0.06	0.21	
Benzo(ghi)perylene	0.0082	WFD	0.17	0.66	6

Table 5 Summary of Leachate Chemical Test Results Petroleum Hydrocarbons

Substance	Threshold (ug/l)	Source	Measured Concentrations of Tested Substances (ug/l)		Number of Exceedences
			Minimum	Maximum	
Aliphatic EC >5-6	-	-	<0.1	<0.1	0
Aliphatic EC >6-8	-	-	<0.1	<0.1	0
Aliphatic EC >8-10	-	-	<0.1	<0.1	0
Aliphatic EC >10-12	-	-	<1.0	<1.0	0
Aliphatic EC >12-16	-	-	<1.0	<1.0	0
Aliphatic EC >16-21	-	-	<1.0	<1.0	0
Aliphatic EC >21-35	-	-	<1.0	<1.0	0
Aromatic EC >5-7	-	-	<0.1	<0.1	0
Aromatic EC >7-8	-	-	<0.1	<0.1	0
Aromatic EC >8-10	-	-	<0.1	<0.1	0
Aromatic EC >10-12	-	-	<1.0	<1.0	0
Aromatic EC >12-16	-	-	<1.0	<1.0	0
Aromatic EC >16-21	-	-	<1.0	<1.0	0
Aromatic EC >21-35	-	-	<1.0	<1.0	0

ANNEX H
Green Lane and Hawes Lane Soils –
Risk Assessment Report

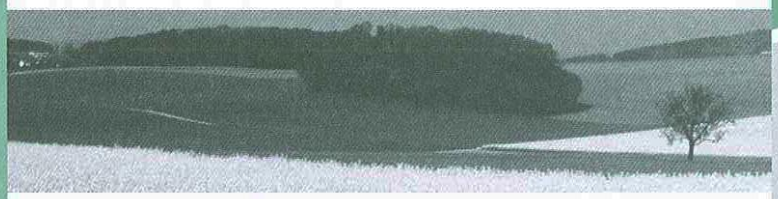
Proposed Fill For Importation
Risk Assessment Report
Proposed Residential Development
Herbert Road
Newport

Prepared for:

Riversee Limited

October 2016

Report No. 12032/RA1







terrafirma

REPORT TITLE	**:**	**Proposed Fill For Importation Risk Assessment Report:** Herbert Road, Newport
REPORT STATUS	**:**	**FINAL**
JOB NUMBER	**:**	**12032/RA1**
DATE	**:**	**November 2016**
PREPARED BY	**:**	R. Howells. …….. **(Mrs R. Howells)**
REVIEWED BY	**:**	M. Lake …….. **(Mr M. Lake)**
APPROVED BY	**:**	Gary Lake …….. **(Dr G. C. Lake)**

Executive Summary

In order to comply with current Government directives and the Flood Consequence Assessment (FCA) approved by NRW the site is to be raised from its original level to an average formation level of 9.20m AOD. The proposed finished level of the site is 9.95m AOD.

Riversee Limited has to date completed partial fill of the site. Site earthworks are soon due to re-commence as two new potential fill sources have been identified, named Green Lane and Hawes Lane. Terra Firma Wales (Limited) have been commissioned to assess the suitability of these materials for use. The total proposed volume of fill to be imported will be 15,000m^3.

Eighty-eight samples of the proposed source soils have been chemically tested.

Comparison of soil results with regulatory guidelines has identified a number of contaminants of concern. However, it is concluded that the contamination is minimal and that there should be no risks to human health. Construction workers would not be at risk provided that appropriate PPE is used and dust suppression is provided. Site end users would be protected through placement of a 600mm clean capping layer in all gardens and landscaped areas and backfill of service trenches with clean materials. A capping layer or bund of clean materials along the drainage reen will also be installed. Gas monitoring via flux boxes post fill –placement will also ensure that any risks from ground gas from the fill are addressed.

In terms of the aquatic environment the drainage reen is deemed to be a direct receptor of any contamination. Assessment of the leachate test results was carried out. For those substances exceeding generic assessment thresholds site specific target concentrations were derived using the Remedial Targets Methodology. The reen was set as the compliance point, at a distance of 10m from any fill imported. This was chosen because a new road and footpath is to run alongside the new reen, which will be at least 10m wide and be constructed of clean imported quarry stone from current to proposed ground level. Copper, zinc, lead and cadmium were found to be in exceedence of the assessment criteria in a limited number of samples. Out of eighty-eight samples tested only 8 had elevated levels of zinc, 4 had elevated lead or copper concentrations, and a single sample was elevated in cadmium.

During earthworks and for a period of 1 to 2 years following earthworks (to allow settlement to occur) the fill will be exposed to rainfall and run-off of surface waters towards the reen could occur. However, the actual amount of run-off that could be expected would be very low. In addition, a 10m wide well compacted strip of clean quarry stone will be placed along the length of the reen in preparation for the new road. Towards the edge of the reen this should be raised above the level of the fill. Whilst the site is left to settle this will act to physically separate the fill materials from the reen and prevent/minimise any run-off into the reen. Upon development new drainage will be installed in the road to prevent any migration of run-off into the reen.

If the quality of the reen water is found to be significantly affected then it may be necessary to install a permanent deep cut-off drain connected to a sump that be emptied when necessary.

TABLE OF CONTENTS

SECTION 1 Introduction

1.1 General
1.2 Limitations and Exceptions

SECTION 2 Proposed Fill Source Sites

SECTION 3 Chemical Analysis of Source Site Soils

SECTION 4 Comparison of Fill Test Results With Assessment Criteria

4.1 Comparison of Soil Test Results With Generic Assessment Criteria
4.2 Comparison of Leachate Test Results With Generic Assessment Criteria
4.3 Comparison of Soil Test Results With Site Specific Assessment Criteria
4.3.1 General
4.3.2 Outline of Model Scenario
4.3.3 Calculated Remedial Targets and Comparison With Sample Concentrations

SECTION 5 Human Health and Environmental Risk Assessment

5.1 Human Health Assessment
5.1.1 Construction Workers
5.1.2 Future Site Users
5.2 Environmental Assessment
5.3 Site Conceptual Model

Figures

Figure 2.1 Source Site Locations (OS Map 151)
Figure 4.1 Hydrological Scenario Applied In Remedial Targets Methodology

Tables

Table 4.1 Green Lane Source - Contaminants of Concern
Table 4.2 Hawes Lane Source - Contaminants of Concern
Table 4.3 Input Parameters
Table 4.4 Calculated Remedial Target at 10m Compliance Point
Table 5.1 Site Conceptual Model

Annexes

Annex A Photographs of Source Sites
Annex B Ecovigour Sampling Location Plans
Annex C Ecovigour Green Lane Soil and Leachate Test Results
Annex D Ecovigour Hawes Lane Soil and Leachate Test Results
Annex E Terra Firma Stockpile and Hawes Lane and Green Lane Source Soil and Leachate Test Results
Annex F Soil Test Results - Exceedence Summary Tables
Annex G Remedial Targets Methodology Worksheets

SECTION 1 Introduction

1.1 General

In order to comply with current Government directives and the Flood Consequence Assessment (FCA) approved by NRW the site is to be raised from its original level to an average formation level of 9.20m AOD.

Riversee Limited has to date completed partial fill of the site. This has been achieved by importation of soils from various sources already validated and approved by Newport City Council and National Resources Wales.

Site earthworks are soon due to re-commence as two new potential fill sources have been identified, named Green Lane and Hawes Lane.

Terra Firma Wales (Limited) has been commissioned to assess the suitability of these materials for use.

The total proposed volume of fill to be imported will be 15,000m^3.

The fill materials have been transported and stored in a stockpile on a site on Herbert Road adjacent to the site in preparation for the earthworks.

For the two sources, 7500m^3 each, 8 samples are required for the first 1000m^3, 1 sample per 250m^3 for the remainder, i.e 34 samples per source and 68 samples in total, as specified in Terra Firma Remediation Strategy Report.

The fill materials were sampled and tested at source by Ecovigour Limited. It was proposed that half the number of samples for the volume, 34No, should be independently sampled and tested by Terra Firma.

1.2 Limitations and Exceptions

The Risk Assessment Report has been prepared for Riversee Limited. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The report represents the findings and opinions of experienced geo-technical and geo-environmental consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may also be required.

SECTION 2 Proposed Fill Source Sites

The material at both the Green Lane and Hawes Lane source sites comprises fill from road embankments either site of a railway bridge crossing, along the rail line between Cardiff and Newport.

The source locations are illustrated in the **Figure 1** below.



Figure 2.1: Source Site Locations (OS Map 151)

Both source sites were visited by a Terra Firma engineer. Photographs of the source sites are provided in **Annex A**.

SECTION 3 Chemical Analysis of Source Site Materials

Alun Griffiths (Contractors) Limited were contracted to remove and replace the two road railway bridges.

Both the Green Lane and Hawes Lane embankment materials were sampled and tested at source by Ecovigour Limited via trial pits. Ecovigour documented the sample locations on aerial shots. These illustrations are provided in **Annex B**.

The trial pits were excavated using a 21 tonne excavator and were deep enough to ensure sampling from the core of the embankments Samples IDs have been designated according to location, for example: GLSW60/2.5

GL = Green Lane
SW = South side of the bridge, western side of the embankment
60 = 60m from the bridge abutment
/2.5 = depth below existing road levels (m)

The samples were submitted by Ecovigour Limited to the laboratories of Chemtech Environmental. The chemicals tested for were specified by Terra Firma, in line with our Remediation Strategy Report.

Twenty-four representative samples from Green Lane and thirty from Hawes Lane were tested. Soil sample results for Green Lane are provided in **Annex C**. Those for Hawes Lane may be found in **Annex D**.

Terra Firma subsequently undertook independent sampling and analysis of the Green Lane and Hawes Lane materials. Thirty-four samples were taken in total. Twenty-two samples were taken from the accumulating stockpile on Herbert Road (TFW SP S1 – S22 - 14 on one occasion and 8 on another) and a further 12 from the source sites – 4 from Green Lane (south of the railway TFW GLS), 4 from Hawes Lane (north of the railway TFW HLN) and 4 from Hawes Lane (south of the railway TFW HLS).

These test results may be found in **Annex E.**

SECTION 4 Comparison of Fill Test Results With Assessment Criteria

4.1 Comparison of Soil Test Results With Generic Assessment Criteria

The 88 sets of test results from Green Lane and Hawes Lane were compared to the residential (without plant uptake) soil assessment criteria quoted in Terra Firma Remediation Strategy.

Substances found to exceed the criteria are detailed in **Table 1** in **Annex F**. A summary of the table is provided in **Tables 4.1.**

Antimony, manganese and molybdenum were not assessed as no guidelines for these substances are available.

Table 4.1 Green Lane and Hawes Lane Soils Contaminants of Concern

Soils			
Chemical	**Guideline (mg/kg)**	**Exceedance (mg/kg)**	**No of Samples Exceeded (Out of 88)**
Asbestos	Chrysotile bundle of fibres <0.001% total mass		1
Arsenic	32	35 - 52	3
Beryllium	1.7	1.8 – 2.9	24
Lead	310	516 - 1700	4
Cadmium	10	17.9 - 26.4	2
Dibenzo(ah)anthracene	0.31 – 0.32	0.34 - 3.02	9
Benzo(b)fluoranthene	3.9 – 4.0	4.4 – 18.94	6
Benzo(a)pyrene	3.2	3.7 – 12.97	5

Those substances for which there are water framework directive threshold levels have been assessed. Please note that that the laboratory limit of detection used for PAHs for Ecovigour samples is 0.1ug/l which exceeds some of the available threshold levels. The Terra Firma laboratory tests for PAHs is 0.01ug/l.

The Ecovigour laboratory detection limit for Chromium VI is 10ug/l, and the Terra Firma detection limit used is 7ug/l. The threshold for CrVI is 0.6ug/l. Please note that for all Terra Firma samples (34No) the total level of chromium was <0.6ug/l.

Cyanide levels were <20ug/l compared the threshold level of 1.0ug/l.

All leachate concentrations of petroleum hydrocarbons were below the limits of laboratory detection or below 10ug/l, a target concentration used due to the absence of available regulatory threshold levels.

4.2 Comparison of Leachate Test Results With Generic Assessment Criteria

The 88 sets of test results from Green Lane and Hawes Lane were compared to the Water Framework Direction (2015) thresholds for saltwater/other surface waters.

Substances found to exceed the criteria are detailed in **Table 2** in **Annex F**. A summary of the tables is provided in **Table 4.2.**

Table 4.2 Green Lane and Hawes Lane Leachates Contaminants of Concern

Leachates			
Chemical	**Guideline (ug/l)**	**Exceedance (ug/l)**	**No of Samples Exceeded (Out of 88)**
Cadmium	0.2	0.59	1
Copper	3.67	3.9 - 6.8	10
Lead	1.2	1.3 – 8.8	7
Zinc	9.0	9.2 - 216	11
Cyanide	1.0	24	1
Anthracene	0.1	0.11 – 0.65	7
Fluoranthene	0.0063	0.04 – 3.4	34
Benzo(b)fluoranthene	0.017	0.11 - 10	25
Benzo(k)fluoranthene	0.017	0.03 – 4.5	24
Benzo(a)pyrene	0.00017	0.06 – 7.0	24
Benzo(ghi)perylene	0.0082	0.07 – 6.7	27

4.3 Comparison of Soil Test Results With Site Specific Assessment Criteria

4.3.1 General

Given the number and frequency of substances determined to be leachable (see **Table 4.2**) when compared to generic assessment criteria a hydrogeological risk assessment using the Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination has been completed.

The Level 3 Assessment 'considers whether attenuation in the saturated zone is sufficient to reduce contaminant concentrations to acceptable levels. The remedial target is defined as the Level 2 remedial target (unsaturated zone and dilution at the water table) multiplied by the saturated zone attenuation factor.'

4.3.2 Outline of Model Scenario

With reference to known ground conditions to the site and to the Remedial Targets Methodology handbook, **Figure 4.1** illustrates the simplified hydrological scenario applied in the model. The drainage reen on site is taken to be the compliance point.

The reen was set as the compliance point, at a distance of 10m from any fill imported. This was chosen because a new road and footpath is to run alongside the new reen, which will be at least 10m wide and be constructed of clean imported quarry stone from current to proposed ground level.

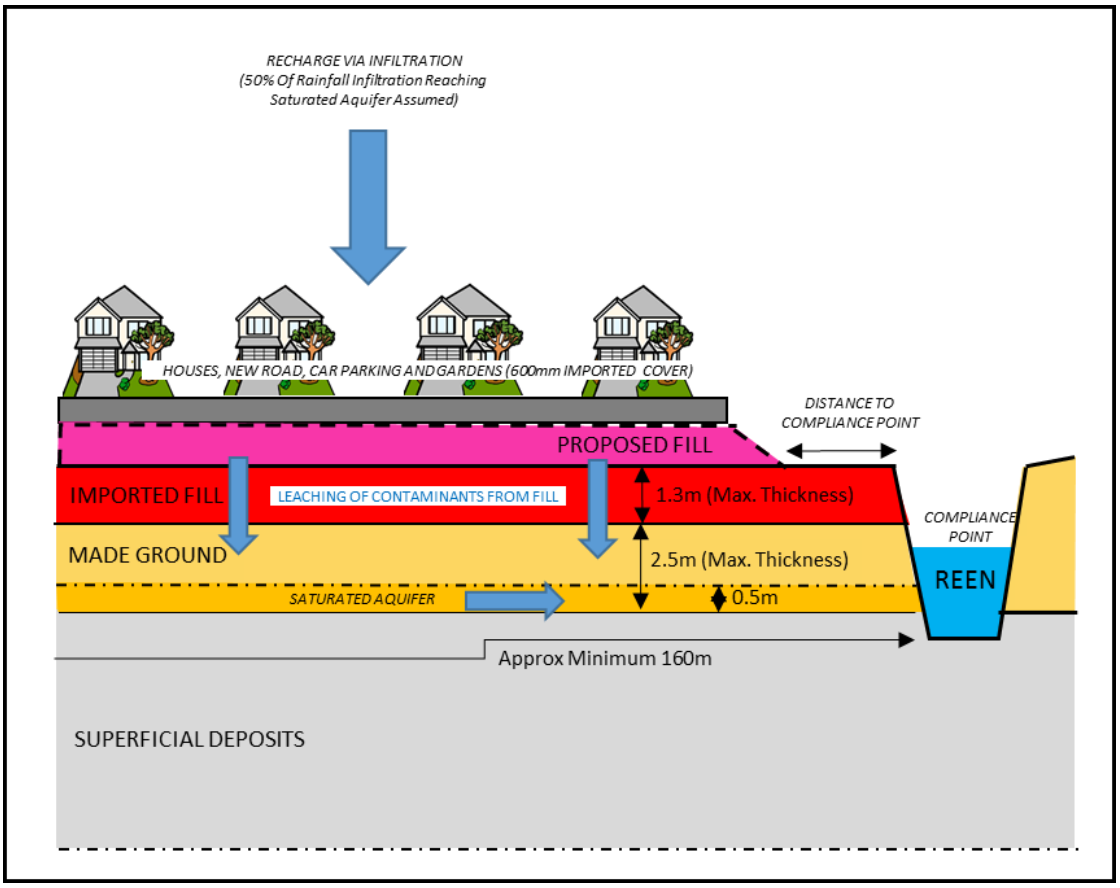


Figure 4.1 Hydrological Scenario Applied In Remedial Targets Methodology (Not to Scale)

4.3.2 Outline of Model Scenario (Continued)

Table 4.3 below details the input parameters used in the Remedial Targets Methodology assessment.

The model simplifies actual hydrogeological regime, and the model assumptions are:

- The aquifer is homogenous and isotropic
- Flow is laminar in one direction, with a constant velocity
- Contaminant and aquifer physiochemical properties are constant
- Darcy's Law is valid
- No dispersion other than that specified occurs

Table 4.3 Input Parameters

Parameter		Value	Source
Level 2 Soil			
Inf	**Infiltration**	**0.000179m/d**	Average infiltration for 2015 (0.00358m/d) taken from Cardiff monitoring station (closest to Newport) Value amended to assume 50% of rainfall reaches saturated zone
A	**Area of Contaminant Source**	**18000m^2**	Fill to be placed a suggested distance of 10m from the reen
L	**Length of Contaminant Source**	**150m**	Minimum length of site (north to south) and takes into account 10m distance between proposed contaminated fill and the reen (compliance point)
da	**Saturated Aquifer Thickness**	**0.5m**	Little to negligible groundwater anticipated due to heavy compaction of fill imported to date, which can be expected to have very low porosity.
K	**Hydraulic conductivity of aquifer in which dilution occurs**	**0.0864m/d**	Assumes a conservative infiltration rate of 1 x 10^{-6} m/s for the well compacted imported fill
I	**Hydraulic gradient of water table**	**0.000625**	Assumes 160m site length (north to south) and 0.1m drop in water level towards the reen
w	**Width of contaminant source perpendicular to groundwater flow**	**120m**	Width of site (east to west)
Cu	**Background concentration of contaminant of groundwater beneath site**	**0**	Not data available for groundwater in made ground (none identified during previous site investigation work)
Mz	**Mixing Zone Thickness**	**0.5m**	Same as saturated aquifer thickness

4.3.2 Outline of Model Scenario (Continued)

Table 4.3 Input Parameters (Continued)

Parameter		Value	Source
Level 3			
-	**Soil Leachate Concentration**	Maximum recorded value for each substance quoted	
T½	**Half Life for Degradation of Contaminant in Water**	For organic substances data obtained from Surampelli et al	
Sz	**Width of Aquifer Plume at Source**	**120m**	Width of site (east to west)
Sy	**Plume thickness at Source**	**0.5m**	From Level 2
p	**Bulk Density of Aquifer Material**	**2.09 g/cm^3**	Based on geotechnical tests undertaken on imported fill
n	**Effective Porosity of Aquifer**	**0.59 (fraction)**	SR3 Updated Technical Background to the CLEA model, Table 4.4. Clay soil type used for imported fill.
i	**Hydraulic Gradient**	**-**	From level 2 (adjusted by model)
K	**Hydraulic Conductivity of Saturated Aquifer**	**0.0864**	From level 2
koc	**Organic Carbon Partition Coefficient (non-polar organic)**	**Substance specific**	EA (2003) – Environment Agency Technical Report P5-079/TR1
foc	**Fraction of organic carbon (non-polar organic)**	**Substance specific**	Average value per substance calculated from laboratory test results (where exceedences recorded)

The Remedial Targets Methodology worksheets are presented in **Annex G.**

A target concentration for cyanide could not be derived due to the lack of available substance specific data.

4.3.3 Calculated Remedial Targets and Comparison With Sample Concentrations

The Level 3 remedial target concentrations calculated, which assume a 10m distance between the fill if placed on site to the compliance point (the reen), are compared to laboratory leachate tests results in **Table 4.4**.

Table 4.4 Calculated Remedial Target at 10m Compliance Point

Chemical	Level 3 Target Concentration 10m Compliance Point (ug/l)	No. of Samples Exceeded (Out of 88)
Cadmium	0.0272	1
Copper	4.98	4
Lead	1.63	4
Zinc	12.2	8
Anthracene	19.3	0
Fluoranthene	17.6	0
Benzo(b)fluoranthene	8×10^{24}	0
Benzo(k)fluoranthene	1.21×10^{39}	0
Benzo(a)pyrene	9.04×10^{16}	0
Benzo(ghi)perylene	1.59×10^{27}	0

SECTION 5 Human Health and Environmental Risk Assessment

5.1 Human Health Assessment

Current site levels range approximately between 7.9m and 8.45m AOD.

The Green Lane and Hawes Lane soils are currently proposed for use to raise current site levels on site to 9.25m AOD, allowing for placement of a 600mm capping layer in all garden and landscaped areas (taking levels to 9.85m AOD).

The imported fill could present a human health risk to two sets of receptors, construction workers and future site users (site residents and maintenance contractors).

5.1.1 Construction Workers

Site construction workers may be exposed to fill materials through activities such as placing the fill during earthworks or deep drainage works.

Potential pathways between the fill and construction workers are dermal contact with soil/soil dust, ingestion of soil/soil dust and inhalation of soil dust. Inhalation of asbestos fibres is also considered, but the risks from exposure to asbestos are considered exceedingly low.

Assessment of contamination has been carried out by comparison of results to residential thresholds, which considers long term exposure to site residents. Also, soil guidelines used assume a worst case and reflect the risk to the most vulnerable receptor, a child.

Site construction workers are deemed to be at very low risk from the identified contaminants given that any exposure time would be comparatively, to how the trigger levels are derived, exceedingly short. Furthermore, these very low risks may be mitigated through good site management, COSHH, good standards of hygiene and appropriate health & safety on site, with personal protection equipment (PPE) and dust suppression where appropriate.

The above is summarised in a site conceptual model in table format in **Section 5.3.**

5.1.2 Future Site Users

Possible contamination linkages between the fill and future site users are dermal contact with soil/soil dust, ingestion of soil/soil dust, inhalation of soil dust, ingestion of site grown vegetables/fruit and consumption of potable water.

Only one sample out of 88 was found to contain asbestos. The risk from asbestos to future site users through inhalation of fibres is therefore considered to be very low.

No substances have been identified that may potentially exist as vapours.

Any notable potentially degradable materials such as timber and old tree roots/branches will be removed from the fill upon placement. However, ground gas inhalation is also considered as a potential risk to human health from decomposition of any organic content in the fill.

5.1.2 Future Site Users (Continued)

Should the Green Lane and Hawes Lane materials be imported on to site future site users are not considered to be at risk from the contaminants provided the remedial measures outlined in Terra Firma Remediation Strategy Report are implemented. This includes flux box testing once placement of the fill has been completed, which will assess the levels of any carbon dioxide or methane being released. The currently recommended gas protection in line with 'gas characteristic situation 2' will be reviewed once flux box monitoring has been completed.

Proposed remedial measures are:

1. Placement of a 600mm clean capping layer in all garden and landscaped areas comprising imported subsoil and topsoil. These soils will be chemically validated in accordance with the Remediation Strategy and the capping thickness verified.

2. The new water supply pipes will be laid above 9.20m AOD. However, prior to the placement of water supply pipes an assessment should be made, by the water provider, of soil along the route of the pipe with reference made to the material selection criteria quoted in UKWIR Report Ref No 10/WM/03/21 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'.

In addition to these previously proposed measures also recommended are:

3. Backfill of service trenches with clean imported materials/stone

4. Placement of clean soils along the drainage reen. This area will be fenced off from residents but a bund of clean soils and/or a capping layer of clean soils will be placed along the reen edges to ensure that site residents are not exposed to the fill.

5. Installation of appropriate gas protection measures.

The above is summarised in a site conceptual model in table format in **Section 5.3.**

5.2 Environmental Assessment

The proposed imported fill from Green Lane and Hawes Lane has been leachate tested. This assesses the susceptibility of substances to mobilise in groundwaters.

The potential receptors identified are the drainage reen that flows along the northern edge of the area of earthworks and the River Usk. The reen discharges into the River Usk that is located approximately 40m west of the site.

Groundwater beneath the site and the underlying St Maughan's Group Secondary A Aquifer are also potential receptors. However, groundwater beneath the site in the superficial deposits is confined to intermittent granular bands. Previous on-site groundwater monitoring during a tidal cycle confirmed that there was no tidal influence on groundwater beneath the site and therefore no hydraulic continuity between groundwater and the River Usk. The River Usk is therefore not considered to be a direct receptor, but a secondary receptor through discharge of waters from the drainage reen.

5.2 Environmental Assessment (Continued)

The drainage reen would be a direct receptor.

The Remedial Targets Methodology exercise carried out in **Section 4.3** calculated site specific target concentrations for substances found to exceed generic water framework directive thresholds.

This identified copper, lead zinc and cadmium as potential contaminants of the reen. However, the number of samples with exceedences out of the 88 in total analysed are few.

The Remedial Targets Methodology assessment does make conservative assumptions which means calculated thresholds are over-stringent. For example it assumes a saturated aquifer thickness of 0.5m. In reality little or no groundwater is anticipated to be in the made ground; no groundwater in the made ground was noted in previous site investigation works. For example, if the saturated aquifer thickness was taken to be 0.1m rather than 0.5m the zinc remedial target would be 50.9ug/l, meaning only 4 of 88 samples would be found to be in exceedence. The remedial target for lead would be 6.78ug/l, and only one sample out of 88 would exceed on lead. All levels of copper would be deemed acceptable.

Upon development the engineered fill will be capped with 600mm clean cover in garden and soft landscaped areas and a significant area of the site will be surfaced with houses and hardcover as well as new drainage significantly limiting the infiltration of rainfall.

In conclusion, it is considered that the risk to the reen through groundwater flow is very low to negligible.

During earthworks and for a period of 1 to 2 years following earthworks (to allow settlement to occur) the fill will be exposed to rainfall and run-off of surface waters towards the reen could occur. However, the actual amount of run-off that could be expected would be very low. In addition a 10m wide well compacted strip of clean quarry stone will be placed along the length of the reen in preparation for the new road. Towards the edge of the reen this should be raised above the level of the fill. Whilst the site is left to settle this will act to physically separate the fill materials from the reen and prevent/minimise any run-off into the reen. Upon development new drainage will be installed in the road to prevent any migration of run-off into the reen.

In order to confirm that there are no adverse effects on the water quality of the reen it recommended that regular sampling and testing of the reen waters be carried out during and two months following placement of the fill on a regular basis.

If the quality of the reen water is to found to be significantly affected then it may be necessary to install a permanent deep cut-off drain connected to a sump that be emptied when necessary.

The new housing development is to be constructed upon precast concrete piled foundations. Piles will extend down into the top of the St Maughan’s Group mudstone Secondary A Aquifer.

5.2 Environmental Assessment (Continued)

Piles are considered to present a potential pathway for contamination by downward migration of shallow waters along pile routes. However, as explained above, no significant perched groundwater is anticipated to be present.

The underlying estuarine alluvium is intersected by bands of peat or sand/gravel. However the alluvial clays themselves are largely impermeable and will act as an aquitard, preventing downward migration of any perched groundwater. Pollution Scenario 1 ‘Creation of preferential pathways through an aquitard to allow potential contamination of an aquifer’ detailed by the Environment Agency in publication ‘Piling into Contaminated Sites’ was considered. Precast piling is a displacement method, and due to significant stresses applied on soils during the process of driving these piles creation of preferential flow paths around the outside of the piles does not occur.

In its publication ‘Piling in Layered Ground: Risks to Groundwater and Archaeology’ the Environment Agency state that square piles would ‘be expected to seal when driven through a sufficient thickness of clay, that is, a thickness of two pile diameters. Although variable in thickness, and interrupted by bands of peat or granular deposits the alluvial clay is persistent across the site and it is considered that an adequate seal will be created between the piles and clay deposits.

As no preferential pathway for contamination is created and there is, therefore, no potential for contamination of the underlying Secondary A Aquifer.

Environment Agency Pollution Scenario 5 (‘Piling into Contaminated Sites’) was also considered. Driven piles can potentially drag down contaminated soils along the pile and in front of the pile. However, the effects of this can be expected to be low, particularly given the thickness of alluvium.

5.3 Site Conceptual Model

The risk assessment is summarised in **Table 5.1** on the following pages.

Table 5.1
Site Conceptual Model

Source of Contamination	Pollution Linkage	Potential Receptor During Construction	Level of Risk	Mitigation Measures to Reduce Risk to Acceptable Levels	Potential Receptor Post Construction	Level of Risk	Remedial Measures to Reduce Risk to Acceptable Levels
Contaminants of Concern identified in Green Lane and Hawes Lane fill soils are as follows: **Substances present above residential (without plant uptake) regulatory guidelines:** • **Arsenic** • **Beryllium** • **Lead** • **Cadmium** • **Benzo(b)fluoranthene** • **Benzo(a)pyrene** • **Dibenzo(ah)anthracene** • **Asbestos**	**Ingestion, inhalation and dermal contact with soil/soil dust**	Construction Workers	Medium Risk	**Working to site method statements and risk assessments.** **Use of appropriate PPE.** **Dust suppression.** **.**	Future site residents Maintenance Contractors	Medium Risk	**Capping of all garden and soft landscaped areas with 600mm clean capping soil.** **Backfill of service trenches with clean material** **Placement of capping and/or bund of clean materials along edge of reen**
	Inhalation o Asbestos fibres	Construction Workers	Very Low Risk *(Asbestos only identified in 1 of 88 samples)*		Future site residents Maintenance Contractors	Very Low Risk *(Asbestos only identified in 1 of 88 samples)*	
	Consumption of home grown produce *Contaminants may be susceptible to uptake by plants*	N/A	N/A	N/A	Future site residents	N/A	**Capping of all garden areas with 600mm clean imported soil suitable for planting produce**
	Inhalation of vapours *Accumulation of vapours indoors in confined spaces*	Construction Workers	No Risk *No substances present that occur as vapours*	No Risk	Future site residents	No Risk *No substances present that occur as vapours*	No Risk *No substances present that occur as vapours*
	Ingestion of potable water *Absorption of contamination from contaminated soils into potable water pipes*	N/A	N/A	N/A	Future site residents	Medium Risk	**Appropriate water pipes in accordance with UKWIR**

Potential Source	Pollution Linkage	Potential Receptor During Construction	Level of Risk	Mitigation Measures to Reduce Risk to Acceptable Levels	Potential Receptor Post Construction	Level of Risk	Remedial Measures to Reduce Risk to Acceptable Levels
<u>Leachable Contaminants of Concern identified in Green Lane and Hawes Lane fill soils are as follows:</u> **Substances present above water framework directive thresholds:** • **Cadmium** • **Copper** • **Lead** • **Zinc** • **Cyanide** • **Anthracene** • **Fluoranthene** • **Benzo(b)fluoranthene** • **Benzo(k)fluoranthene** • **Benzo(ghi)perylene** • **Benzo(a)pyrene**	**Leaching of contamination from the imported fill**	Shallow/ Perched Groundwater	Very Low Risk *Imported fill laid when dry and is heavily compacted leading to poor porosity. Therefore, negligible shallow waters present in new and previous imported fill.* *No groundwater previously noted in made ground on site*	N/A	Shallow/ Perched Groundwater	Very Low Risk *Imported fill laid when dry and is heavily compacted leading to poor porosity. Therefore, negligible shallow waters present in new and previous imported fill.* *No groundwater previously noted in made ground on site*	N/A *Significant coverage of the site with new buildings and impermeable hardstanding, and installation of storm water drainage will limit infiltration of rainwaters into the ground*
	Surface Run-off from imported fill	Drainage Reen	Very Low Risk	Placement of 10m wide strip of clean imported fill along the edge of the reen, separating the reen from the imported fill Monitoring of reen water during and following placement of the fill	Drainage Reen	Very Low Risk	Placement of 10m wide stripof clean imported fill along the edge of the reen, separating the reen from the imported fill Installation of a permanent deep cut-off drain and sump if required
	Downward migration of shallow/ perched groundwater	Groundwater in superficial deposits	Negligible Risk *Imported fill laid when dry and is heavily compacted leading to poor porosity. Therefore, negligible shallow waters present in new and previous imported fill.* *Largely impermeable superficial clays present beneath the site* *Groundwater in superficial deposits confined to inconsistent and isolated granular bands/lenses*	N/A	Groundwater in superficial deposits	Negligible Risk *Imported fill laid when dry and is heavily compacted leading to poor porosity. Therefore, negligible shallow waters present in new and previous imported fill.* *Largely impermeable superficial clays present beneath the site* *Groundwater in superficial deposits confined to inconsistent and isolated granular bands/lenses*	N/A
	Migration of Groundwater	River Usk	No Risk *River Usk not in hydraulic continuity with River Usk*	N/A	River Usk	No Risk *River Usk not in hydraulic continuity with River Usk*	N/A

	Downward migration of groundwaters	Secondary A Aquifer	No Risk *Very low risk of leaching of contaminants due to very low porosity well compacted fill.* *Very low to negligible downward migration of shallow waters due to very low porosity well compacted fill and presence of impermeable clays*	N/A	Secondary A Aquifer	No Risk *Very low risk of leaching of contaminants due to very low porosity well compacted fill.* *Very low to negligible downward migration of shallow waters due to very low porosity well compacted fill and presence of impermeable clays*	N/A
	Piled Foundation Solution	Groundwater Secondary A Aquifer	No Risk *Negligible shallow waters present in imported fill.* *Superficial clay largely impermeable and seals around piles preventing downward migration of any groundwater present.*	N/A	Groundwater Secondary A Aquifer	No Risk *Negligible shallow waters present in imported fill.* *Superficial clay largely impermeable and seals around piles preventing downward migration of any groundwater present.*	N/A

Annex A
Photographs of Source Sites

GREEN LANE SOURCE - FORMER EMBANKMENT SOUTH OF RAIL LINE





HAWES LANE SOURCE - FORMER EMBANKMENT NORTH OF RAIL LINE






KOMATSU
M&J Plant & Transport
VOLVO
M&J Plant & Transport
01443 825330
07976 254393
YD11 FGM

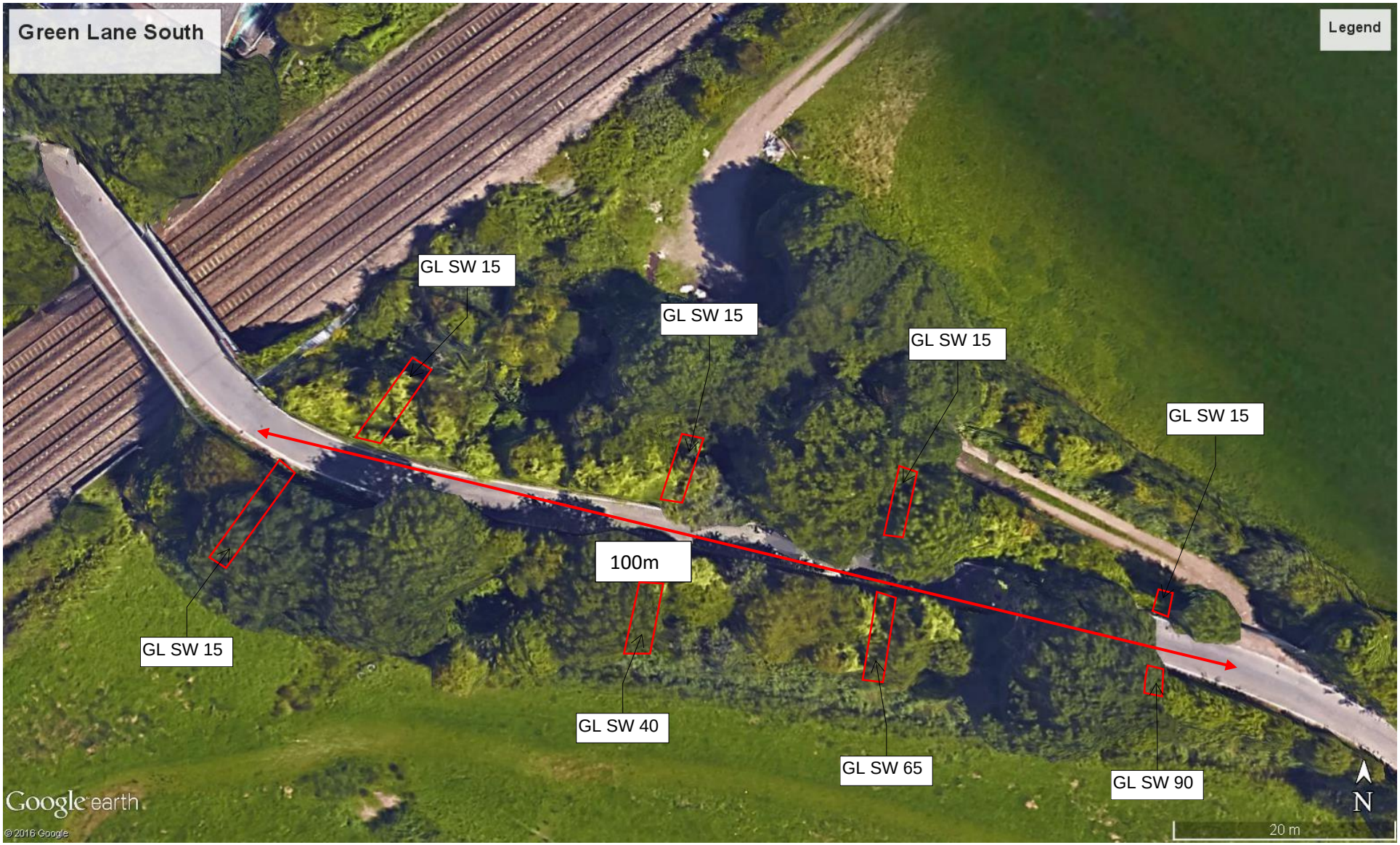
HAWES LANE SOURCE - FORMER EMBANKMENT SOUTH OF RAIL LINE

(Viewed Facing South From Northern Side of Railway

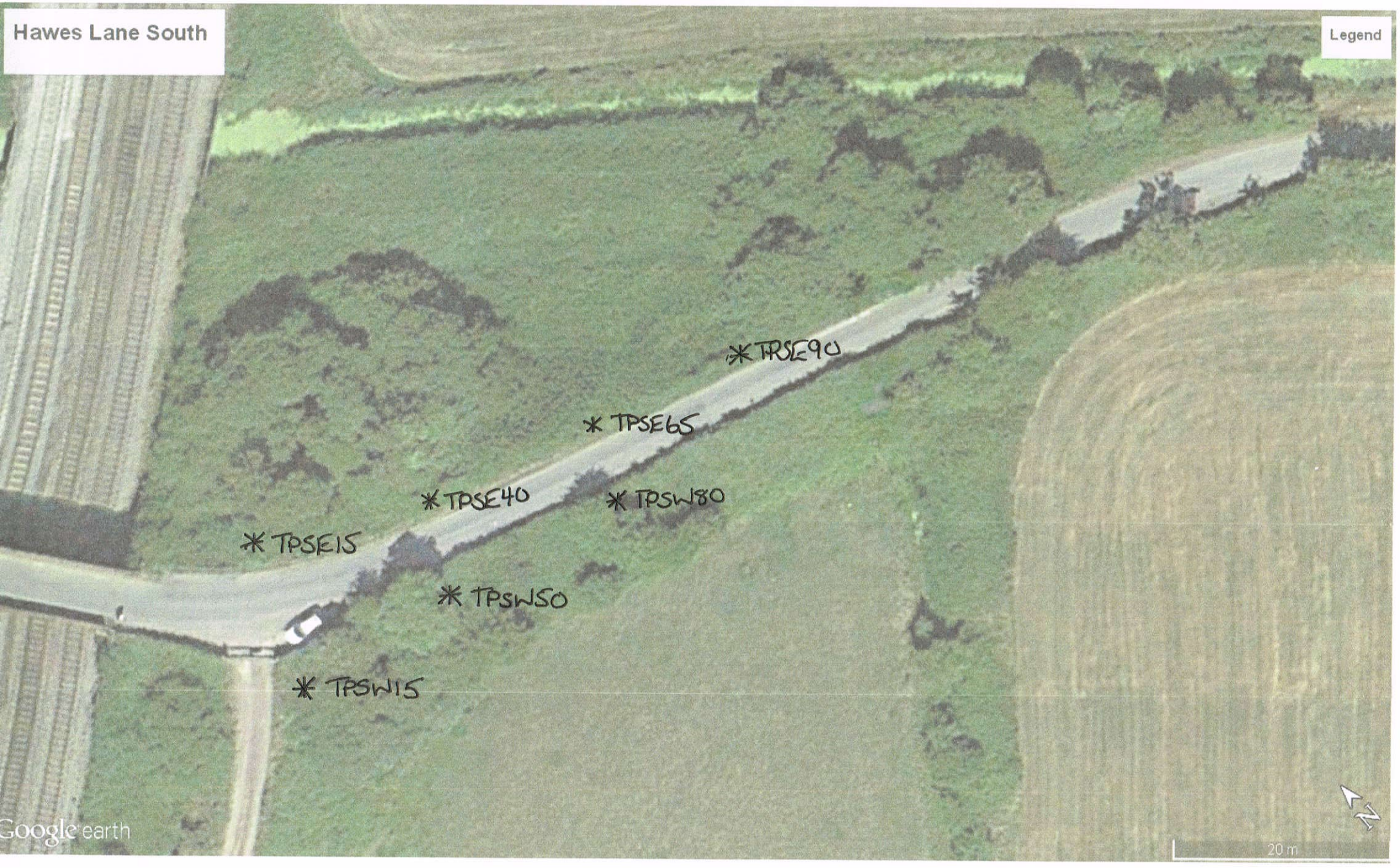


Annex B
Ecovigour Sampling Location Plans


Green Lane North
Sampling Locations 09/09/2016
Legend
No samples taken here due to presence of residential properties.
100m
GL NW 85
GL NW 65
GL NW 35
GL NW 15
Google earth
© 2016 Google
30 m
N


Green Lane South
Legend
GL SW 15
GL SW 15
GL SW 15
GL SW 15
GL SW 15
100m
GL SW 40
GL SW 65
GL SW 90
Google earth
© 2016 Google
N
20 m


Hawes Lane North
Legend
*TPNE80
*TPNW90
*TPNE50
*TPNW65
*TPNE20
*TPNW40
*TPNW15
Google earth
20 m
N


Hawes Lane South
Legend
TPSE90
TPSE65
TPSE40
TPSW80
TPSE15
TPSW50
TPSW15
Google earth
20 m
N

Annex C
Ecovigour Green Lane Soil and Leachate Test Results

2531

ANALYTICAL TEST REPORT

Contract no: 61237

Contract name: Green Lane Bridge

Client reference: -

Clients name: Eco Vigour

Clients address: 12 Devon Place
Newport
Gwent
NP20 4NN

Samples received: 12 September 2016

Analysis started: 12 September 2016

Analysis completed 19 September 2016

Report issued: 19 September 2016

Notes:
Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, withour prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key:
U UKAS accredited test
M MCERTS & UKAS accredited test
$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:

James Spittle
Customer Services Team Leader

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
61237-1	GL NW 15/1	1.00	Sand with Gravel, Slag & Shale	-	-	6.7
61237-2	GL NW 15/2	3.00	Sand with Gravel, Slag & Shale	-	-	9.6
61237-3	GL NW 15/3	6.00	Sand with Shale	-	-	11.9
61237-4	GL SE 15/1	1.00	Sand with Coal & Slag	-	-	6.4
61237-5	GL SE 15/2	4.00	Sand with Coal & Slag	-	-	11.0
61237-6	GL SE 15/3	6.00	Sand with Coal & Slag	-	-	9.2
61237-7	GL SW 15/1	1.00	Sand with Slag, Coal & Shale	-	-	7.7
61237-8	GL SW 15/2	3.00	Sand with Slag & Coal	-	-	14.9
61237-9	GL SW 15/3	6.00	Sand with Gravel & Slag	-	-	6.9
61237-10	GL NW 35/1	1.00	Sand with Coal & Slag	-	-	7.8
61237-11	GL NW 35/2	4.00	Sand with Coal & Shale	-	-	10.3
61237-12	GL SE 40/1	1.00	Sand with Coal, Gravel & Roots	-	-	12.0
61237-13	GL SE 40/2	4.00	Sand with Coal & Shale	-	-	10.7
61237-14	GL SW 40/1	1.00	Sand with Shale & Gravel	-	-	6.1
61237-15	GL SW 40/2	5.00	Sand with Shale, Slag & Gravel	-	-	9.0
61237-16	GL NW 60/1	1.00	Sand with Coal	-	-	4.5
61237-17	GL NW 60/2	3.00	Sand with Coal	-	-	4.4
61237-18	GL SE 65/1	1.00	Sand with Gravel, Shale, Roots & Slag	-	-	10.9
61237-19	GL SE 65/2	3.00	Sand with Coal & Gravel	-	-	9.3
61237-20	GL SW 65/1	1.00	Sand with Coal & Shale	-	-	9.9
61237-21	GL SW 65/2	3.00	Sand with Shale & Coal	-	-	15.5
61237-22	GL NW 85/1	1.00	Sand with Shale & Coal	-	-	9.2
61237-23	GL SE 90/1	1.00	Sand with Gravel, Coal & Slag	-	-	8.2
61237-24	GL SW 90/1	1.00	Sand with Coal & Gravel	-	-	17.0

Chemtech Environmental Limited

SOILS

Lab number			61237-1	61237-2	61237-3	61237-4	61237-5	61237-6
Sample id			GL NW 15/1	GL NW 15/2	GL NW 15/3	GL SE 15/1	GL SE 15/2	GL SE 15/3
Depth (m)			1.00	3.00	6.00	1.00	4.00	6.00
Date sampled			07/09/2016	07/09/2016	07/09/2016	08/09/2016	08/09/2016	08/09/2016
Test	**Method**	**Units**						
Antimony (total)	CE127 U	mg/kg Sb	0.7	1.3	1.5	1.6	1.0	1.5
Arsenic (total)	CE127 M	mg/kg As	18	21	23	13	16	22
Beryllium (total)	CE127 U	mg/kg Be	1.7	1.7	2.3	1.3	2.9	1.2
Boron (water soluble)	CE063 M	mg/kg B	1.0	1.4	1.2	1.7	1.8	1.4
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	<0.2	<0.2	1.3	0.3	0.3
Chromium (III)	-	mg/kg CrIII	45	48	60	21	28	19
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	38	47	54	55	138	76
Lead (total)	CE127 M	mg/kg Pb	19	35	33	124	171	516
Manganese (total)	CE127	mg/kg Mn	351	376	288	519	630	407
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	3.6	5.5	6.0	3.8	3.8	2.8
Nickel (total)	CE127 M	mg/kg Ni	32	38	42	37	84	31
Selenium (total)	CE127 M	mg/kg Se	1.4	2.4	2.1	2.1	2.2	2.2
Zinc (total)	CE127 M	mg/kg Zn	58	48	58	1937	100	64
pH	CE004 M	units	8.1	7.0	7.6	7.3	5.9	7.0
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	0.12	0.15	0.02	0.13	0.21	0.72
Acenaphthylene	CE087 M	mg/kg	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	CE087 M	mg/kg	0.02	0.02	<0.01	<0.01	<0.01	<0.01
Fluorene	CE087 U	mg/kg	0.03	0.03	<0.01	0.03	0.06	0.21
Phenanthrene	CE087 M	mg/kg	0.33	0.52	0.07	0.29	0.59	1.75
Anthracene	CE087 U	mg/kg	0.08	0.12	<0.02	0.05	<0.02	<0.02
Fluoranthene	CE087 M	mg/kg	0.36	0.35	<0.02	0.08	0.13	0.33
Pyrene	CE087 M	mg/kg	0.39	0.31	<0.02	0.07	0.12	0.27
Benzo(a)anthracene	CE087 U	mg/kg	0.15	0.14	<0.02	0.09	0.19	0.13
Chrysene	CE087 M	mg/kg	0.25	0.23	0.01	0.08	0.16	0.37
Benzo(b)fluoranthene	CE087 M	mg/kg	0.39	0.33	<0.02	0.07	0.12	0.28
Benzo(k)fluoranthene	CE087 M	mg/kg	0.12	0.16	<0.02	0.02	0.03	0.07
Benzo(a)pyrene	CE087 U	mg/kg	0.26	0.30	<0.02	0.04	0.07	0.13
Indeno(123cd)pyrene	CE087 M	mg/kg	0.23	0.35	<0.02	0.03	0.05	0.09
Dibenz(ah)anthracene	CE087 M	mg/kg	0.06	0.07	<0.02	<0.02	0.03	0.06
Benzo(ghi)perylene	CE087 M	mg/kg	0.19	0.30	<0.02	0.05	0.08	0.17
PAH (total of USEPA 16)	CE087	mg/kg	2.97	3.41	<0.27	1.04	1.84	4.57
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

SOILS

Lab number			61237-1	61237-2	61237-3	61237-4	61237-5	61237-6
Sample id			GL NW 15/1	GL NW 15/2	GL NW 15/3	GL SE 15/1	GL SE 15/2	GL SE 15/3
Depth (m)			1.00	3.00	6.00	1.00	4.00	6.00
Date sampled			07/09/2016	07/09/2016	07/09/2016	08/09/2016	08/09/2016	08/09/2016
Test	**Method**	**Units**						
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	1	1	<1	<1	<1	3
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	1	2	<1	<1	<1	1
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	7	6	<4	<4	9	10
EPH Aliphatic (>C12-C16)	CE068	mg/kg	16	19	5	10	23	36
EPH Aliphatic (>C16-C35)	CE068	mg/kg	103	81	24	49	101	156
EPH Aliphatic (>C35-C44)	CE068	mg/kg	42	19	11	14	29	38
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

SOILS

Lab number			61237-7	61237-8	61237-9	61237-10	61237-11	61237-12
Sample id			GL SW 15/1	GL SW 15/2	GL SW 15/3	GL NW 35/1	GL NW 35/2	GL SE 40/1
Depth (m)			1.00	3.00	6.00	1.00	4.00	1.00
Date sampled			07/09/2016	07/09/2016	07/09/2016	07/09/2016	07/09/2016	08/09/2016
Test	**Method**	**Units**						
Antimony (total)	CE127 U	mg/kg Sb	1.0	0.9	0.3	0.6	0.8	6.1
Arsenic (total)	CE127 M	mg/kg As	13	13	7.0	30	14	21
Beryllium (total)	CE127 U	mg/kg Be	2.2	1.6	2.0	1.1	1.4	2.1
Boron (water soluble)	CE063 M	mg/kg B	1.2	1.9	1.2	2.2	1.6	1.4
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	<0.2	<0.2	<0.2	<0.2	17.9
Chromium (III)	-	mg/kg CrIII	44	46	46	19	43	33
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	46	62	30	48	46	65
Lead (total)	CE127 M	mg/kg Pb	44	14	20	18	25	545
Manganese (total)	CE127	mg/kg Mn	1691	293	1515	260	231	294
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	4.1	8.9	2.6	2.7	4.2	4.7
Nickel (total)	CE127 M	mg/kg Ni	36	37	22	27	34	43
Selenium (total)	CE127 M	mg/kg Se	1.8	1.7	1.4	1.8	1.6	1.8
Zinc (total)	CE127 M	mg/kg Zn	110	42	95	43	44	19007
pH	CE004 M	units	8.5	8.3	8.1	7.9	8.0	7.9
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	0.25	0.26	0.18	0.81	0.10	0.35
Acenaphthylene	CE087 M	mg/kg	0.03	0.05	0.02	<0.01	<0.01	<0.01
Acenaphthene	CE087 M	mg/kg	0.05	0.34	0.06	<0.01	0.01	<0.01
Fluorene	CE087 U	mg/kg	0.07	0.39	0.08	0.11	0.02	0.04
Phenanthrene	CE087 M	mg/kg	1.21	2.58	0.95	1.98	0.30	1.25
Anthracene	CE087 U	mg/kg	0.27	0.80	0.28	0.29	0.07	<0.02
Fluoranthene	CE087 M	mg/kg	1.55	3.37	1.76	0.27	0.10	0.13
Pyrene	CE087 M	mg/kg	1.38	2.40	1.48	0.26	0.10	0.13
Benzo(a)anthracene	CE087 U	mg/kg	0.79	2.08	1.38	0.33	0.09	0.18
Chrysene	CE087 M	mg/kg	0.94	1.48	1.09	0.36	0.11	0.23
Benzo(b)fluoranthene	CE087 M	mg/kg	1.44	2.12	1.70	0.23	0.08	0.11
Benzo(k)fluoranthene	CE087 M	mg/kg	0.54	0.80	0.66	0.04	0.03	0.03
Benzo(a)pyrene	CE087 U	mg/kg	1.02	1.50	1.28	0.10	0.05	0.05
Indeno(123cd)pyrene	CE087 M	mg/kg	1.02	1.45	1.13	0.05	0.04	0.03
Dibenz(ah)anthracene	CE087 M	mg/kg	0.22	0.35	0.26	0.04	0.02	<0.02
Benzo(ghi)perylene	CE087 M	mg/kg	0.86	1.12	0.89	0.14	0.05	0.08
PAH (total of USEPA 16)	CE087	mg/kg	11.6	21.1	13.2	5.00	1.18	2.61
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

SOILS

Lab number			61237-7	61237-8	61237-9	61237-10	61237-11	61237-12
Sample id			GL SW 15/1	GL SW 15/2	GL SW 15/3	GL NW 35/1	GL NW 35/2	GL SE 40/1
Depth (m)			1.00	3.00	6.00	1.00	4.00	1.00
Date sampled			07/09/2016	07/09/2016	07/09/2016	07/09/2016	07/09/2016	08/09/2016
Test	**Method**	**Units**						
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	4	10	5	3	<1	2
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	6	10	7	1	<1	<1
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	5	4	5	25	5	18
EPH Aliphatic (>C12-C16)	CE068	mg/kg	19	15	24	61	10	47
EPH Aliphatic (>C16-C35)	CE068	mg/kg	190	132	647	237	46	203
EPH Aliphatic (>C35-C44)	CE068	mg/kg	81	35	1191	42	<10	96
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

SOILS

Lab number			61237-13	61237-14	61237-15	61237-16	61237-17	61237-18
Sample id			GL SE 40/2	GL SW 40/1	GL SW 40/2	GL NW 60/1	GL NW 60/2	GL SE 65/1
Depth (m)			4.00	1.00	5.00	1.00	3.00	1.00
Date sampled			08/09/2016	07/09/2016	07/09/2016	07/09/2016	07/09/2016	08/09/2016
Test	**Method**	**Units**						
Antimony (total)	CE127 U	mg/kg Sb	1.1	0.8	0.9	0.4	0.5	0.7
Arsenic (total)	CE127 M	mg/kg As	18	13	13	7.9	11	11
Beryllium (total)	CE127 U	mg/kg Be	1.5	2.0	1.5	1.2	1.1	1.7
Boron (water soluble)	CE063 M	mg/kg B	1.6	1.3	1.3	1.8	1.4	1.3
Cadmium (total)	CE127 M	mg/kg Cd	0.4	<0.2	<0.2	<0.2	<0.2	0.4
Chromium (III)	-	mg/kg CrIII	28	58	49	20	12	43
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	42	38	42	40	42	50
Lead (total)	CE127 M	mg/kg Pb	25	20	23	17	15	25
Manganese (total)	CE127	mg/kg Mn	845	399	271	129	177	479
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	4.3	7.0	5.0	1.8	1.1	4.2
Nickel (total)	CE127 M	mg/kg Ni	46	44	34	18	18	38
Selenium (total)	CE127 M	mg/kg Se	1.7	1.7	1.4	1.5	1.3	1.6
Zinc (total)	CE127 M	mg/kg Zn	350	56	58	31	42	941
pH	CE004 M	units	8.0	8.3	8.3	8.2	8.1	8.3
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	0.23	0.20	0.06	0.14	0.58	0.13
Acenaphthylene	CE087 M	mg/kg	<0.01	0.03	0.01	<0.01	<0.01	<0.01
Acenaphthene	CE087 M	mg/kg	0.02	0.01	<0.01	<0.01	<0.01	0.01
Fluorene	CE087 U	mg/kg	0.04	0.05	0.01	0.14	0.05	0.03
Phenanthrene	CE087 M	mg/kg	0.41	0.76	0.21	0.53	2.21	0.37
Anthracene	CE087 U	mg/kg	0.09	0.24	0.08	<0.02	<0.02	0.11
Fluoranthene	CE087 M	mg/kg	0.07	0.81	0.31	0.07	0.22	0.37
Pyrene	CE087 M	mg/kg	0.06	0.69	0.31	0.10	0.20	0.36
Benzo(a)anthracene	CE087 U	mg/kg	0.11	0.42	0.22	0.18	0.31	0.13
Chrysene	CE087 M	mg/kg	0.09	0.35	0.19	0.19	0.39	0.29
Benzo(b)fluoranthene	CE087 M	mg/kg	0.06	0.43	0.31	0.09	0.16	0.46
Benzo(k)fluoranthene	CE087 M	mg/kg	<0.02	0.20	0.14	<0.02	0.05	0.14
Benzo(a)pyrene	CE087 U	mg/kg	0.03	0.39	0.19	<0.02	0.03	0.31
Indeno(123cd)pyrene	CE087 M	mg/kg	<0.02	0.45	0.36	<0.02	0.04	0.28
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02	0.07	0.05	0.03	0.04	0.07
Benzo(ghi)perylene	CE087 M	mg/kg	0.05	0.42	0.35	0.08	0.12	0.24
PAH (total of USEPA 16)	CE087	mg/kg	1.25	5.52	2.81	1.54	4.41	3.29
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

SOILS

Lab number			61237-13	61237-14	61237-15	61237-16	61237-17	61237-18
Sample id			GL SE 40/2	GL SW 40/1	GL SW 40/2	GL NW 60/1	GL NW 60/2	GL SE 65/1
Depth (m)			4.00	1.00	5.00	1.00	3.00	1.00
Date sampled			08/09/2016	07/09/2016	07/09/2016	07/09/2016	07/09/2016	08/09/2016
Test	**Method**	**Units**						
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	<1	3	<1	<1	3	1
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	<1	2	1	<1	<1	2
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	4	<4	<4	6	20	4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	10	5	5	16	50	14
EPH Aliphatic (>C16-C35)	CE068	mg/kg	62	29	34	142	146	310
EPH Aliphatic (>C35-C44)	CE068	mg/kg	22	<10	<10	92	17	235
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

SOILS

Lab number			61237-19	61237-20	61237-21	61237-22	61237-23	61237-24
Sample id			GL SE 65/2	GL SW 65/1	GL SW 65/2	GL NW 85/1	GL SE 90/1	GL SW 90/1
Depth (m)			3.00	1.00	3.00	1.00	1.00	1.00
Date sampled			08/09/2016	07/09/2016	08/09/2016	09/09/2016	10/09/2016	07/09/2016
Test	**Method**	**Units**						
Antimony (total)	CE127 U	mg/kg Sb	0.8	2.7	2.6	0.9	2.6	9.8
Arsenic (total)	CE127 M	mg/kg As	16	25	26	12	22	52
Beryllium (total)	CE127 U	mg/kg Be	1.6	2.8	1.8	1.7	2.2	2.6
Boron (water soluble)	CE063 M	mg/kg B	1.5	1.9	2.2	1.9	1.7	1.6
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	0.6	0.3	<0.2	0.5	26.4
Chromium (III)	-	mg/kg CrIII	27	43	37	24	58	57
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	53	87	89	57	60	107
Lead (total)	CE127 M	mg/kg Pb	20	117	50	23	36	797
Manganese (total)	CE127	mg/kg Mn	294	276	209	200	550	437
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	3.8	8.8	7.9	2.8	7.4	14
Nickel (total)	CE127 M	mg/kg Ni	30	52	45	28	47	61
Selenium (total)	CE127 M	mg/kg Se	2.1	2.1	1.6	1.8	1.8	2.4
Zinc (total)	CE127 M	mg/kg Zn	48	905	136	35	888	34205
pH	CE004 M	units	7.4	8.4	8.6	7.6	7.6	7.7
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	0.07	0.24	0.15	0.81	0.05	0.29
Acenaphthylene	CE087 M	mg/kg	<0.01	<0.01	0.03	<0.01	<0.01	<0.01
Acenaphthene	CE087 M	mg/kg	<0.01	0.02	0.02	<0.01	<0.01	0.03
Fluorene	CE087 U	mg/kg	0.02	0.04	0.05	0.07	0.02	0.03
Phenanthrene	CE087 M	mg/kg	0.24	0.58	0.44	2.27	0.17	0.59
Anthracene	CE087 U	mg/kg	0.07	0.14	0.13	0.39	0.05	0.16
Fluoranthene	CE087 M	mg/kg	0.21	0.23	0.24	0.49	0.16	0.60
Pyrene	CE087 M	mg/kg	0.20	0.22	0.25	0.41	0.14	0.54
Benzo(a)anthracene	CE087 U	mg/kg	0.17	0.24	0.12	0.49	0.14	0.41
Chrysene	CE087 M	mg/kg	0.21	0.23	0.31	0.47	0.14	0.37
Benzo(b)fluoranthene	CE087 M	mg/kg	0.17	0.24	0.47	0.33	0.17	0.34
Benzo(k)fluoranthene	CE087 M	mg/kg	0.09	0.08	0.21	0.12	0.05	0.18
Benzo(a)pyrene	CE087 U	mg/kg	0.12	0.19	0.43	0.15	0.14	0.28
Indeno(123cd)pyrene	CE087 M	mg/kg	0.06	0.18	0.58	0.09	0.11	0.22
Dibenz(ah)anthracene	CE087 M	mg/kg	0.03	0.05	0.13	0.04	0.03	0.05
Benzo(ghi)perylene	CE087 M	mg/kg	0.08	0.17	0.58	0.17	0.11	0.19
PAH (total of USEPA 16)	CE087	mg/kg	1.76	2.86	4.14	6.30	1.46	4.30
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

SOILS

Lab number			61237-19	61237-20	61237-21	61237-22	61237-23	61237-24
Sample id			GL SE 65/2	GL SW 65/1	GL SW 65/2	GL NW 85/1	GL SE 90/1	GL SW 90/1
Depth (m)			3.00	1.00	3.00	1.00	1.00	1.00
Date sampled			08/09/2016	07/09/2016	08/09/2016	09/09/2016	10/09/2016	07/09/2016
Test	**Method**	**Units**						
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	<1	1	1	4	<1	2
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	<1	1	2	2	<1	2
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	0.1	0.2	<0.1	0.1	0.2	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	<4	4	<4	12	<4	4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	5	10	5	35	<4	4
EPH Aliphatic (>C16-C35)	CE068	mg/kg	39	73	78	127	88	59
EPH Aliphatic (>C35-C44)	CE068	mg/kg	18	27	56	18	120	20
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61237-1L	61237-2L	61237-3L	61237-4L	61237-5L	61237-6L
Sample id			GL NW 15/1	GL NW 15/2	GL NW 15/3	GL SE 15/1	GL SE 15/2	GL SE 15/3
Depth (m)			1.00	3.00	6.00	1.00	4.00	6.00
Test	**Method**	**Units**						
Arsenic (dissolved)	CE128 U	µg/l As	3.41	6.35	4.33	4.18	0.40	1.95
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chromium III (dissolved)	-	µg/l CrIII	<0.2	<0.2	0.3	<0.2	<0.2	<0.2
Chromium VI (dissolved)	CE050 U	µg/l CrVI	<10	<10	<10	<10	<10	<10
Copper (dissolved)	CE128 U	µg/l Cu	1.5	1.3	2.9	2.0	0.4	2.1
Lead (dissolved)	CE128 U	µg/l Pb	<0.2	<0.2	0.5	1.3	<0.2	8.8
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium (dissolved)	CE128 U	µg/l Se	0.56	1.29	0.26	0.34	0.78	0.35
Zinc (dissolved)	CE128 U	µg/l Zn	<1	<1	<1	10	<1	<1
Chloride	CE049 U	mg/l Cl	1	1.3	<1	1.2	<1	<1
Fluoride	CE049 U	mg/l F	0.2	0.3	0.2	0.2	<0.1	0.1
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20	<20
Phenols (total)	CE148	µg/l PhOH	<10	<10	<10	<10	<10	<10
PAH								
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
TPH								
VPH Aromatic (>EC5-EC7)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61237-1L	61237-2L	61237-3L	61237-4L	61237-5L	61237-6L
Sample id			GL NW 15/1	GL NW 15/2	GL NW 15/3	GL SE 15/1	GL SE 15/2	GL SE 15/3
Depth (m)			1.00	3.00	6.00	1.00	4.00	6.00
Test	**Method**	**Units**						
VPH Aliphatic (>C6-C8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61237-7L	61237-8L	61237-9L	61237-10L	61237-11L	61237-12L
Sample id			GL SW 15/1	GL SW 15/2	GL SW 15/3	GL NW 35/1	GL NW 35/2	GL SE 40/1
Depth (m)			1.00	3.00	6.00	1.00	4.00	1.00
Test	**Method**	**Units**						
Arsenic (dissolved)	CE128 U	µg/l As	4.47	2.75	3.20	3.47	4.65	3.96
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07	0.08
Chromium III (dissolved)	-	µg/l CrIII	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium VI (dissolved)	CE050 U	µg/l CrVI	<10	<10	<10	<10	<10	<10
Copper (dissolved)	CE128 U	µg/l Cu	3.3	1.4	1.3	2.6	2.6	2.7
Lead (dissolved)	CE128 U	µg/l Pb	4.2	<0.2	<0.2	0.3	0.5	1.2
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium (dissolved)	CE128 U	µg/l Se	0.32	0.38	0.28	0.29	0.21	0.09
Zinc (dissolved)	CE128 U	µg/l Zn	<1	<1	<1	<1	<1	60
Chloride	CE049 U	mg/l Cl	<1	1.1	<1	<1	<1	<1
Fluoride	CE049 U	mg/l F	0.1	0.1	<0.1	0.2	0.2	0.1
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20	<20
Phenols (total)	CE148	µg/l PhOH	<10	<10	<10	<10	<10	<10
PAH								
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
TPH								
VPH Aromatic (>EC5-EC7)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61237-7L	61237-8L	61237-9L	61237-10L	61237-11L	61237-12L
Sample id			GL SW 15/1	GL SW 15/2	GL SW 15/3	GL NW 35/1	GL NW 35/2	GL SE 40/1
Depth (m)			1.00	3.00	6.00	1.00	4.00	1.00
Test	**Method**	**Units**						
VPH Aliphatic (>C6-C8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61237-13L	61237-14L	61237-15L	61237-16L	61237-17L	61237-18L
Sample id			GL SE 40/2	GL SW 40/1	GL SW 40/2	GL NW 60/1	GL NW 60/2	GL SE 65/1
Depth (m)			4.00	1.00	5.00	1.00	3.00	1.00
Test	**Method**	**Units**						
Arsenic (dissolved)	CE128 U	µg/l As	5.29	2.93	5.28	1.07	1.63	4.46
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chromium III (dissolved)	-	µg/l CrIII	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium VI (dissolved)	CE050 U	µg/l CrVI	<10	<10	<10	<10	<10	<10
Copper (dissolved)	CE128 U	µg/l Cu	2.8	1.3	0.9	2.1	2.4	2.6
Lead (dissolved)	CE128 U	µg/l Pb	0.6	<0.2	<0.2	<0.2	<0.2	0.4
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	0.8	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium (dissolved)	CE128 U	µg/l Se	0.65	0.28	0.25	0.20	0.17	0.37
Zinc (dissolved)	CE128 U	µg/l Zn	2	<1	<1	<1	<1	<1
Chloride	CE049 U	mg/l Cl	<1	<1	<1	<1	<1	<1
Fluoride	CE049 U	mg/l F	0.4	0.2	0.1	0.1	0.1	0.2
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20	<20
Phenols (total)	CE148	µg/l PhOH	<10	<10	<10	<10	<10	<10
PAH								
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
TPH								
VPH Aromatic (>EC5-EC7)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61237-13L	61237-14L	61237-15L	61237-16L	61237-17L	61237-18L
Sample id			GL SE 40/2	GL SW 40/1	GL SW 40/2	GL NW 60/1	GL NW 60/2	GL SE 65/1
Depth (m)			4.00	1.00	5.00	1.00	3.00	1.00
Test	**Method**	**Units**						
VPH Aliphatic (>C6-C8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61237-19L	61237-20L	61237-21L	61237-22L	61237-23L	61237-24L
Sample id			GL SE 65/2	GL SW 65/1	GL SW 65/2	GL NW 85/1	GL SE 90/1	GL SW 90/1
Depth (m)			3.00	1.00	3.00	1.00	1.00	1.00
Test	**Method**	**Units**						
Arsenic (dissolved)	CE128 U	µg/l As	2.49	7.01	14.99	5.20	1.93	10.88
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07	0.59
Chromium III (dissolved)	-	µg/l CrIII	<0.2	<0.2	0.2	0.2	0.3	<0.2
Chromium VI (dissolved)	CE050 U	µg/l CrVI	<10	<10	<10	<10	<10	<10
Copper (dissolved)	CE128 U	µg/l Cu	3.4	2.4	3.9	4.7	6.4	3.9
Lead (dissolved)	CE128 U	µg/l Pb	0.6	0.5	2.6	1.0	0.9	1.2
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	<0.5	<0.5	<0.5	0.9	0.6	<0.5
Selenium (dissolved)	CE128 U	µg/l Se	0.36	0.48	0.41	0.30	0.39	<0.07
Zinc (dissolved)	CE128 U	µg/l Zn	<1	<1	<1	<1	<1	216
Chloride	CE049 U	mg/l Cl	<1	<1	1.1	<1	<1	<1
Fluoride	CE049 U	mg/l F	0.1	0.2	0.1	0.1	0.3	0.1
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20	<20
Phenols (total)	CE148	µg/l PhOH	<10	<10	<10	<10	<10	<10
PAH								
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
TPH								
VPH Aromatic (>EC5-EC7)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61237-19L	61237-20L	61237-21L	61237-22L	61237-23L	61237-24L
Sample id			GL SE 65/2	GL SW 65/1	GL SW 65/2	GL NW 85/1	GL SE 90/1	GL SW 90/1
Depth (m)			3.00	1.00	3.00	1.00	1.00	1.00
Test	**Method**	**Units**						
VPH Aliphatic (>C6-C8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Antimony (total)	Aqua regia digest, ICP-MS	Dry	U	0.2	mg/kg Sb
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Beryllium (total)	Aqua regia digest, ICP-MS	Dry	U	1	mg/kg Be
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry	M	0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
-	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Manganese (total)	Aqua regia digest, ICP-MS	Dry		1	mg/kg Mn
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Molybdenum (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Mo
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	Wet	M	-	units
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	Wet	M	1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	Wet		0.5	mg/kg PhOH
CE087	Naphthalene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	Wet	U	0.01	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	Wet		0.27	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	Wet		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	Wet		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	Wet		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	Wet		1	mg/kg

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	Wet		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	Wet		10	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

METHOD DETAILS

METHOD	PREPARED LEACHATES	METHOD SUMMARY	STATUS	LOD	UNITS
CE001	Leachate preparation (10:1 single-stage)	BS12457-2		-	-
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Cadmium (dissolved)	ICP-MS	U	0.07	µg/l Cd
-	Chromium III (dissolved)	Calculation: Cr (total) - Cr (VI)		10	µg/l CrIII
CE050	Chromium VI (dissolved)	Colorimetry	U	10	µg/l CrVI
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb
CE128	Mercury (dissolved)	ICP-MS	U	0.008	µg/l Hg
CE128	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
CE128	Selenium (dissolved)	ICP-MS	U	0.07	µg/l Se
CE128	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
CE049	Chloride	Ion Chromatography	U	1	mg/l Cl
CE049	Fluoride	Ion Chromatography	U	0.2	mg/l F
CE147	Cyanide (total)	Continuous Flow Colorimetry		20	µg/l CN
CE148	Phenols (total)	Continuous Flow Colorimetry		10	µg/l PhOH
CE051	PAH (speciated)	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID		1	µg/l
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID		1	µg/l
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID		1	µg/l
CE161	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID		1	µg/l
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID		1	µg/l
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID		1	µg/l
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID		1	µg/l
CE161	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID		1	µg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
IT	Sample not cooled
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
61237-1	GL NW 15/1	1.00	N	
61237-2	GL NW 15/2	3.00	N	
61237-3	GL NW 15/3	6.00	N	
61237-4	GL SE 15/1	1.00	N	
61237-5	GL SE 15/2	4.00	N	
61237-6	GL SE 15/3	6.00	N	
61237-7	GL SW 15/1	1.00	N	
61237-8	GL SW 15/2	3.00	N	
61237-9	GL SW 15/3	6.00	N	
61237-10	GL NW 35/1	1.00	N	
61237-11	GL NW 35/2	4.00	N	
61237-12	GL SE 40/1	1.00	N	
61237-13	GL SE 40/2	4.00	N	
61237-14	GL SW 40/1	1.00	N	
61237-15	GL SW 40/2	5.00	N	
61237-16	GL NW 60/1	1.00	N	
61237-17	GL NW 60/2	3.00	N	
61237-18	GL SE 65/1	1.00	N	
61237-19	GL SE 65/2	3.00	N	
61237-20	GL SW 65/1	1.00	N	
61237-21	GL SW 65/2	3.00	N	
61237-22	GL NW 85/1	1.00	N	
61237-23	GL SE 90/1	1.00	N	
61237-24	GL SW 90/1	1.00	N	

Annex D
Ecovigour Hawes Lane Soil and Leachate Test Results

2531

ANALYTICAL TEST REPORT

Contract no: 61281

Contract name: Green Lane Bridge

Client reference: -

Clients name: Eco Vigour

Clients address: Hardwick Farm
5 Lanes, Caerwent
Monmouthshire
NP25 5PH

Samples received: 14 September 2016

Analysis started: 15 September 2016

Analysis completed 21 September 2016

Report issued: 21 September 2016

Notes:
Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, withour prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key:
U UKAS accredited test
M MCERTS & UKAS accredited test
$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:

Dave Bowerbank
Customer Services Co-ordinator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
61281-1	HL/NW/15/1	1.00	Sand with Shale	-	-	8.2
61281-2	HL/SE/15/1	1.00	Sand with Shale, Slag & Coal	-	-	9.2
61281-3	HL/SW/15/1	1.00	Sand with Shale, Slag & Coal	-	-	6.1
61281-4	HL/NW/15/2	3.00	Sand with Shale	-	-	7.9
61281-5	HL/SE/15/2	4.00	Sand with Shale	-	-	10.7
61281-6	HL/SW/15/2	3.00	Sand with Shale & Coal	-	-	7.8
61281-7	HL/NW15/3	6.00	Sand with Slag & Shale	-	-	13.4
61281-8	HL/SE/15/3	6.00	Sand with Shale	-	-	10.7
61281-9	HL/NE/20/1	1.00	Sand with Shale	-	-	10.1
61281-10	HL/NE/20/2	3.00	Sand with Shale	-	-	9.7
61281-11	HL/NE/20/3	6.00	Sand with Shale	-	-	8.6
61281-12	HL/NW/40/1	1.00	Coal	-	-	6.0
61281-13	HL/SE/40/1	1.00	Clay	-	-	8.2
61281-14	HL/NW/40/2	4.00	Sand with Slag & Coal	-	-	7.3
61281-15	HL/SE/40/2	4.00	Sandy Clay with Shale & Coal	-	-	12.1
61281-16	HL/NE/50/1	1.00	Coal	-	-	3.8
61281-17	HL/SW/50/1	1.00	Sand with Shale	-	-	9.2
61281-18	HL/NE/50/2	3.00	Coal	-	-	5.6
61281-19	HL/SW/50/2	3.00	Sand with Coal & Shale	-	-	6.3
61281-20	HL/NW/65/1	1.00	Clay & Sand with Coal	-	-	11.2
61281-21	HL/SE/65/1	1.00	Clay & Sand with Slag	-	-	10.9
61281-22	HL/NW/65/2	3.00	Sand with Coal & Shale	-	-	8.6
61281-23	HL/SE/65/2	2.00	Clay with Mudstone	-	-	7.3
61281-24	HL/NE/80/1	1.00	Sand & Clay with Slag	-	-	13.6
61281-25	HL/SW/80/1	1.00	Sand with Shale	-	-	6.8
61281-26	HL/NE/80/2	2.00	Sand with Slag & Coal	-	-	9.9
61281-27	HL/SW/80/2	3.00	Sand with Shale & Slag	-	-	4.8
61281-28	HL/SW/80/3	6.00	Sand with Slag	-	-	5.0
61281-29	HL/NW/90/1	1.00	Sand with Slag	-	-	10.2
61281-30	NL/SE/90/1	1.00	Sand with Slag	-	-	14.8

Chemtech Environmental Limited

SOILS

Lab number			61281-1	61281-2	61281-3	61281-4	61281-5	61281-6
Sample id			HL/NW/15/1	HL/SE/15/1	HL/SW/15/1	HL/NW/15/2	HL/SE/15/2	HL/SW/15/2
Depth (m)			1.00	1.00	1.00	3.00	4.00	3.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
Antimony (total)	CE127 U	mg/kg Sb	1.7	1.3	0.9	0.8	2.3	<0.2
Arsenic (total)	CE127 M	mg/kg As	22	16	15	11	22	14
Beryllium (total)	CE127 U	mg/kg Be	2.1	1.8	1.2	1.6	1.9	1.0
Boron (water soluble)	CE063 M	mg/kg B	0.6	1.4	1.6	1.4	1.0	1.6
Cadmium (total)	CE127 M	mg/kg Cd	0.2	0.4	<0.2	<0.2	2.5	<0.2
Chromium (total)	CE127 M	mg/kg Cr	53	42	22	52	54	20
Chromium (III)	-	mg/kg CrIII	53	42	22	52	54	20
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	388	46	56	38	49	37
Lead (total)	CE127 M	mg/kg Pb	58	36	23	19	62	19
Manganese (total)	CE127	mg/kg Mn	454	332	242	241	1300	148
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	4.1	3.6	2.2	3.9	5.4	1.0
Nickel (total)	CE127 M	mg/kg Ni	49	36	38	30	39	34
Selenium (total)	CE127 M	mg/kg Se	1.7	1.6	1.3	1.3	1.5	1.0
Zinc (total)	CE127 M	mg/kg Zn	106	305	60	57	3226	100
pH	CE004 M	units	8.4	7.8	8.3	7.9	7.3	8.0
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	<0.01	0.20	0.62	0.06	0.04	0.83
Acenaphthylene	CE087 M	mg/kg	<0.01	<0.01	0.08	0.01	<0.01	<0.01
Acenaphthene	CE087 M	mg/kg	<0.01	0.02	0.03	0.03	<0.01	0.03
Fluorene	CE087 U	mg/kg	<0.01	0.09	0.10	0.04	<0.01	<0.01
Phenanthrene	CE087 M	mg/kg	<0.02	1.12	2.71	0.46	0.12	2.47
Anthracene	CE087 U	mg/kg	<0.02	<0.02	0.45	0.13	<0.02	0.23
Fluoranthene	CE087 M	mg/kg	<0.02	0.43	2.21	1.21	0.07	0.43
Pyrene	CE087 M	mg/kg	<0.02	0.34	1.83	0.96	0.06	0.47
Benzo(a)anthracene	CE087 U	mg/kg	<0.02	0.19	0.84	0.81	0.03	0.16
Chrysene	CE087 M	mg/kg	<0.01	0.32	0.82	0.71	0.05	0.41
Benzo(b)fluoranthene	CE087 M	mg/kg	<0.02	0.28	0.82	1.09	0.06	0.21
Benzo(k)fluoranthene	CE087 M	mg/kg	<0.02	0.07	0.31	0.41	<0.02	0.03
Benzo(a)pyrene	CE087 U	mg/kg	<0.02	0.17	0.59	0.80	0.03	0.07
Indeno(123cd)pyrene	CE087 M	mg/kg	<0.02	0.11	0.36	0.67	0.04	0.04
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02	0.05	0.11	0.20	<0.02	0.04
Benzo(ghi)perylene	CE087 M	mg/kg	<0.02	0.16	0.42	0.68	0.03	0.12
PAH (total of USEPA 16)	CE087	mg/kg	<0.27	3.55	12.3	8.26	0.53	5.54
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Chemtech Environmental Limited

SOILS

Lab number			61281-1	61281-2	61281-3	61281-4	61281-5	61281-6
Sample id			HL/NW/15/1	HL/SE/15/1	HL/SW/15/1	HL/NW/15/2	HL/SE/15/2	HL/SW/15/2
Depth (m)			1.00	1.00	1.00	3.00	4.00	3.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	1	<1	<1	1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	<1	2	8	3	<1	5
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	<1	1	4	6	1	2
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	<1	<1	1	2	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	0.2	0.2	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	<4	<4	13	<4	<4	18
EPH Aliphatic (>C12-C16)	CE068	mg/kg	<4	<4	39	<4	<4	55
EPH Aliphatic (>C16-C35)	CE068	mg/kg	<10	<10	134	141	85	204
EPH Aliphatic (>C35-C44)	CE068	mg/kg	<10	<10	14	65	134	34
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

SOILS

Lab number			61281-7	61281-8	61281-9	61281-10	61281-11	61281-12
Sample id			HL/NW15/3	HL/SE/15/3	HL/NE/20/1	HL/NE/20/2	HL/NE/20/3	HL/NW/40/1
Depth (m)			6.00	6.00	1.00	3.00	6.00	1.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
Antimony (total)	CE127 U	mg/kg Sb	1.2	1.1	1.2	1.1	5.8	0.5
Arsenic (total)	CE127 M	mg/kg As	12	16	17	14	45	8.0
Beryllium (total)	CE127 U	mg/kg Be	1.6	1.7	1.7	1.6	1.1	<1
Boron (water soluble)	CE063 M	mg/kg B	1.3	1.1	1.9	1.5	1.4	1.6
Cadmium (total)	CE127 M	mg/kg Cd	0.4	1.0	<0.2	<0.2	0.3	<0.2
Chromium (total)	CE127 M	mg/kg Cr	34	51	49	47	48	17
Chromium (III)	-	mg/kg CrIII	34	51	49	47	48	17
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	35	41	52	48	164	55
Lead (total)	CE127 M	mg/kg Pb	25	54	30	25	144	16
Manganese (total)	CE127	mg/kg Mn	423	389	356	448	1702	124
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	2.8	4.4	4.4	4.0	5.5	1.5
Nickel (total)	CE127 M	mg/kg Ni	31	38	37	37	34	12
Selenium (total)	CE127 M	mg/kg Se	1.2	1.6	1.8	1.5	1.9	1.3
Zinc (total)	CE127 M	mg/kg Zn	154	1463	124	51	113	11
pH	CE004 M	units	7.4	7.0	8.3	7.6	7.1	7.5
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	0.09	0.16	0.95	0.98	3.04	0.37
Acenaphthylene	CE087 M	mg/kg	<0.01	<0.01	0.21	0.06	0.52	<0.01
Acenaphthene	CE087 M	mg/kg	<0.01	<0.01	0.21	0.21	0.29	0.03
Fluorene	CE087 U	mg/kg	0.03	0.03	0.46	0.22	0.45	0.11
Phenanthrene	CE087 M	mg/kg	0.26	0.44	4.40	3.29	19.31	0.91
Anthracene	CE087 U	mg/kg	<0.02	0.04	1.02	0.74	4.98	0.23
Fluoranthene	CE087 M	mg/kg	0.21	0.10	4.05	5.70	21.37	0.28
Pyrene	CE087 M	mg/kg	0.17	0.09	3.33	4.50	15.18	0.31
Benzo(a)anthracene	CE087 U	mg/kg	0.14	0.05	1.92	3.41	8.81	0.22
Chrysene	CE087 M	mg/kg	0.16	0.09	1.50	3.01	7.16	0.32
Benzo(b)fluoranthene	CE087 M	mg/kg	0.21	0.07	2.07	3.54	7.87	0.20
Benzo(k)fluoranthene	CE087 M	mg/kg	0.07	0.02	0.88	1.43	3.18	0.06
Benzo(a)pyrene	CE087 U	mg/kg	0.13	0.04	1.65	2.73	5.76	0.18
Indeno(123cd)pyrene	CE087 M	mg/kg	0.12	0.04	1.21	1.84	4.02	0.13
Dibenz(ah)anthracene	CE087 M	mg/kg	0.03	<0.02	0.32	0.59	1.17	0.07
Benzo(ghi)perylene	CE087 M	mg/kg	0.11	0.05	1.17	1.84	3.62	0.33
PAH (total of USEPA 16)	CE087	mg/kg	1.74	1.23	25.4	34.1	107	3.75
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Chemtech Environmental Limited

SOILS

Lab number			61281-7	61281-8	61281-9	61281-10	61281-11	61281-12
Sample id			HL/NW15/3	HL/SE/15/3	HL/NE/20/1	HL/NE/20/2	HL/NE/20/3	HL/NW/40/1
Depth (m)			6.00	6.00	1.00	3.00	6.00	1.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	1	3	<1
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	1	<1	4	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	<1	1	14	14	63	2
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	2	2	10	17	39	2
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	<1	2	2	5	1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	0.3	0.3
EPH Aliphatic (>C10-C12)	CE068	mg/kg	<4	<4	8	<4	6	<4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	<4	10	33	12	23	10
EPH Aliphatic (>C16-C35)	CE068	mg/kg	22	55	233	102	141	153
EPH Aliphatic (>C35-C44)	CE068	mg/kg	<10	<10	36	19	35	109
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

SOILS

Lab number			61281-13	61281-14	61281-15	61281-16	61281-17	61281-18
Sample id			HL/SE/40/1	HL/NW/40/2	HL/SE/40/2	HL/NE/50/1	HL/SW/50/1	HL/NE/50/2
Depth (m)			1.00	4.00	4.00	1.00	1.00	3.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
Antimony (total)	CE127 U	mg/kg Sb	0.4	<0.2	0.8	0.4	1.2	0.4
Arsenic (total)	CE127 M	mg/kg As	3.2	3.4	11	4.6	20	17
Beryllium (total)	CE127 U	mg/kg Be	<1	<1	1.0	<1	2.3	<1
Boron (water soluble)	CE063 M	mg/kg B	0.5	1.3	0.8	1.7	1.5	1.5
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (total)	CE127 M	mg/kg Cr	51	7.4	41	13	45	11
Chromium (III)	-	mg/kg CrIII	51	7.4	41	13	45	11
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	14	37	51	38	56	38
Lead (total)	CE127 M	mg/kg Pb	12	15	22	16	40	18
Manganese (total)	CE127	mg/kg Mn	951	257	609	96	257	69
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	1.0	<1	3.4	<1	4.6	1.2
Nickel (total)	CE127 M	mg/kg Ni	46	16	38	21	39	15
Selenium (total)	CE127 M	mg/kg Se	0.9	0.8	1.2	1.5	2.2	2.2
Zinc (total)	CE127 M	mg/kg Zn	61	28	64	12	35	9.3
pH	CE004 M	units	7.6	8.3	7.0	8.1	8.5	7.8
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	<0.01	0.35	0.05	0.24	0.39	0.28
Acenaphthylene	CE087 M	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	CE087 M	mg/kg	<0.01	0.05	0.01	<0.01	<0.01	0.01
Fluorene	CE087 U	mg/kg	<0.01	0.10	0.02	0.07	0.05	0.11
Phenanthrene	CE087 M	mg/kg	0.04	0.84	0.33	0.42	1.14	0.65
Anthracene	CE087 U	mg/kg	<0.02	<0.02	0.05	<0.02	<0.02	<0.02
Fluoranthene	CE087 M	mg/kg	0.05	0.59	0.36	0.06	0.16	0.08
Pyrene	CE087 M	mg/kg	0.04	0.49	0.29	0.07	0.15	0.10
Benzo(a)anthracene	CE087 U	mg/kg	0.03	0.30	0.22	0.03	0.07	0.06
Chrysene	CE087 M	mg/kg	0.03	0.35	0.25	0.12	0.20	0.19
Benzo(b)fluoranthene	CE087 M	mg/kg	0.04	0.43	0.34	0.06	0.10	0.10
Benzo(k)fluoranthene	CE087 M	mg/kg	<0.02	0.15	0.13	<0.02	<0.02	<0.02
Benzo(a)pyrene	CE087 U	mg/kg	0.03	0.30	0.25	0.03	0.04	0.04
Indeno(123cd)pyrene	CE087 M	mg/kg	0.03	0.25	0.21	<0.02	0.03	<0.02
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02	0.06	0.07	<0.02	0.02	0.03
Benzo(ghi)perylene	CE087 M	mg/kg	0.03	0.27	0.23	0.05	0.08	0.08
PAH (total of USEPA 16)	CE087	mg/kg	0.32	4.52	2.81	1.15	2.44	1.73
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Chemtech Environmental Limited

SOILS

Lab number			61281-13	61281-14	61281-15	61281-16	61281-17	61281-18
Sample id			HL/SE/40/1	HL/NW/40/2	HL/SE/40/2	HL/NE/50/1	HL/SW/50/1	HL/NE/50/2
Depth (m)			1.00	4.00	4.00	1.00	1.00	3.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	<1	2	1	<1	2	1
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	1	3	3	2	2	2
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	1	1	<1	<1	1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	<4	5	<4	<4	8	7
EPH Aliphatic (>C12-C16)	CE068	mg/kg	<4	15	<4	9	24	16
EPH Aliphatic (>C16-C35)	CE068	mg/kg	15	97	50	47	95	98
EPH Aliphatic (>C35-C44)	CE068	mg/kg	13	31	39	14	17	41
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

SOILS

Lab number			61281-19	61281-20	61281-21	61281-22	61281-23	61281-24
Sample id			HL/SW/50/2	HL/NW/65/1	HL/SE/65/1	HL/NW/65/2	HL/SE/65/2	HL/NE/80/1
Depth (m)			3.00	1.00	1.00	3.00	2.00	1.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
Antimony (total)	CE127 U	mg/kg Sb	0.6	0.5	1.0	0.2	0.5	1.1
Arsenic (total)	CE127 M	mg/kg As	24	7.7	7.1	3.9	3.3	16
Beryllium (total)	CE127 U	mg/kg Be	1.2	1.1	1.6	1.1	1.4	2.6
Boron (water soluble)	CE063 M	mg/kg B	1.8	0.8	1.1	1.1	0.6	1.5
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (total)	CE127 M	mg/kg Cr	17	34	44	13	46	43
Chromium (III)	-	mg/kg CrIII	17	34	44	13	46	43
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	47	27	28	34	17	73
Lead (total)	CE127 M	mg/kg Pb	20	16	34	16	15	7.1
Manganese (total)	CE127	mg/kg Mn	186	642	371	194	355	316
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	2.0	1.8	2.8	1.0	1.3	10.9
Nickel (total)	CE127 M	mg/kg Ni	28	44	46	25	52	50
Selenium (total)	CE127 M	mg/kg Se	1.4	1.0	1.0	0.6	0.8	2.0
Zinc (total)	CE127 M	mg/kg Zn	42	64	86	36	58	19
pH	CE004 M	units	8.3	7.9	7.7	7.7	7.4	8.0
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	0.28	0.25	0.19	0.24	0.02	0.04
Acenaphthylene	CE087 M	mg/kg	<0.01	<0.01	0.02	<0.01	<0.01	0.01
Acenaphthene	CE087 M	mg/kg	0.01	0.01	0.13	0.01	<0.01	0.03
Fluorene	CE087 U	mg/kg	0.04	0.09	0.12	0.05	<0.01	0.03
Phenanthrene	CE087 M	mg/kg	0.74	0.69	1.42	0.58	0.08	0.23
Anthracene	CE087 U	mg/kg	<0.02	<0.02	0.29	<0.02	<0.02	0.08
Fluoranthene	CE087 M	mg/kg	0.14	0.19	2.37	0.10	0.09	0.70
Pyrene	CE087 M	mg/kg	0.12	0.16	1.91	0.09	0.07	0.57
Benzo(a)anthracene	CE087 U	mg/kg	0.06	0.11	1.59	0.04	0.04	0.50
Chrysene	CE087 M	mg/kg	0.13	0.22	1.42	0.11	0.05	0.43
Benzo(b)fluoranthene	CE087 M	mg/kg	0.08	0.18	2.03	0.09	0.06	0.62
Benzo(k)fluoranthene	CE087 M	mg/kg	<0.02	0.04	0.82	<0.02	0.02	0.26
Benzo(a)pyrene	CE087 U	mg/kg	0.05	0.08	1.60	0.03	0.05	0.47
Indeno(123cd)pyrene	CE087 M	mg/kg	0.05	0.07	1.51	0.03	0.05	0.36
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02	0.04	0.41	<0.02	<0.02	0.10
Benzo(ghi)perylene	CE087 M	mg/kg	0.08	0.12	1.35	0.05	0.06	0.35
PAH (total of USEPA 16)	CE087	mg/kg	1.77	2.24	17.2	1.42	0.59	4.79
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Chemtech Environmental Limited

SOILS

Lab number			61281-19	61281-20	61281-21	61281-22	61281-23	61281-24
Sample id			HL/SW/50/2	HL/NW/65/1	HL/SE/65/1	HL/NW/65/2	HL/SE/65/2	HL/NE/80/1
Depth (m)			3.00	1.00	1.00	3.00	2.00	1.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	1	1	6	1	<1	2
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	1	2	9	2	<1	3
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	1	2	1	<1	1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	9	8	<4	6	<4	<4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	23	22	5	17	<4	<4
EPH Aliphatic (>C16-C35)	CE068	mg/kg	75	114	89	91	<10	38
EPH Aliphatic (>C35-C44)	CE068	mg/kg	11	42	43	36	<10	11
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

SOILS

Lab number			61281-25	61281-26	61281-27	61281-28	61281-29	61281-30
Sample id			HL/SW/80/1	HL/NE/80/2	HL/SW/80/2	HL/SW/80/3	HL/NW/90/1	NL/SE/90/1
Depth (m)			1.00	2.00	3.00	6.00	1.00	1.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
Antimony (total)	CE127 U	mg/kg Sb	0.3	<0.2	0.8	0.4	1.1	3.1
Arsenic (total)	CE127 M	mg/kg As	10	9.0	8.4	4.8	11	29
Beryllium (total)	CE127 U	mg/kg Be	1.8	1.9	1.9	2.3	1.9	1.9
Boron (water soluble)	CE063 M	mg/kg B	1.9	1.8	1.2	1.3	1.2	1.8
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	0.2	<0.2	<0.2	0.3	0.7
Chromium (total)	CE127 M	mg/kg Cr	27	22	32	36	34	46
Chromium (III)	-	mg/kg CrIII	27	22	32	36	34	46
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	39	86	51	57	65	129
Lead (total)	CE127 M	mg/kg Pb	28	36	18	14	42	145
Manganese (total)	CE127	mg/kg Mn	188	298	269	851	819	776
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum (total)	CE127 M	mg/kg Mo	2.2	1.9	3.2	3.3	3.4	7.9
Nickel (total)	CE127 M	mg/kg Ni	27	39	29	38	48	41
Selenium (total)	CE127 M	mg/kg Se	0.9	1.1	1.6	1.3	1.4	1.4
Zinc (total)	CE127 M	mg/kg Zn	39	70	32	37	126	232
pH	CE004 M	units	7.8	7.8	7.7	7.3	7.8	7.7
Cyanide (total)	CE077 M	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 M	mg/kg	0.87	0.12	0.18	0.16	0.22	0.07
Acenaphthylene	CE087 M	mg/kg	<0.01	0.02	<0.01	<0.01	0.16	0.06
Acenaphthene	CE087 M	mg/kg	0.06	0.04	0.01	0.01	1.54	0.32
Fluorene	CE087 U	mg/kg	0.10	0.07	0.05	0.03	1.43	0.28
Phenanthrene	CE087 M	mg/kg	2.40	0.80	0.56	0.34	13.70	3.39
Anthracene	CE087 U	mg/kg	0.26	0.19	<0.02	0.05	2.56	0.59
Fluoranthene	CE087 M	mg/kg	0.41	0.93	0.15	0.07	28.00	7.55
Pyrene	CE087 M	mg/kg	0.36	0.73	0.13	0.06	21.32	5.65
Benzo(a)anthracene	CE087 U	mg/kg	0.17	0.49	0.09	0.03	13.03	3.70
Chrysene	CE087 M	mg/kg	0.39	0.52	0.14	0.07	13.62	3.73
Benzo(b)fluoranthene	CE087 M	mg/kg	0.24	0.83	0.15	0.05	17.94	7.12
Benzo(k)fluoranthene	CE087 M	mg/kg	0.05	0.31	0.04	<0.02	6.65	2.68
Benzo(a)pyrene	CE087 U	mg/kg	0.11	0.61	0.09	0.03	12.97	5.16
Indeno(123cd)pyrene	CE087 M	mg/kg	0.08	0.42	0.07	0.02	11.25	3.96
Dibenz(ah)anthracene	CE087 M	mg/kg	0.05	0.11	<0.02	<0.02	3.02	1.10
Benzo(ghi)perylene	CE087 M	mg/kg	0.15	0.40	0.08	0.04	9.65	3.58
PAH (total of USEPA 16)	CE087	mg/kg	5.69	6.60	1.74	0.95	157	48.9
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Chemtech Environmental Limited

SOILS

Lab number			61281-25	61281-26	61281-27	61281-28	61281-29	61281-30
Sample id			HL/SW/80/1	HL/NE/80/2	HL/SW/80/2	HL/SW/80/3	HL/NW/90/1	NL/SE/90/1
Depth (m)			1.00	2.00	3.00	6.00	1.00	1.00
Date sampled			09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016	09/09/2016
Test	**Method**	**Units**						
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	1	<1	<1	<1	3	1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	4	3	2	<1	69	18
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	2	4	2	1	83	29
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	<1	1	<1	<1	16	6
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	27	5	7	<4	4	<4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	70	15	16	10	21	12
EPH Aliphatic (>C16-C35)	CE068	mg/kg	219	108	63	41	571	373
EPH Aliphatic (>C35-C44)	CE068	mg/kg	31	40	19	12	237	277
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-1L	61281-2L	61281-3L	61281-4L	61281-5L	61281-6L
Sample id			HL/NW/15/1	HL/SE/15/1	HL/SW/15/1	HL/NW/15/2	HL/SE/15/2	HL/SW/15/2
Depth (m)			1.00	1.00	1.00	3.00	4.00	3.00
Test	**Method**	**Units**						
Arsenic (dissolved)	CE128 U	µg/l As	14.70	6.28	14.34	9.80	8.40	5.41
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chromium (dissolved)	CE128 U	µg/l Cr	0.3	0.3	0.4	0.9	0.6	<0.2
Chromium III (dissolved)	-	µg/l CrIII	<10	<10	<10	<10	<10	<10
Chromium VI (dissolved)	CE050 U	µg/l CrVI	<10	<10	<10	<10	<10	<10
Copper (dissolved)	CE128 U	µg/l Cu	1.9	5.6	4.4	2.2	3.0	2.0
Lead (dissolved)	CE128 U	µg/l Pb	0.3	0.6	1.3	0.7	0.6	0.3
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	<0.5	0.8	1.5	0.9	0.8	0.5
Selenium (dissolved)	CE128 U	µg/l Se	0.28	0.20	0.27	0.31	0.11	0.25
Zinc (dissolved)	CE128 U	µg/l Zn	65	62	9	5	38	<1
Chloride	CE049 U	mg/l Cl	1.1	<1	<1	1.1	<1	<1
Fluoride	CE049 U	mg/l F	0.5	0.2	0.2	0.2	0.3	0.2
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20	<20
Phenols (total)	CE148	µg/l PhOH	<10	<10	<10	<10	<10	<10
PAH								
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
TPH								
VPH Aromatic (>EC5-EC7)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-1L	61281-2L	61281-3L	61281-4L	61281-5L	61281-6L
Sample id			HL/NW/15/1	HL/SE/15/1	HL/SW/15/1	HL/NW/15/2	HL/SE/15/2	HL/SW/15/2
Depth (m)			1.00	1.00	1.00	3.00	4.00	3.00
Test	**Method**	**Units**						
VPH Aliphatic (>C5-C6)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C6-C8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-7L	61281-8L	61281-9L	61281-10L	61281-11L	61281-12L
Sample id			HL/NW15/3	HL/SE/15/3	HL/NE/20/1	HL/NE/20/2	HL/NE/20/3	HL/NW/40/1
Depth (m)			6.00	6.00	1.00	3.00	6.00	1.00
Test	**Method**	**Units**						
Arsenic (dissolved)	CE128 U	µg/l As	2.81	5.22	5.35	4.40	2.37	0.75
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chromium (dissolved)	CE128 U	µg/l Cr	<0.2	<0.2	0.5	<0.2	<0.2	<0.2
Chromium III (dissolved)	-	µg/l CrIII	<10	<10	<10	<10	<10	<10
Chromium VI (dissolved)	CE050 U	µg/l CrVI	<10	<10	<10	<10	<10	<10
Copper (dissolved)	CE128 U	µg/l Cu	3.4	3.0	2.3	1.7	4.3	2.4
Lead (dissolved)	CE128 U	µg/l Pb	<0.2	<0.2	0.4	0.3	0.5	<0.2
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Selenium (dissolved)	CE128 U	µg/l Se	0.25	0.10	0.29	0.24	0.22	0.39
Zinc (dissolved)	CE128 U	µg/l Zn	<1	45	14	<1	<1	<1
Chloride	CE049 U	mg/l Cl	1.0	<1	<1	<1	<1	<1
Fluoride	CE049 U	mg/l F	0.2	0.2	0.4	0.2	0.1	<0.1
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20	<20
Phenols (total)	CE148	µg/l PhOH	<10	<10	<10	<10	<10	<10
PAH								
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
TPH								
VPH Aromatic (>EC5-EC7)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-7L	61281-8L	61281-9L	61281-10L	61281-11L	61281-12L
Sample id			HL/NW15/3	HL/SE/15/3	HL/NE/20/1	HL/NE/20/2	HL/NE/20/3	HL/NW/40/1
Depth (m)			6.00	6.00	1.00	3.00	6.00	1.00
Test	**Method**	**Units**						
VPH Aliphatic (>C5-C6)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C6-C8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-13L	61281-14L	61281-15L	61281-16L	61281-17L	61281-18L
Sample id			HL/SE/40/1	HL/NW/40/2	HL/SE/40/2	HL/NE/50/1	HL/SW/50/1	HL/NE/50/2
Depth (m)			1.00	4.00	4.00	1.00	1.00	3.00
Test	**Method**	**Units**						
Arsenic (dissolved)	CE128 U	µg/l As	0.16	4.10	0.78	0.07	3.25	2.79
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chromium (dissolved)	CE128 U	µg/l Cr	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium III (dissolved)	-	µg/l CrIII	<10	<10	<10	<10	<10	<10
Chromium VI (dissolved)	CE050 U	µg/l CrVI	<10	<10	<10	<10	<10	<10
Copper (dissolved)	CE128 U	µg/l Cu	0.5	3.1	2.5	1.1	2.1	2.8
Lead (dissolved)	CE128 U	µg/l Pb	<0.2	0.5	<0.2	<0.2	<0.2	0.2
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	0.011	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	<0.5	<0.5	<0.5	<0.5	<0.5	0.8
Selenium (dissolved)	CE128 U	µg/l Se	0.13	0.47	0.19	0.73	0.46	0.31
Zinc (dissolved)	CE128 U	µg/l Zn	<1	<1	<1	<1	<1	<1
Chloride	CE049 U	mg/l Cl	<1	<1	<1	<1	<1	<1
Fluoride	CE049 U	mg/l F	0.5	0.1	0.4	0.1	0.3	0.1
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	24	<20	<20
Phenols (total)	CE148	µg/l PhOH	<10	<10	<10	<10	<10	<10
PAH								
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
TPH								
VPH Aromatic (>EC5-EC7)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-13L	61281-14L	61281-15L	61281-16L	61281-17L	61281-18L
Sample id			HL/SE/40/1	HL/NW/40/2	HL/SE/40/2	HL/NE/50/1	HL/SW/50/1	HL/NE/50/2
Depth (m)			1.00	4.00	4.00	1.00	1.00	3.00
Test	**Method**	**Units**						
VPH Aliphatic (>C5-C6)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C6-C8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-19L	61281-20L	61281-21L	61281-22L	61281-23L	61281-24L
Sample id			HL/SW/50/2	HL/NW/65/1	HL/SE/65/1	HL/NW/65/2	HL/SE/65/2	HL/NE/80/1
Depth (m)			3.00	1.00	1.00	3.00	2.00	1.00
Test	**Method**	**Units**						
Arsenic (dissolved)	CE128 U	µg/l As	5.46	0.92	1.33	0.67	0.42	4.48
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chromium (dissolved)	CE128 U	µg/l Cr	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium III (dissolved)	-	µg/l CrIII	<10	<10	<10	<10	<10	<10
Chromium VI (dissolved)	CE050 U	µg/l CrVI	<10	<10	<10	<10	<10	<10
Copper (dissolved)	CE128 U	µg/l Cu	2.4	2.7	2.1	2.9	1.3	2.4
Lead (dissolved)	CE128 U	µg/l Pb	0.3	<0.2	<0.2	<0.2	<0.2	<0.2
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	0.9	0.6	<0.5	<0.5	<0.5	0.6
Selenium (dissolved)	CE128 U	µg/l Se	0.51	0.17	0.20	0.19	0.16	0.41
Zinc (dissolved)	CE128 U	µg/l Zn	<1	12	<1	<1	<1	<1
Chloride	CE049 U	mg/l Cl	<1	<1	<1	1.3	<1	<1
Fluoride	CE049 U	mg/l F	0.1	0.2	0.3	0.2	0.2	0.2
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20	<20
Phenols (total)	CE148	µg/l PhOH	<10	<10	<10	<10	<10	<10
PAH								
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
TPH								
VPH Aromatic (>EC5-EC7)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-19L	61281-20L	61281-21L	61281-22L	61281-23L	61281-24L
Sample id			HL/SW/50/2	HL/NW/65/1	HL/SE/65/1	HL/NW/65/2	HL/SE/65/2	HL/NE/80/1
Depth (m)			3.00	1.00	1.00	3.00	2.00	1.00
Test	**Method**	**Units**						
VPH Aliphatic (>C5-C6)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C6-C8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-25L	61281-26L	61281-27L	61281-28L	61281-29L	61281-30L
Sample id			HL/SW/80/1	HL/NE/80/2	HL/SW/80/2	HL/SW/80/3	HL/NW/90/1	NL/SE/90/1
Depth (m)			1.00	2.00	3.00	6.00	1.00	1.00
Test	**Method**	**Units**						
Arsenic (dissolved)	CE128 U	µg/l As	5.66	4.06	2.71	1.46	3.85	5.26
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chromium (dissolved)	CE128 U	µg/l Cr	0.4	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium III (dissolved)	-	µg/l CrIII	<10	<10	<10	<10	<10	<10
Chromium VI (dissolved)	CE050 U	µg/l CrVI	<10	<10	<10	<10	<10	<10
Copper (dissolved)	CE128 U	µg/l Cu	3.3	6.8	3.7	1.8	4.4	6.3
Lead (dissolved)	CE128 U	µg/l Pb	0.7	0.5	0.2	<0.2	<0.2	0.4
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	1.2	1.4	0.7	<0.5	0.7	<0.5
Selenium (dissolved)	CE128 U	µg/l Se	0.51	0.28	0.34	0.26	0.48	0.21
Zinc (dissolved)	CE128 U	µg/l Zn	<1	<1	<1	<1	<1	<1
Chloride	CE049 U	mg/l Cl	<1	<1	<1	<1	1.3	<1
Fluoride	CE049 U	mg/l F	0.3	0.3	0.2	<0.1	0.3	0.1
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20	<20
Phenols (total)	CE148	µg/l PhOH	<10	<10	<10	<10	<10	<10
PAH								
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	0.2	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	0.7	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	0.6	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	0.4	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	0.4	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	0.5	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	0.2	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	0.3	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	3.1	<1.6
TPH								
VPH Aromatic (>EC5-EC7)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

PREPARED LEACHATES

Lab number			61281-25L	61281-26L	61281-27L	61281-28L	61281-29L	61281-30L
Sample id			HL/SW/80/1	HL/NE/80/2	HL/SW/80/2	HL/SW/80/3	HL/NW/90/1	NL/SE/90/1
Depth (m)			1.00	2.00	3.00	6.00	1.00	1.00
Test	**Method**	**Units**						
VPH Aliphatic (>C5-C6)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C6-C8)	CE067	µg/l	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE067	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	<1	<1	1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	<1	<1	<1	4	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1	<1	<1	<1

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Antimony (total)	Aqua regia digest, ICP-MS	Dry	U	0.2	mg/kg Sb
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Beryllium (total)	Aqua regia digest, ICP-MS	Dry	U	1	mg/kg Be
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry	M	0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
-	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Manganese (total)	Aqua regia digest, ICP-MS	Dry		1	mg/kg Mn
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Molybdenum (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Mo
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	Wet	M	-	units
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	Wet	M	1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	Wet		0.5	mg/kg PhOH
CE087	Naphthalene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	Wet	U	0.01	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	Wet	M	0.01	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	Wet	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	Wet	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	Wet		0.27	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	Wet		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	Wet		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	Wet		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	Wet		1	mg/kg

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	Wet		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	Wet		10	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

METHOD DETAILS

METHOD	PREPARED LEACHATES	METHOD SUMMARY	STATUS	LOD	UNITS
CE001	Leachate preparation (10:1 single-stage)	BS12457-2		-	-
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Cadmium (dissolved)	ICP-MS	U	0.07	µg/l Cd
CE128	Chromium (dissolved)	ICP-MS	U	0.2	µg/l Cr
-	Chromium III (dissolved)	Calculation: Cr (total) - Cr (VI)		10	µg/l CrIII
CE050	Chromium VI (dissolved)	Colorimetry	U	10	µg/l CrVI
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb
CE128	Mercury (dissolved)	ICP-MS	U	0.008	µg/l Hg
CE128	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
CE128	Selenium (dissolved)	ICP-MS	U	0.07	µg/l Se
CE128	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
CE049	Chloride	Ion Chromatography	U	1	mg/l Cl
CE049	Fluoride	Ion Chromatography	U	0.2	mg/l F
CE147	Cyanide (total)	Continuous Flow Colorimetry		20	µg/l CN
CE148	Phenols (total)	Continuous Flow Colorimetry		10	µg/l PhOH
CE051	PAH (speciated)	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID		1	µg/l
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID		1	µg/l
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID		1	µg/l
CE161	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID		1	µg/l
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID		1	µg/l
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID		1	µg/l
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID		1	µg/l
CE161	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID		1	µg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
IT	Sample not cooled
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
61281-1	HL/NW/15/1	1.00	N	
61281-2	HL/SE/15/1	1.00	N	
61281-3	HL/SW/15/1	1.00	N	
61281-4	HL/NW/15/2	3.00	N	
61281-5	HL/SE/15/2	4.00	N	
61281-6	HL/SW/15/2	3.00	N	
61281-7	HL/NW15/3	6.00	N	
61281-8	HL/SE/15/3	6.00	N	
61281-9	HL/NE/20/1	1.00	N	
61281-10	HL/NE/20/2	3.00	N	
61281-11	HL/NE/20/3	6.00	N	
61281-12	HL/NW/40/1	1.00	N	
61281-13	HL/SE/40/1	1.00	N	
61281-14	HL/NW/40/2	4.00	N	
61281-15	HL/SE/40/2	4.00	N	
61281-16	HL/NE/50/1	1.00	N	
61281-17	HL/SW/50/1	1.00	N	
61281-18	HL/NE/50/2	3.00	N	
61281-19	HL/SW/50/2	3.00	N	
61281-20	HL/NW/65/1	1.00	N	
61281-21	HL/SE/65/1	1.00	N	
61281-22	HL/NW/65/2	3.00	N	
61281-23	HL/SE/65/2	2.00	N	
61281-24	HL/NE/80/1	1.00	N	
61281-25	HL/SW/80/1	1.00	N	
61281-26	HL/NE/80/2	2.00	N	
61281-27	HL/SW/80/2	3.00	N	
61281-28	HL/SW/80/3	6.00	N	
61281-29	HL/NW/90/1	1.00	N	

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
IT	Sample not cooled
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
61281-30	NL/SE/90/1	1.00	N	

Annex E
Terra Firma Stockpile and Hawes Lane and Green Lane Source Soil and Leachate Test Results

Certificate of Analysis

Certificate Number 16-80775-1

25-Oct-16

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 16-80775-1

Client Reference 12032/GLHL

Order No 12032/GLHL

Contract Title H.Rd (Herbert Road)

Description 14 Soil samples, 14 Leachate samples.

Date Received 10-Oct-16

Date Started 10-Oct-16

Date Completed 25-Oct-16

Test Procedures Identified by prefix DETSn (details on request).

Notes **This report supersedes 16-80775. Extra testing**

Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

Sample ID	Lab No	Completed	Matrix Description
SP S1	1064955	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S2	1064956	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S3	1064957	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S4	1064958	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S5	1064959	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S6	1064960	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S7	1064961	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S8	1064962	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S9	1064963	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S10	1064964	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S11	1064965	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S12	1064966	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S13	1064967	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S14	1064968	18/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)

Summary of Chemical Analysis
Soil Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064955	1064956	1064957	1064958	1064959	1064960
			Sample ID	SP S1	SP S2	SP S3	SP S4	SP S5	SP S6
			Depth						
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification	DETSC 1102	0							
Preparation									
Moisture Content	DETSC 1004*	0.1	%	9.7	8.2	8.3	13	11	7.9
Metals									
Antimony	DETSC 2301*	1	mg/kg	2.6	1.7	1.5	1.7	1.3	1.6
Arsenic	DETSC 2301#	0.2	mg/kg	14	11	8.1	14	19	12
Beryllium	DETSC 2301#	0.2	mg/kg	1.0	1.1	0.7	1.2	1.2	1.2
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	0.8	0.8	0.9	1.5	1.2	1.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.2	0.1	0.1	< 0.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg	13	15	15	16	19	19
Chromium III	DETSC 2301*	0.15	mg/kg	13	15	15	16	19	19
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	42	47	37	47	39	34
Lead	DETSC 2301#	0.3	mg/kg	38	33	20	22	28	22
Manganese	DETSC 2301#	20	mg/kg	520	790	430	730	300	1500
Mercury	DETSC 2325#	0.05	mg/kg	0.12	0.06	0.14	0.05	< 0.05	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	2.4	2.1	1.1	2.4	3.2	2.3
Nickel	DETSC 2301#	1	mg/kg	26	33	24	28	25	24
Selenium	DETSC 2301#	0.5	mg/kg	1.2	1.1	0.6	1.1	0.6	0.7
Zinc	DETSC 2301#	1	mg/kg	63	120	53	45	33	180
Inorganics									
pH	DETSC 2008#			8.4	8.0	8.1	8.3	8.5	9.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.2	0.1	< 0.1	< 0.1	0.1
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	14	8.4	8.7	6.9	1.8	7.6
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.13	0.08	0.10	0.23	0.27	0.15
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	11	1.7	1.7	< 0.6	< 0.6	< 0.6

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064955	1064956	1064957	1064958	1064959	1064960
			Sample ID	SP S1	SP S2	SP S3	SP S4	SP S5	SP S6
			Depth						
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	41	3.7	4.8	< 1.4	< 1.4	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	51	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	51	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.36	0.19	0.14	0.09	0.06	0.32
Anthracene	DETSC 3303	0.03	mg/kg	0.09	0.06	< 0.03	< 0.03	< 0.03	0.13
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.72	0.33	0.22	0.08	0.09	0.74
Pyrene	DETSC 3303#	0.03	mg/kg	0.61	0.31	0.19	0.08	0.08	0.70
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.35	0.17	0.11	0.04	0.06	0.50
Chrysene	DETSC 3303	0.03	mg/kg	0.42	0.19	0.13	0.07	0.07	0.55
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.52	0.22	0.14	0.08	0.09	0.73
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.16	0.08	0.05	< 0.03	0.03	0.26
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.31	0.13	0.08	0.04	0.05	0.43
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.20	0.10	0.07	0.04	0.05	0.25
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	< 0.03	< 0.03	< 0.03	0.08
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.23	0.12	< 0.03	0.04	0.06	0.27
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	4.2	1.9	1.1	0.57	0.62	5.0
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064961	1064962	1064963	1064964	1064965	1064966
			Sample ID	SP S7	SP S8	SP S9	SP S10	SP S11	SP S12
			Depth						
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification	DETSC 1102	0		Y					
Preparation									
Moisture Content	DETSC 1004*	0.1	%	8.6	11	9.3	8.8	32	11
Metals									
Antimony	DETSC 2301*	1	mg/kg	< 1.0	16	3.2	2.3	2.6	2.1
Arsenic	DETSC 2301#	0.2	mg/kg	10	26	35	17	20	13
Beryllium	DETSC 2301#	0.2	mg/kg	1.0	1.8	2.0	1.7	1.1	1.2
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	1.1	1.5	1.7	1.1	1.0	1.1
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.6	0.7	0.2	0.2	0.1
Chromium	DETSC 2301#	0.15	mg/kg	9.2	18	19	26	17	20
Chromium III	DETSC 2301*	0.15	mg/kg	9.2	18	19	26	17	20
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	41	120	90	49	61	47
Lead	DETSC 2301#	0.3	mg/kg	34	1700	110	66	73	42
Manganese	DETSC 2301#	20	mg/kg	300	430	440	750	710	990
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.06	0.07	< 0.05	0.52	0.08
Molybdenum	DETSC 2301#	0.4	mg/kg	2.6	6.2	6.9	3.6	3.0	2.9
Nickel	DETSC 2301#	1	mg/kg	29	44	49	40	28	29
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	1.4	0.6	1.1	0.9	< 0.5
Zinc	DETSC 2301#	1	mg/kg	110	1400	94	130	150	240
Inorganics									
pH	DETSC 2008#			8.1	7.9	8.1	8.3	8.2	7.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.1	0.1	0.2	0.2	0.2
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	8.7	15	9.4	7.7	12	9.6
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.09	0.16	0.28	0.07	0.16	0.12
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	25	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	19	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	25	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	1.6	1.2

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064961	1064962	1064963	1064964	1064965	1064966
			Sample ID	SP S7	SP S8	SP S9	SP S10	SP S11	SP S12
			Depth						
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	6.4	4.1
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	< 10	25	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	0.05	< 0.03	0.04	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.03	< 0.03	0.04	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.13	0.21	0.22	0.18	0.44	0.17
Anthracene	DETSC 3303	0.03	mg/kg	0.09	0.07	0.03	0.05	0.11	0.05
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.39	0.48	0.20	0.30	0.88	0.35
Pyrene	DETSC 3303#	0.03	mg/kg	0.55	0.42	0.20	0.28	0.75	0.30
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.22	0.21	0.10	0.16	0.44	0.16
Chrysene	DETSC 3303	0.03	mg/kg	0.23	0.22	0.12	0.17	0.49	0.19
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.43	0.22	0.13	0.21	0.59	0.24
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.15	0.08	0.04	0.08	0.21	0.08
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.26	0.14	0.08	0.14	0.37	0.15
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.18	0.09	0.05	0.10	0.21	0.09
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03	0.07	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.22	0.10	0.05	0.12	0.25	0.11
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	2.9	2.3	1.3	1.8	5.0	1.9
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.7	0.5	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064967	1064968
			Sample ID	SP S13	SP S14
			Depth		
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	06/10/16	06/10/16
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Asbestos Quantification	DETSC 1102	0			
Preparation					
Moisture Content	DETSC 1004*	0.1	%	9.1	10
Metals					
Antimony	DETSC 2301*	1	mg/kg	2.6	1.5
Arsenic	DETSC 2301#	0.2	mg/kg	16	9.6
Beryllium	DETSC 2301#	0.2	mg/kg	1.1	0.8
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	1.0	1.0
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg	15	16
Chromium III	DETSC 2301*	0.15	mg/kg	15	16
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	49	30
Lead	DETSC 2301#	0.3	mg/kg	46	23
Manganese	DETSC 2301#	20	mg/kg	660	500
Mercury	DETSC 2325#	0.05	mg/kg	0.09	0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	2.7	2.0
Nickel	DETSC 2301#	1	mg/kg	30	24
Selenium	DETSC 2301#	0.5	mg/kg	1.7	< 0.5
Zinc	DETSC 2301#	1	mg/kg	110	78
Inorganics					
pH	DETSC 2008#			8.1	7.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2	0.2
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	< 0.2	0.2
Organic matter	DETSC 2002#	0.1	%	7.9	4.6
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.17	0.13
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	1.3	3.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064967	1064968
			Sample ID	SP S13	SP S14
			Depth		
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	06/10/16	06/10/16
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	3.4	9.2
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	12
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	< 10	12
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.32	0.25
Anthracene	DETSC 3303	0.03	mg/kg	0.07	0.07
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.55	0.51
Pyrene	DETSC 3303#	0.03	mg/kg	0.47	0.45
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.21	0.25
Chrysene	DETSC 3303	0.03	mg/kg	0.24	0.30
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.30	0.37
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.09	0.12
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.16	0.21
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.11	0.14
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.12	0.16
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	2.7	2.9
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064969	1064970	1064971	1064972	1064973	1064974
			Sample ID	SP S1	SP S2	SP S3	SP S4	SP S5	SP S6
			Depth						
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.3	2.1	0.61	3.3	4.8	2.9
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.28	0.39	< 0.25	0.31	0.56	0.36
Chromium III, Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.0	1.3	0.7	0.6	0.7	0.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.66	0.69	0.34	0.43	0.47	0.48
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.6	0.7	< 0.5	0.5	0.7	0.6
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.76	0.57	1.2	0.74	0.68	0.75
Zinc, Dissolved	DETSC 2306	1.3	ug/l	7.0	4.3	1.9	< 1.3	6.8	2.8
Inorganics									
pH	DETSC 2008			7.2	6.9	7.0	7.4	7.2	7.5
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.2	1.1	4.2	1.5	1.3	1.3
Fluoride	DETSC 2055	0.1	mg/l	0.83	0.82	0.94	0.89	0.89	0.98
Sulphate as SO4	DETSC 2055	0.1	mg/l	3.8	2.4	16	3.4	2.4	7.3
Total Organic Carbon	DETSC 2085	1	mg/l	2.4	6.0	4.0	2.2	1.6	5.7
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	1.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	2.7	3.3	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	1.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.09	0.09	0.11	0.06	0.07	0.07
Acenaphthylene	DETSC 3304	0.01	ug/l	0.02	0.03	0.02	< 0.01	0.02	0.02

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064969	1064970	1064971	1064972	1064973	1064974
			Sample ID	SP S1	SP S2	SP S3	SP S4	SP S5	SP S6
			Depth						
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.06	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.06	0.03	0.07	< 0.01	0.02	0.03
Phenanthrene	DETSC 3304	0.01	ug/l	0.28	0.26	0.32	0.10	0.18	0.15
Anthracene	DETSC 3304	0.01	ug/l	0.05	0.05	0.04	0.02	0.03	0.04
Fluoranthene	DETSC 3304	0.01	ug/l	0.29	0.25	0.25	0.07	0.13	0.27
Pyrene	DETSC 3304	0.01	ug/l	0.22	0.24	0.18	0.06	0.11	0.26
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.12	0.15	0.11	0.02	0.06	0.17
Chrysene	DETSC 3304	0.01	ug/l	0.24	0.26	0.23	0.05	0.14	0.32
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.29	0.33	0.24	< 0.01	0.25	0.48
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.09	0.12	0.07	< 0.01	0.06	0.16
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.16	0.17	0.12	< 0.01	0.06	0.28
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.16	0.38	0.15	< 0.01	0.17	0.30
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.21	0.41	0.15	< 0.01	0.17	0.36
PAH Total	DETSC 3304	0.04	ug/l	2.3	2.8	2.1	0.37	1.5	2.9
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064975	1064976	1064977	1064978	1064979	1064980
			Sample ID	SP S7	SP S8	SP S9	SP S10	SP S11	SP S12
			Depth						
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
NRA Leachate Preparation	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.9	2.8	3.3	2.1	1.4	1.6
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.32	< 0.25	< 0.25	0.28	< 0.25	< 0.25
Chromium III, Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.2	1.6	1.0	1.0	1.7	1.2
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.65	2.9	1.4	0.69	0.93	0.56
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.6	< 0.5	< 0.5	< 0.5	0.5	0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.82	1.5	2.1	0.39	1.8	0.66
Zinc, Dissolved	DETSC 2306	1.3	ug/l	9.2	6.1	1.7	3.4	3.0	5.3
Inorganics									
pH	DETSC 2008			7.2	7.2	7.2	7.0	7.2	7.2
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	3.5	2.7	6.1	1.1	2.0	2.2
Fluoride	DETSC 2055	0.1	mg/l	0.88	0.88	0.97	0.95	0.91	0.92
Sulphate as SO4	DETSC 2055	0.1	mg/l	7.4	14	20	2.3	15	9.9
Total Organic Carbon	DETSC 2085	1	mg/l	3.7	1.9	3.8	4.0	5.9	5.8
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.8
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.09	0.05	0.06	0.10	0.15	0.08
Acenaphthylene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	0.03	0.05	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064975	1064976	1064977	1064978	1064979	1064980
			Sample ID	SP S7	SP S8	SP S9	SP S10	SP S11	SP S12
			Depth						
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16	06/10/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.04	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.05	< 0.01	0.07	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.21	0.09	0.15	0.29	0.56	0.22
Anthracene	DETSC 3304	0.01	ug/l	0.04	0.01	0.02	0.05	0.11	0.04
Fluoranthene	DETSC 3304	0.01	ug/l	0.33	0.07	0.07	0.33	0.68	0.23
Pyrene	DETSC 3304	0.01	ug/l	0.33	0.05	0.06	0.26	0.55	0.19
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.16	0.02	0.03	0.16	0.36	0.12
Chrysene	DETSC 3304	0.01	ug/l	0.30	0.04	0.06	0.28	0.67	0.23
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.43	< 0.01	< 0.01	0.30	0.75	0.27
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.16	< 0.01	< 0.01	0.13	0.26	0.12
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.23	< 0.01	< 0.01	0.16	0.40	0.11
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.34	0.02	< 0.01	0.29	0.38	0.19
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.43	0.06	< 0.01	0.35	0.47	0.20
PAH Total	DETSC 3304	0.04	ug/l	3.1	0.41	0.53	2.8	5.5	2.0
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064981	1064982
			Sample ID	SP S13	SP S14
			Depth		
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	06/10/16	06/10/16
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
NRA Leachate Preparation	DETS 036*			Y	Y
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.6	1.6
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.29	0.32
Chromium III, Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.1	1.0
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.69	0.57
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.67	0.75
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.4	2.3
Inorganics					
pH	DETSC 2008			7.5	7.3
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.6	2.0
Fluoride	DETSC 2055	0.1	mg/l	1.1	0.92
Sulphate as SO4	DETSC 2055	0.1	mg/l	7.6	9.4
Total Organic Carbon	DETSC 2085	1	mg/l	6.1	3.0
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	4.1	2.6
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10
PAHs					
Naphthalene	DETSC 3304	0.01	ug/l	0.22	0.12
Acenaphthylene	DETSC 3304	0.01	ug/l	0.09	0.05

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

			Lab No	1064981	1064982
			Sample ID	SP S13	SP S14
			Depth		
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	06/10/16	06/10/16
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	0.21
Fluorene	DETSC 3304	0.01	ug/l	0.10	0.17
Phenanthrene	DETSC 3304	0.01	ug/l	0.85	2.2
Anthracene	DETSC 3304	0.01	ug/l	0.19	0.75
Fluoranthene	DETSC 3304	0.01	ug/l	1.1	3.4
Pyrene	DETSC 3304	0.01	ug/l	1.0	3.6
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.62	0.95
Chrysene	DETSC 3304	0.01	ug/l	0.97	2.4
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	1.0	2.6
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.42	0.43
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.60	0.98
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.89	0.75
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.29	0.13
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.99	0.84
PAH Total	DETSC 3304	0.04	ug/l	9.4	19
Phenols					
Phenol	*	0.5	ug/l	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1064955	SP S1	SOIL	NAD	none	Steven Lambert
1064956	SP S2	SOIL	NAD	none	Steven Lambert
1064957	SP S3	SOIL	NAD	none	Steven Lambert
1064958	SP S4	SOIL	NAD	none	Steven Lambert
1064959	SP S5	SOIL	NAD	none	Steven Lambert
1064960	SP S6	SOIL	NAD	none	Steven Lambert
1064961	SP S7	SOIL	Chrysotile	Chrysotile present in loose bundle	Steven Lambert
1064962	SP S8	SOIL	NAD	none	Steven Lambert
1064963	SP S9	SOIL	NAD	none	Steven Lambert
1064964	SP S10	SOIL	NAD	none	Steven Lambert
1064965	SP S11	SOIL	NAD	none	Steven Lambert
1064966	SP S12	SOIL	NAD	none	Steven Lambert
1064967	SP S13	SOIL	NAD	none	Steven Lambert
1064968	SP S14	SOIL	NAD	none	Steven Lambert

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract Title H.Rd (Herbert Road)

		Lab No	1064961
		Sample ID	SP S7
		Depth	
		Other ID	
		Sample Type	SOIL
		Sampling Date	06/10/16
		Sampling Time	
Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	1009.10
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	<0.001
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 16-80775-1
Client Ref 12032/GLHL
Contract H.Rd (Herbert Road)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1064955	SP S1 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064956	SP S2 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064957	SP S3 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064958	SP S4 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064959	SP S5 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064960	SP S6 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064961	SP S7 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064962	SP S8 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064963	SP S9 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064964	SP S10 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064965	SP S11 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064966	SP S12 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064967	SP S13 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064968	SP S14 SOIL	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064969	SP S1 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064970	SP S2 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064971	SP S3 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064972	SP S4 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064973	SP S5 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064974	SP S6 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064975	SP S7 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064976	SP S8 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064977	SP S9 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064978	SP S10 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064979	SP S11 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064980	SP S12 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064981	SP S13 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1064982	SP S14 LEACHATE	06/10/16	GJ 250ml x2, GV x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar V-Vial T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 16-81431

25-Oct-16

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 16-81431

Client Reference 12032

Order No (not supplied)

Contract Title H.Rd (Herbert Road)

Description 8 Soil samples, 8 Leachate samples.

Date Received 18-Oct-16

Date Started 18-Oct-16

Date Completed 25-Oct-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

Sample ID	Lab No	Completed	Matrix Description
SP S16	1069409	25/10/2016	Brown gravelly, sandy CLAY
SP S17	1069410	25/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S18	1069411	25/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S19	1069412	25/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S20	1069413	25/10/2016	Brown gravelly, sandy CLAY (Made ground - brick)
SP S21	1069414	25/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S22	1069415	25/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)
SP S23	1069416	25/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick)

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

			Lab No	1069409	1069410	1069411	1069412	1069413	1069414
			Sample ID	SP S16	SP S17	SP S18	SP S19	SP S20	SP S21
			Depth						
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	30/09/16	30/09/16	30/09/16	30/09/16	30/09/16	30/09/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
Moisture Content	DETSC 1004*	0.1	%	9.6	14	9.9	8.2	7.3	11
Metals									
Antimony	DETSC 2301*	1	mg/kg	1.3	1.9	< 1.0	1.3	1.2	1.6
Arsenic	DETSC 2301#	0.2	mg/kg	3.4	19	4.8	13	5.6	18
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	1.1	0.6	1.4	0.8	1.6
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	< 0.2	0.8	1.2	1.7	< 0.2	1.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	1.1	0.2	0.7	0.1	0.3
Chromium	DETSC 2301#	0.15	mg/kg	29	17	7.9	15	25	17
Chromium III	DETSC 2301*	0.15	mg/kg	29	17	7.9	15	25	17
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	11	48	31	52	19	71
Lead	DETSC 2301#	0.3	mg/kg	11	40	38	26	13	280
Manganese	DETSC 2301#	20	mg/kg	1000	430	540	380	670	410
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.06	0.06	< 0.05	< 0.05	0.09
Molybdenum	DETSC 2301#	0.4	mg/kg	< 0.4	3.7	0.7	2.8	0.8	3.6
Nickel	DETSC 2301#	1	mg/kg	33	27	12	37	35	43
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	0.8	0.9	< 0.5	< 0.5	0.8
Zinc	DETSC 2301#	1	mg/kg	50	2000	70	560	74	150
Inorganics									
pH	DETSC 2008#			7.8	8.1	8.2	8.6	7.7	7.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	0.4	6.0	5.9	6.3	1.6	8.3
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.16	0.21	0.16	0.15	0.10	0.38
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	3.1	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	65	< 3.4	8.9	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	21	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	68	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	3.3	5.1	1.9	2.2	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	22	150	33	30	< 1.4	< 1.4

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

			Lab No	1069409	1069410	1069411	1069412	1069413	1069414
			Sample ID	SP S16	SP S17	SP S18	SP S19	SP S20	SP S21
			Depth						
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	30/09/16	30/09/16	30/09/16	30/09/16	30/09/16	30/09/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	44	9.9	7.3	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	26	160	35	32	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	26	220	35	41	< 10	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.25	0.13	0.14	0.09	0.04	0.12
Anthracene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.59	0.34	0.36	0.13	0.06	0.16
Pyrene	DETSC 3303#	0.03	mg/kg	0.50	0.34	0.33	0.13	0.06	0.15
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.34	0.19	0.17	0.08	0.03	0.10
Chrysene	DETSC 3303	0.03	mg/kg	0.39	0.30	0.23	0.13	0.04	0.12
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.40	0.39	0.29	0.12	0.06	0.13
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.12	0.09	0.04	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.21	0.23	0.16	0.08	0.03	0.08
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.13	0.15	0.11	0.06	< 0.03	0.05
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.04	0.04	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.12	0.20	0.12	0.06	< 0.03	0.07
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	3.2	2.4	2.0	0.91	0.32	1.0
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

			Lab No	1069415	1069416
			Sample ID	SP S22	SP S23
			Depth		
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	30/09/16	30/09/16
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
Moisture Content	DETSC 1004*	0.1	%	7.6	10
Metals					
Antimony	DETSC 2301*	1	mg/kg	< 1.0	1.6
Arsenic	DETSC 2301#	0.2	mg/kg	5.7	14
Beryllium	DETSC 2301#	0.2	mg/kg	1.1	0.9
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	2.4	1.2
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.4
Chromium	DETSC 2301#	0.15	mg/kg	8.4	13
Chromium III	DETSC 2301*	0.15	mg/kg	8.4	13
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	36	46
Lead	DETSC 2301#	0.3	mg/kg	22	20
Manganese	DETSC 2301#	20	mg/kg	460	350
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	1.2	7.0
Nickel	DETSC 2301#	1	mg/kg	19	30
Selenium	DETSC 2301#	0.5	mg/kg	0.6	0.7
Zinc	DETSC 2301#	1	mg/kg	49	510
Inorganics					
pH	DETSC 2008#			8.4	8.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	9.5	5.4
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.16	0.18
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	4.0
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	33
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	7.1
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	37
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

			Lab No	1069415	1069416
			Sample ID	SP S22	SP S23
			Depth		
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	30/09/16	30/09/16
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	< 10	37
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.19
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.04
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.16	0.72
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.09
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	0.46
Pyrene	DETSC 3303#	0.03	mg/kg	0.04	0.44
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.21
Chrysene	DETSC 3303	0.03	mg/kg	0.08	0.33
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.31
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.10
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.19
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.20
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.30	3.4
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

			Lab No	1069417	1069418	1069419	1069420	1069421	1069422
			Sample ID	SP S16	SP S17	SP S18	SP S19	SP S20	SP S21
			Depth						
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	30/09/16	30/09/16	30/09/16	30/09/16	30/09/16	30/09/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Preparation									
Leachate 10:1	DETS 036*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	< 0.16	< 0.16	< 0.16	9.2	1.2	5.3
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	0.41	< 0.25	< 0.25
Chromium III, Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	< 0.4	0.6	0.7	< 0.4	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.15	0.25	0.72	0.14	0.49
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.39	1.1	3.5	1.9	2.1
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	8.1	< 1.3	7.7	< 1.3	3.2
Inorganics									
pH	DETSC 2008			7.1	7.0	7.0	6.8	6.6	6.8
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.3	2.0	2.1	1.7	1.1	1.1
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	3.3	11	27	9.9	5.8	39
Total Organic Carbon	DETSC 2085	1	mg/l	1.9	3.1	10	4.3	2.0	1.2
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	2.6	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3304	0.01	ug/l	0.03	0.03	0.14	0.06	0.03	0.03
Acenaphthylene	DETSC 3304	0.01	ug/l	0.01	0.01	0.02	< 0.01	< 0.01	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

			Lab No	1069417	1069418	1069419	1069420	1069421	1069422
			Sample ID	SP S16	SP S17	SP S18	SP S19	SP S20	SP S21
			Depth						
			Other ID						
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	30/09/16	30/09/16	30/09/16	30/09/16	30/09/16	30/09/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Acenaphthene	DETSC 3304	0.01	ug/l	0.03	0.01	0.07	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.02	< 0.01	0.09	0.03	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.04	0.10	0.49	0.19	0.06	0.05
Anthracene	DETSC 3304	0.01	ug/l	0.02	0.02	0.08	0.02	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.11	0.09	0.31	0.10	0.04	0.04
Pyrene	DETSC 3304	0.01	ug/l	0.10	0.08	0.25	0.09	0.04	0.03
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.09	0.05	0.13	0.03	0.02	0.02
Chrysene	DETSC 3304	0.01	ug/l	0.18	0.14	0.40	0.13	0.06	0.04
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.27	0.27	0.38	0.11	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.09	0.13	0.05	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.18	0.21	0.21	0.09	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.17	0.27	0.25	0.12	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.05	0.11	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.17	0.42	0.34	0.19	< 0.01	< 0.01
PAH Total	DETSC 3304	0.04	ug/l	1.5	1.9	3.3	1.2	0.24	0.21
Phenols									
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

			Lab No	1069423	1069424
			Sample ID	SP S22	SP S23
			Depth		
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	30/09/16	30/09/16
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
Leachate 10:1	DETS 036*			Y	Y
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.86	1.8
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25
Chromium III, Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	0.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.30	0.26
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	2.6	1.4
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	5.0
Inorganics					
pH	DETSC 2008			6.7	6.8
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.4	1.7
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	9.7	16
Total Organic Carbon	DETSC 2085	1	mg/l	12	1.9
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10
PAHs					
Naphthalene	DETSC 3304	0.01	ug/l	0.16	0.04
Acenaphthylene	DETSC 3304	0.01	ug/l	0.02	< 0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

			Lab No	1069423	1069424
			Sample ID	SP S22	SP S23
			Depth		
			Other ID		
			Sample Type	LEACHATE	LEACHATE
			Sampling Date	30/09/16	30/09/16
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Acenaphthene	DETSC 3304	0.01	ug/l	0.06	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.09	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.56	0.09
Anthracene	DETSC 3304	0.01	ug/l	0.04	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.16	0.07
Pyrene	DETSC 3304	0.01	ug/l	0.14	0.06
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.06	0.04
Chrysene	DETSC 3304	0.01	ug/l	0.33	0.09
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.15	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.03	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.35	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.08	0.08
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.19	0.07
PAH Total	DETSC 3304	0.04	ug/l	2.4	0.53
Phenols					
Phenol	*	0.5	ug/l	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 16-81431
Client Ref 12032
Contract Title H.Rd (Herbert Road)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1069409	SP S16	SOIL	NAD	none	Andrew Little
1069410	SP S17	SOIL	NAD	none	Andrew Little
1069411	SP S18	SOIL	NAD	none	Andrew Little
1069412	SP S19	SOIL	NAD	none	Andrew Little
1069413	SP S20	SOIL	NAD	none	Andrew Little
1069414	SP S21	SOIL	NAD	none	Andrew Little
1069415	SP S22	SOIL	NAD	none	Andrew Little
1069416	SP S23	SOIL	NAD	none	Andrew Little

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 16-81431
Client Ref 12032
Contract H.Rd (Herbert Road)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1069409	SP S16 SOIL	30/09/16	GJ 250ml x2, GV x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days)	
1069410	SP S17 SOIL	30/09/16	GJ 250ml x2, GV x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days)	
1069411	SP S18 SOIL	30/09/16	GJ 250ml x2, GV x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days)	
1069412	SP S19 SOIL	30/09/16	GJ 250ml x2, GV x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days)	
1069413	SP S20 SOIL	30/09/16	GJ 250ml x2, GV x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days)	
1069414	SP S21 SOIL	30/09/16	GJ 250ml x2, GV x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days)	
1069415	SP S22 SOIL	30/09/16	GJ 250ml x2, GV x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days)	
1069416	SP S23 SOIL	30/09/16	GJ 250ml x2, GV x2, PT 1L x2	Aliphatics/Aromatics (14 days), BTEX (14 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days)	
1069417	SP S16 LEACHATE	30/09/16	GJ 250ml x2, GV x2, PT 1L x2		
1069418	SP S17 LEACHATE	30/09/16	GJ 250ml x2, GV x2, PT 1L x2		
1069419	SP S18 LEACHATE	30/09/16	GJ 250ml x2, GV x2, PT 1L x2		
1069420	SP S19 LEACHATE	30/09/16	GJ 250ml x2, GV x2, PT 1L x2		
1069421	SP S20 LEACHATE	30/09/16	GJ 250ml x2, GV x2, PT 1L x2		
1069422	SP S21 LEACHATE	30/09/16	GJ 250ml x2, GV x2, PT 1L x2		
1069423	SP S22 LEACHATE	30/09/16	GJ 250ml x2, GV x2, PT 1L x2		
1069424	SP S23 LEACHATE	30/09/16	GJ 250ml x2, GV x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar V-Vial T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Information in Support of the Analytical Results

Our Ref 16-81431
Client Ref 12032
Contract H.Rd (Herbert Road)

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 16-81290

24-Oct-16

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 16-81290

Client Reference 12032/GL

Order No 12032/GLHL

Contract Title GL (S) Green Lane South

Description 4 Soil samples, 4 Leachate samples.

Date Received 17-Oct-16

Date Started 17-Oct-16

Date Completed 24-Oct-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 16-81290
Client Ref 12032/GL
Contract Title GL (S) Green Lane South

Sample ID	Lab No	Completed	Matrix Description
S1	1068546	24/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick,,slag)
S2	1068547	24/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick,,slag)
S3	1068548	24/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick,,slag)
S4	1068549	24/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick,,slag)

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81290
Client Ref 12032/GL
Contract Title GL (S) Green Lane South

			Lab No	1068546	1068547	1068548	1068549
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Moisture Content	DETSC 1004*	0.1	%	7.4	5.9	9.0	8.9
Metals							
Antimony	DETSC 2301*	1	mg/kg	< 1.0	1.6	< 1.0	1.2
Arsenic	DETSC 2301#	0.2	mg/kg	8.0	14	9.1	17
Beryllium	DETSC 2301#	0.2	mg/kg	2.0	1.1	1.0	1.0
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	1.0	2.3	1.0	0.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	< 0.1	< 0.1	0.4
Chromium	DETSC 2301#	0.15	mg/kg	8.8	11	13	16
Chromium III	DETSC 2301*	0.15	mg/kg	8.8	11	13	16
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	46	35	32	120
Lead	DETSC 2301#	0.3	mg/kg	23	20	17	29
Manganese	DETSC 2301#	20	mg/kg	1300	2500	290	350
Mercury	DETSC 2325#	0.05	mg/kg	0.06	0.13	< 0.05	0.07
Molybdenum	DETSC 2301#	0.4	mg/kg	1.4	1.3	1.5	2.8
Nickel	DETSC 2301#	1	mg/kg	32	51	25	30
Selenium	DETSC 2301#	0.5	mg/kg	1.1	< 0.5	< 0.5	0.7
Zinc	DETSC 2301#	1	mg/kg	66	81	41	710
Inorganics							
pH	DETSC 2008#			8.7	8.1	8.4	6.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	2.5	11	1.7	8.3
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.20	0.21	0.09	0.24
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	0.03	< 0.01	0.05	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.02	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	2.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	40
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	11
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	43
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81290
Client Ref 12032/GL
Contract Title GL (S) Green Lane South

			Lab No	1068546	1068547	1068548	1068549
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	43
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	0.07	0.05	0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.15	0.24	0.12	0.10
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	0.09	0.11	0.25
Pyrene	DETSC 3303#	0.03	mg/kg	0.13	0.08	0.09	0.23
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.08	0.05	0.07	0.13
Chrysene	DETSC 3303	0.03	mg/kg	0.11	0.11	0.09	0.18
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.11	0.07	0.09	0.22
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.03	0.08
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	0.04	0.13
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	0.04	0.10
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.04	0.04	0.04	0.13
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.93	0.75	0.75	1.5
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81290
Client Ref 12032/GL
Contract Title GL (S) Green Lane South

	Lab No	1068550	1068551	1068552	1068553
	Sample ID	S1	S2	S3	S4
	Depth				
	Other ID				
	Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
	Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
	Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Preparation							
Leachate 10:1	DETS 036*			Y	Y	Y	Y
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.0	0.88	1.6	0.38
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III, Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.7	< 0.4	0.5	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.39	< 0.09	0.18	0.21
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.0	< 0.5	0.8	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.46	2.3	0.68	0.32
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	< 1.3	< 1.3	3.2
Inorganics							
pH	DETSC 2008			7.0	6.7	7.2	7.1
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	0.93	0.75	1.1	3.6
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.9	55	7.1	8.5
Total Organic Carbon	DETSC 2085	1	mg/l	1.6	1.4	1.2	1.4
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
PAHs							
Naphthalene	DETSC 3304	0.01	ug/l	0.34	0.76	0.26	0.07
Acenaphthylene	DETSC 3304	0.01	ug/l	0.03	0.07	< 0.01	0.01

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81290
Client Ref 12032/GL
Contract Title GL (S) Green Lane South

			Lab No	1068550	1068551	1068552	1068553
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	0.13	0.11	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.13	0.36	0.11	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.74	10	0.76	0.17
Anthracene	DETSC 3304	0.01	ug/l	0.07	0.22	0.08	0.03
Fluoranthene	DETSC 3304	0.01	ug/l	0.34	1.1	0.36	0.16
Pyrene	DETSC 3304	0.01	ug/l	0.33	0.84	0.33	0.13
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.18	0.36	0.19	0.07
Chrysene	DETSC 3304	0.01	ug/l	0.48	0.92	0.38	0.23
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.41	0.49	0.31	0.33
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.13	0.14	0.09	0.08
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.19	0.37	0.13	0.11
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.32	0.20	0.20	0.30
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.79	0.61	0.39	0.47
PAH Total	DETSC 3304	0.04	ug/l	4.5	17	3.7	2.2
Phenols							
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 16-81290
Client Ref 12032/GL
Contract Title GL (S) Green Lane South

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1068546	S1	SOIL	NAD	none	Colin Patrick
1068547	S2	SOIL	NAD	none	Colin Patrick
1068548	S3	SOIL	NAD	none	Colin Patrick
1068549	S4	SOIL	NAD	none	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 16-81290
Client Ref 12032/GL
Contract GL (S) Green Lane South

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1068546	S1 SOIL	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068547	S2 SOIL	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068548	S3 SOIL	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068549	S4 SOIL	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068550	S1 LEACHATE	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068551	S2 LEACHATE	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068552	S3 LEACHATE	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068553	S4 LEACHATE	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 16-81288

24-Oct-16

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 16-81288

Client Reference 12032/HLN

Order No 12032/GLHL

Contract Title HL (N) Hawes Lane North

Description 4 Soil samples, 4 Leachate samples.

Date Received 17-Oct-16

Date Started 17-Oct-16

Date Completed 24-Oct-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 16-81288
Client Ref 12032/HLN
Contract Title HL (N) Hawes Lane North

Sample ID	Lab No	Completed	Matrix Description
S1	1068530	24/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick,,slag)
S2	1068531	24/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick,,slag)
S3	1068532	24/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick,,slag)
S4	1068533	24/10/2016	Dark brown gravelly, sandy CLAY (Made ground - brick slag)

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81288
Client Ref 12032/HLN
Contract Title HL (N) Hawes Lane North

			Lab No	1068530	1068531	1068532	1068533
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Moisture Content	DETSC 1004*	0.1	%	8.9	9.1	8.3	7.9
Metals							
Antimony	DETSC 2301*	1	mg/kg	< 1.0	1.3	< 1.0	< 1.0
Arsenic	DETSC 2301#	0.2	mg/kg	8.2	5.0	11	11
Beryllium	DETSC 2301#	0.2	mg/kg	0.7	0.8	0.7	0.8
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	0.9	0.8	1.3	1.0
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	0.1	0.1
Chromium	DETSC 2301#	0.15	mg/kg	20	26	9.3	13
Chromium III	DETSC 2301*	0.15	mg/kg	20	26	9.3	13
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	25	25	42	41
Lead	DETSC 2301#	0.3	mg/kg	15	16	20	22
Manganese	DETSC 2301#	20	mg/kg	510	900	280	360
Mercury	DETSC 2325#	0.05	mg/kg	0.07	0.06	0.08	0.13
Molybdenum	DETSC 2301#	0.4	mg/kg	0.7	0.7	1.9	1.2
Nickel	DETSC 2301#	1	mg/kg	29	34	22	25
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	44	55	34	53
Inorganics							
pH	DETSC 2008#			7.5	7.4	7.8	7.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	4.5	6.6	17	20
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.15	0.12	0.12	0.21

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81288
Client Ref 12032/HLN
Contract Title HL (N) Hawes Lane North

			Lab No	1068530	1068531	1068532	1068533
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	0.03	< 0.01	< 0.01	0.04
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	0.8	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	1.9	< 1.4
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.05	0.07
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.07	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.05	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.11	0.06	0.54	0.17
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.11	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.11	0.07	0.86	0.14
Pyrene	DETSC 3303#	0.03	mg/kg	0.10	0.06	0.67	0.14
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05	0.03	0.37	0.08
Chrysene	DETSC 3303	0.03	mg/kg	0.05	0.04	0.42	0.12
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.04	0.46	0.10
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.16	0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	0.26	0.04
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.16	0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.04	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.16	0.04
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.53	0.30	4.4	0.97
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81288
Client Ref 12032/HLN
Contract Title HL (N) Hawes Lane North

			Lab No	1068534	1068535	1068536	1068537
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Leachate 10:1	DETS 036*			Y	Y	Y	Y
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.27	< 0.16	0.45	0.19
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III, Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	0.5	0.7	0.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09	0.16	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	2.4
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.4	1.2	1.1	2.4
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.0	2.5	1.3	16
Inorganics							
pH	DETSC 2008			6.2	6.2	6.6	6.5
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	2.0	1.2	2.2	2.3
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	12	11	17	22
Total Organic Carbon	DETSC 2085	1	mg/l	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81288
Client Ref 12032/HLN
Contract Title HL (N) Hawes Lane North

			Lab No	1068534	1068535	1068536	1068537
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3304	0.01	ug/l	0.04	0.04	0.03	0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.06	0.06	0.06	0.10
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02
Fluoranthene	DETSC 3304	0.01	ug/l	0.04	0.04	0.04	0.04
Pyrene	DETSC 3304	0.01	ug/l	0.03	0.03	0.03	0.03
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.04	ug/l	0.18	0.16	0.17	0.24
Phenols							
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 16-81288
Client Ref 12032/HLN
Contract Title HL (N) Hawes Lane North

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1068530	S1	SOIL	NAD	none	Colin Patrick
1068531	S2	SOIL	NAD	none	Colin Patrick
1068532	S3	SOIL	NAD	none	Colin Patrick
1068533	S4	SOIL	NAD	none	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 16-81288
Client Ref 12032/HLN
Contract HL (N) Hawes Lane North

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1068530	S1 SOIL	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068531	S2 SOIL	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068532	S3 SOIL	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068533	S4 SOIL	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068534	S1 LEACHATE	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068535	S2 LEACHATE	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068536	S3 LEACHATE	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1068537	S4 LEACHATE	14/10/16	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Derwentside Environmental Testing Services

Certificate of Analysis

Certificate Number 16-81362

24-Oct-16

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 16-81362

Client Reference 12032/HLS

Order No 12032/GLHL

Contract Title HL (S) Hawes Lane South

Description 4 Soil samples, 4 Leachate samples.

Date Received 17-Oct-16

Date Started 17-Oct-16

Date Completed 24-Oct-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 16-81362
Client Ref 12032/HLS
Contract Title HL (S) Hawes Lane South

Sample ID	Lab No	Completed	Matrix Description
S1	1068956	24/10/2016	Dark brown gravelly, sandy CLAY
S2	1068957	24/10/2016	Dark brown gravelly, sandy CLAY
S3	1068958	24/10/2016	Dark brown gravelly, sandy CLAY
S4	1068959	24/10/2016	Dark brown gravelly, sandy CLAY

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81362
Client Ref 12032/HLS
Contract Title HL (S) Hawes Lane South

			Lab No	1068956	1068957	1068958	1068959
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Moisture Content	DETSC 1004*	0.1	%	10	8.6	11	8.8
Metals							
Antimony	DETSC 2301*	1	mg/kg	1.2	< 1.0	1.1	< 1.0
Arsenic	DETSC 2301#	0.2	mg/kg	4.6	3.3	6.8	4.5
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.8	0.9	0.7
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	0.5	0.3	0.8	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.2	0.3	0.3
Chromium	DETSC 2301#	0.15	mg/kg	25	16	22	16
Chromium III	DETSC 2301*	0.15	mg/kg	25	16	22	16
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	15	9.9	29	14
Lead	DETSC 2301#	0.3	mg/kg	16	12	21	19
Manganese	DETSC 2301#	20	mg/kg	970	630	800	720
Mercury	DETSC 2325#	0.05	mg/kg	3.2	< 0.05	< 0.05	0.07
Molybdenum	DETSC 2301#	0.4	mg/kg	0.9	0.4	1.6	0.6
Nickel	DETSC 2301#	1	mg/kg	30	17	30	16
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	61	38	99	62
Inorganics							
pH	DETSC 2008#			8.3	8.3	7.9	8.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Organic matter	DETSC 2002#	0.1	%	1.2	1.5	2.5	1.9
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.18	0.36	0.09	0.14
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	6.5	24	6.4	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	19	88	17	< 3.4
Aliphatic C35-C44	DETSC 3072*	3.4	mg/kg	< 3.4	10	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	26	110	23	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	8.1
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	4.8	23	5.1	80
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	47	170	44	360

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-81362
Client Ref 12032/HLS
Contract Title HL (S) Hawes Lane South

			Lab No	1068956	1068957	1068958	1068959
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Aromatic C35-C44	DETSC 3072*	1.4	mg/kg	< 1.4	13	< 1.4	27
Aromatic C5-C35	DETSC 3072*	10	mg/kg	51	190	49	450
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	77	300	72	450
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	0.03	0.08	0.16	0.07
Acenaphthylene	DETSC 3303#	0.03	mg/kg	0.13	0.21	0.07	0.11
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.13	0.37	0.78	0.42
Fluorene	DETSC 3303	0.03	mg/kg	0.15	0.49	0.74	0.39
Phenanthrene	DETSC 3303#	0.03	mg/kg	1.1	3.2	4.0	2.4
Anthracene	DETSC 3303	0.03	mg/kg	0.51	1.4	1.1	0.80
Fluoranthene	DETSC 3303#	0.03	mg/kg	4.3	10	6.3	7.2
Pyrene	DETSC 3303#	0.03	mg/kg	3.7	8.2	4.8	6.0
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	3.2	6.8	2.7	4.4
Chrysene	DETSC 3303	0.03	mg/kg	3.2	6.7	2.7	4.4
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	4.4	9.0	3.4	6.0
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	1.5	3.0	1.1	1.9
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	2.7	5.6	2.0	3.7
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	1.3	2.6	1.1	1.7
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.48	1.0	0.34	0.64
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	1.2	2.5	1.0	1.7
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	28	61	32	42
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81362
Client Ref 12032/HLS
Contract Title HL (S) Hawes Lane South

			Lab No	1068960	1068961	1068962	1068963
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Leachate 10:1	DETS 036*			Y	Y	Y	Y
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.32	0.18	0.41	0.51
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25
Chromium III, Dissolved	DETSC 2302*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	< 0.4	0.7	0.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.15	0.10	0.27	0.19
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.54	0.33	0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	< 1.3	< 1.3	< 1.3
Inorganics							
pH	DETSC 2008			7.0	6.9	6.9	7.7
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40
Chloride	DETSC 2055	0.1	mg/l	1.2	0.66	0.78	0.88
Fluoride	DETSC 2055	0.1	mg/l	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	DETSC 2055	0.1	mg/l	3.8	1.4	2.0	2.7
Total Organic Carbon	DETSC 2085	1	mg/l	1.2	1.1	2.1	1.5
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	7.3
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	80
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	87
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10	< 10	87
PAHs							
Naphthalene	DETSC 3304	0.01	ug/l	0.05	0.04	0.03	0.12
Acenaphthylene	DETSC 3304	0.01	ug/l	0.09	0.07	0.03	0.34

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 16-81362
Client Ref 12032/HLS
Contract Title HL (S) Hawes Lane South

			Lab No	1068960	1068961	1068962	1068963
			Sample ID	S1	S2	S3	S4
			Depth				
			Other ID				
			Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	14/10/16	14/10/16	14/10/16	14/10/16
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Acenaphthene	DETSC 3304	0.01	ug/l	0.05	0.03	0.02	0.10
Fluorene	DETSC 3304	0.01	ug/l	0.05	0.03	0.02	0.11
Phenanthrene	DETSC 3304	0.01	ug/l	0.22	0.17	0.08	0.78
Anthracene	DETSC 3304	0.01	ug/l	0.15	0.11	0.04	0.65
Fluoranthene	DETSC 3304	0.01	ug/l	1.1	0.86	0.31	2.6
Pyrene	DETSC 3304	0.01	ug/l	0.98	0.79	0.28	2.9
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.93	0.76	0.22	2.3
Chrysene	DETSC 3304	0.01	ug/l	0.40	0.44	0.18	6.2
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	3.7	2.2	0.77	10
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.65	0.75	0.26	4.5
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	2.0	1.6	0.53	7.0
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	2.0	1.4	0.49	6.2
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.52	0.41	0.18	2.4
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	2.9	1.6	0.51	6.7
PAH Total	DETSC 3304	0.04	ug/l	16	11	4.0	53
Phenols							
Phenol	*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 16-81362
Client Ref 12032/HLS
Contract Title HL (S) Hawes Lane South

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1068956	S1	SOIL	NAD	none	Colin Patrick
1068957	S2	SOIL	NAD	none	Colin Patrick
1068958	S3	SOIL	NAD	none	Colin Patrick
1068959	S4	SOIL	NAD	none	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 16-81362
Client Ref 12032/HLS
Contract HL (S) Hawes Lane South

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1068956	S1 SOIL	14/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1068957	S2 SOIL	14/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1068958	S3 SOIL	14/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1068959	S4 SOIL	14/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1068960	S1 LEACHATE	14/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1068961	S2 LEACHATE	14/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1068962	S3 LEACHATE	14/10/16	GJ 250ml x2, GV x2, PT 1L x2		
1068963	S4 LEACHATE	14/10/16	GJ 250ml x2, GV x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar V-Vial T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Annex F
Soil Test Results – Exceedence Summary Tables

Table 1 Green Lane and Hawes Lane Soils Contaminants of Concern			
Soils			
Chemical	**Guideline (mg/kg)**	**Exceedance (mg/kg)**	**Location**
Asbestos	Chrysotile bundle of fibres <0.001% total mass		TFW SP S7
Arsenic	32	52 35 45	SW 90/1 1.0m TFW SP S9 NE 20/3 6.0m
Beryllium	1.7	2.3 2.9 2.2 2.0 2.1 2.0 2.8 1.8 2.2 2.6 2.1 1.8 1.9 2.3 2.6 1.8 1.9 1.9 2.3 1.9 1.9 1.8 2.0 2.0	NW 15/3 6.0m SE 15/2 4.0m SW 15/1 1.0m SW 15/3 6.0m SE 40/1 1.0m SW 40/1 1.0m SW 65/1 1.0m SW 65/2 3.0m SE 90/1 1.0m SW 90/1 1.0m NW 15/1 1.0m SE 15/1 1.0m SE 15/2 4.0m SW 50/1 1.0m NE 80/1 1.0m SW 80/1 1.0m NE 80/2 2.0m SW 80/2 3.0m SW 80/3 6.0m NW 90/1 1.0m SE 90/1 1.0m TFW SP S8 TFW SP S9 TFW GLS S1
Lead	310	516 545 797 1700	SE 15/3 6.0m SE 40/1 1.0m SW 90/1 1.0m TFW SP S8
Cadmium	10	17.9 26.4	SE 40/1 1.0m SW 90/1 1.0m
Dibenzo(ah)anthracene	0.31 – 0.32	0.35 0.59 1.17 3.02 1.10 0.48 1.0 0.34 0.64	SW 15/2 3.0m NE 20/2 3.0m NE 20/3 6.0m NW 90/1 1.0m SE 90/1 1.0m TFW HLS S1 TFW HLS S2 TFW HLS S3 TFW HLS S4
Benzo(b)fluoranthene	3.9 – 4.0	7.87 18.94 7.12 4.4 9.0 6.0	NE 20/3 6.0m NW 90/1 1.0m SE 90/1 1.0m TFW HLS S1 TFW HLS S2 TFW HLS S4
Benzo(a)pyrene	3.2	5.76 12.97 5.16 5.6 3.7	NE 20/3 6.0m NW 90/1 1.0m SE 90/1 1.0m TFW HLS S2 TFW HLS S4

Table 2 Green Lane and Hawes Lane Leachates Contaminants of Concern

Leachates

Chemical	Guideline (ug/l)	Exceedance (ug/l)	Location
Cadmium	0.2	0.59	SW 90/1 1.0m
Copper	3.67	3.9 4.7 6.4 3.9 5.6 4.4 4.3 6.8 4.4 6.3	SW 65/2 3.0m NW 85/1 1.0m SE 90/1 1.0m SW 90/1 1.0m SE 15/1 1.0m SW 15/1 1.0m NE 20/3 6.0m NE 80/2 2.0m NW 90/1 1.0m SE 90/1 1.0m
Lead	1.2	4.2 1.3 8.8 2.6 1.3 2.9 1.4	SW 15/1 1.0m SE 15/1 1.0m SE 15/3 6.0m SW 65/2 3.0m SW 15/1 1.0m TFW SP S8 TFW SP S9
Zinc	9.0	60 10 216 65 62 38 45 14 12 9.2 16	SE 40/1 1.0m SE 15/1 1.0m SE 90/1 1.0m NW 15/1 1.0m SE 15/1 1.0m SE 15/2 4.0m SE 15/3 6.0m NE 20/1 1.0m NW 65/1 1.0m TFW SP S7 TFW HLN S4
Cyanide	1.0	24	NE 50/1 1.0m
Anthracene	0.1	0.2 0.11 0.19 0.22 0.15 0.11 0.65	SW 40/1 1.0m TFW SP S11 TFW SP S13 TFW GLS S2 TFW HLS S1 TFW HLS S2 TFW HLS S4
Benzo(a)pyrene	0.00017	0.16 0.17 0.12 0.06 0.28 0.23 0.16 0.40 0.11 0.60 0.98 0.18 0.21 0.21 0.09 0.35 0.19 0.37 0.13 0.11 2.0 1.6 0.53 7.0	TFW SP S1 TFW SP S2 TFW SP S3 TFW SP S5 TFW SP S6 TFW SP S7 TFW SP S10 TFW SP S11 TFW SP S12 TFW SP S13 TFW SP S14 TFW SP S15 TFW SP S16 TFW SP S17 TFW SP S18 TFW SP S21 TFW GLS S1 TFW GLS S2 TFW GLS S3 TFW GLS S4 TFW HLS S1 TFW HLS S2 TFW HLS S3 TFW HLS S4

Table 2 (Continued) **Green Lane and Hawes Lane Leachates Contaminants of Concern**

Leachates			
Chemical	**Guideline (ug/l)**	**Exceedance (ug/l)**	**Location**
Benzo(b)fluoranthene	0.017	0.5	NW 90/1 1.0m
		0.29	TFW SP S1
		0.33	TFW SP S2
		0.24	TFW SP S3
		0.25	TFW SP S5
		0.48	TFW SP S6
		0.43	TFW SP S7
		0.3	TFW SP S10
		0.75	TFW SP S11
		0.27	TFW SP S12
		1.0	TFW SP S13
		2.6	TFW SP S14
		0.27	TFW SP S15
		0.27	TFW SP S16
		0.38	TFW SP S17
		0.11	TFW SP S18
		0.15	TFW SP S21
		0.41	TFW GLS S1
		0.49	TFW GLS S2
		0.31	TFW GLS S3
		0.33	TFW GLS S4
		3.7	TFW HLS S1
		2.2	TFW HLS S2
		0.77	TFW HLS S3
		10	TFW HLS S4
Benzo(k)fluoranthene	0.017	0.2	NW 90/1 1.0m
		0.09	TFW SP S1
		0.12	TFW SP S2
		0.07	TFW SP S3
		0.06	TFW SP S5
		0.16	TFW SP S6
		0.16	TFW SP S7
		0.13	TFW SP S10
		0.26	TFW SP S11
		0.12	TFW SP S12
		0.42	TFW SP S13
		0.43	TFW SP S14
		0.09	TFW SP S16
		0.13	TFW SP S17
		0.05	TFW SP S18
		0.03	TFW SP S21
		0.13	TFW GLS S1
		0.14	TFW GLS S2
		0.09	TFW GLS S3
		0.08	TFW GLS S4
		0.65	TFW HLS S1
		0.75	TFW HLS S2
		0.26	TFW HLS S3
		4.5	TFW HLS S4

Table 2 (Continued) **Green Lane and Hawes Lane Leachates Contaminants of Concern**

Leachates			
Chemical	**Guideline (ug/l)**	**Exceedance (ug/l)**	**Location**
Fluoranthene	0.0063	0.7	NW 90/1 1.0m
		0.29	TFW SP S1
		0.25	TFW SP S2
		0.25	TFW SP S3
		0.07	TFW SP S4
		0.13	TFW SP S5
		0.27	TFW SP S6
		0.33	TFW SP S7
		0.07	TFW SP S8
		0.07	TFW SP S9
		0.33	TFW SP S10
		0.68	TFW SP S11
		0.23	TFW SP S12
		1.1	TFW SP S13
		3.4	TFW SP S14
		0.11	TFW SP S15
		0.09	TFW SP S16
		0.31	TFW SP S17
		0.1	TFW SP S18
		0.04	TFW SP S19
		0.04	TFW SP S20
		0.16	TFW SP S21
		0.07	TFW SP S22
		0.34	TFW GLS S1
		1.1	TFW GLS S2
		0.36	TFW GLS S3
		0.16	TFW GLS S4
		1.1	TFW HLS S1
		0.86	TFW HLS S2
		0.1	TFW HLS S3
		2.6	TFW HLS S4
		0.04	TFW HLN S1
		0.04	TFW HLN S2
		0.04	TFW HLN S3
		0.04	TFW HLN S4
Benzo(ghi)perylene	0.0082	0.3	NW 90/1 1.0m
		0.21	TFW SP S1
		0.41	TFW SP S2
		0.15	TFW SP S3
		0.17	TFW SP S5
		0.36	TFW SP S6
		0.43	TFW SP S7
		0.06	TFW SP S8
		0.35	TFW SP S10
		0.47	TFW SP S11
		0.2	TFW SP S12
		0.99	TFW SP S13
		0.84	TFW SP S14
		0.17	TFW SP S15
		0.42	TFW SP S16
		0.34	TFW SP S17
		0.19	TFW SP S18
		0.19	TFW SP S21
		0.07	TFW SP S22
		0.79	TFW GLS S1
		0.61	TFW GLS S2
		0.39	TFW GLS S3
		0.47	TFW GLS S4
		2.9	TFW HLS S1
		1.6	TFW HLS S2
		0.51	TFW HLS S3
		6.7	TFW HLS S4

Annex F
Remedial Targets Methodology Worksheets

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Herbert Road			
Site Address:				
Completed by:	Ruth Howells			
Date:	28.10.2016		Version:	1
Contaminant	Anthracene			
Target Concentration (C_T)	0.0001	mg/l	Origin of C_T:	Water Framework Directive

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

Calculate for non-polar organic chemicals

Contaminant		**Anthracene**		
Target concentration	C_T	**0.0001**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	1.60E-03	dimensionless	*EA 2003*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd		l/kg	
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc	3.40E-02	fraction	Soil Laboratory Chemical Testing
Organic carbon partition coefficient	Koc	2.95E+04	l/kg	*EA 2003*
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	
Soil water partition coefficient used in Level Assessment	**Kd**	**1.00E+03**	**l/kg**	*Calculated value*

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	**1.00E-01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.0001	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Anthracene**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**0.0001** mg/l	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	Variable	Value	Unit	Source of parameter value	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m	**Minimum value**	
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**1.00E-04**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		1.00E-01	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Anthracene		from Level 1
Target Concentration	C_T	0.0001	mg/l	from Level 1
Dilution Factor	DF	1.00E+00		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil leachate concentration as mg/l		
Enter soil leachate concentration		0.00065	mg/l	
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+03	days	*Surampalli et al*
Calculated decay rate	λ	1.90E-04	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	1.20E+02	m	from Level 2
Plume thickness in aquifer at source	Sy	5.00E-01	m	from Level 2
Bulk density of aquifer materials	ρ	2.09E+00	g/cm^3	*Geotech Testing*
Effective porosity of aquifer	n	5.90E-01	fraction	*SR3*
Hydraulic gradient	i	6.22E+00	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	8.64E-02	m/d	from Level 2
Distance to compliance point	x	1.00E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	1.00E+03	l/kg	*see options*
Longitudinal dispersivity	ax	1.000	m	*see options*
Transverse dispersivity	az	0.100	m	*see options*
Vertical dispersivity	ay	0.010	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	9.10E-01	m/d
Retardation factor	Rf	3.56E+03	fraction
Decay rate used	λ	1.90E-04	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	6.22E+00	fraction
Rate of contaminant flow due to retardation	u	2.56E-04	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	5.17E-03	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**1.93E+02**	**fraction**
Soil leachate concentration	Co	6.50E-04	

Remedial Targets

Level 3 Remedial Target		**1.93E-02**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		1.94E+01	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**10**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**5.17E-03**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for non-polar organic chemicals

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer	foc	3.40E-02	fraction
Organic carbon partition coefficient	Koc	2.95E+04	l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		
Acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction

Soil water partition coefficient	Kd	1.00E+03	l/kg

Define dispersivity (click brown cell and use pull down list)

Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	1.00E+00	8.30E-01	m
Transverse dispersivity	**az**	0.00E+00	1.00E-01	8.30E-02	m
Vertical dispersivity	**ay**	0.00E+00	1.00E-02	8.30E-03	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}X)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	6.50E-04
0.5	7.80E-01	5.07E-04
1.0	6.09E-01	3.96E-04
1.5	4.73E-01	3.08E-04
2.0	3.66E-01	2.38E-04
2.5	2.82E-01	1.83E-04
3.0	2.17E-01	1.41E-04
3.5	1.66E-01	1.08E-04
4.0	1.27E-01	8.25E-05
4.5	9.71E-02	6.31E-05
5.0	7.43E-02	4.83E-05
5.5	5.68E-02	3.69E-05
6.0	4.34E-02	2.82E-05
6.5	3.32E-02	2.16E-05
7.0	2.54E-02	1.65E-05
7.5	1.95E-02	1.27E-05
8.0	1.49E-02	9.70E-06
8.5	1.14E-02	7.44E-06
9.0	8.78E-03	5.71E-06
9.5	6.74E-03	4.38E-06
10.0	5.17E-03	3.36E-06

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Herbert Road			
Site Address:				
Completed by:	Ruth Howells			
Date:	28.10.2016		Version:	1
Contaminant	Benzo(b)fluoranthene			
Target Concentration (C_T)	0.000017	mg/l	Origin of C_T:	Water Framework Directive

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

Calculate for non-polar organic chemicals

Contaminant		**Benzo(b)fluoranthene**		
Target concentration	C_T	**0.000017**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	1.75E-04	dimensionless	*EA 2003*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd		l/kg	
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc	1.07E-01	fraction	Laboratory Soil Chemical Testing
Organic carbon partition coefficient	Koc	5.50E+05	l/kg	*EA 2003*
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	
Soil water partition coefficient used in Level Assessment	**Kd**	**5.88E+04**	**l/kg**	*Calculated value*

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	**1.00E+00**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.000017	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Benzo(b)fluoranthene**		from Level 1
Target concentration	C_T	**0.000017**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m		
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**1.70E-05**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		1.00E+00	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Benzo(b)fluoranthene		from Level 1
Target Concentration	C_T	0.000017	mg/l	from Level 1
Dilution Factor	DF	1.00E+00		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil leachate concentration as mg/l		
Enter soil leachate concentration		0.01	mg/l	
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+03	days	*Surampalli et al*
Calculated decay rate	λ	1.90E-04	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	1.20E+02	m	from Level 2
Plume thickness in aquifer at source	Sy	5.00E-01	m	from Level 2
Bulk density of aquifer materials	ρ	2.09E+00	g/cm^3	*Geotech Testing*
Effective porosity of aquifer	n	5.90E-01	fraction	
Hydraulic gradient	i	6.22E+00	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	8.64E-02	m/d	from Level 2
Distance to compliance point	x	1.00E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	5.88E+04	l/kg	*see options*
Longitudinal dispersivity	ax	1.000	m	*see options*
Transverse dispersivity	az	0.100	m	*see options*
Vertical dispersivity	ay	0.010	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	9.10E-01	m/d
Retardation factor	Rf	2.08E+05	fraction
Decay rate used	λ	1.90E-04	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	6.22E+00	fraction
Rate of contaminant flow due to retardation	u	4.37E-06	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	2.12E-27	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**4.71E+26**	**fraction**
Soil leachate concentration	Co	1.00E-02	

Remedial Targets

Level 3 Remedial Target		**8.00E+21**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		4.71E+26	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**10**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**2.12E-27**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for non-polar organic chemicals

Entry if specify partition coefficient (option)

Soil water partition coefficient	Kd		l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer	foc	1.07E-01	fraction
Organic carbon partition coefficient	Koc	5.50E+05	l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		
Acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction
Soil water partition coefficient	Kd	5.88E+04	l/kg

Define dispersivity (click brown cell and use pull down list)

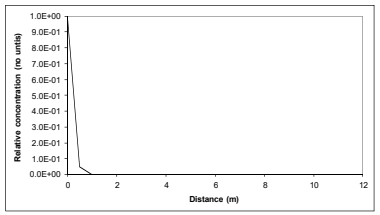
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	1.00E+00	8.30E-01	m
Transverse dispersivity	**az**	0.00E+00	1.00E-01	8.30E-02	m
Vertical dispersivity	**ay**	0.00E+00	1.00E-02	8.30E-03	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}X)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration	Concentration
	(No units)	mg/l
0	1.0E+00	1.00E-02
0.5	4.71E-02	4.71E-04
1.0	2.22E-03	2.22E-05
1.5	1.04E-04	1.04E-06
2.0	4.86E-06	4.86E-08
2.5	2.26E-07	2.26E-09
3.0	1.05E-08	1.05E-10
3.5	4.84E-10	4.84E-12
4.0	2.23E-11	2.23E-13
4.5	1.03E-12	1.03E-14
5.0	4.76E-14	4.76E-16
5.5	2.20E-15	2.20E-17
6.0	1.01E-16	1.01E-18
6.5	4.68E-18	4.68E-20
7.0	2.16E-19	2.16E-21
7.5	1.00E-20	1.00E-22
8.0	4.62E-22	4.62E-24
8.5	2.14E-23	2.14E-25
9.0	9.90E-25	9.90E-27
9.5	4.59E-26	4.59E-28
10.0	2.12E-27	2.12E-29

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Herbert Road			
Site Address:				
Completed by:	Ruth Howells			
Date:	28.10.2016		Version:	1
Contaminant	Benzo(k)fluoranthene			
Target Concentration (C_T)	0.000017	mg/l	Origin of C_T:	Water Framework Directive

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

Calculate for non-polar organic chemicals

Contaminant		**Benzo(k)fluoranthene**		
Target concentration	C_T	**0.000017**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	3.40E-05	dimensionless	*EA 2003*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd		l/kg	
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc	1.07E-01	fraction	Soil Chemical Testing
Organic carbon partition coefficient	Koc	1.23E+06	l/kg	*EA 2003*
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	
Soil water partition coefficient used in Level Assessment	**Kd**	**1.32E+05**	**l/kg**	*Calculated value*

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	**2.24E+00**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.000017	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Benzo(k)fluoranthene**		from Level 1
Target concentration	**C_T**	**0.000017**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m		
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**1.70E-05**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		2.24E+00	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Benzo(k)fluoranthene		from Level 1
Target Concentration	C_T	0.000017	mg/l	from Level 1
Dilution Factor	DF	1.00E+00		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil leachate concentration as mg/l		
Enter soil leachate concentration		0.0045	mg/l	
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+03	days	*Surampalli et al*
Calculated decay rate	λ	1.90E-04	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	1.20E+02	m	from Level 2
Plume thickness in aquifer at source	Sy	5.00E-01	m	from Level 2
Bulk density of aquifer materials	ρ	2.09E+00	g/cm^3	*Geotech Testing*
Effective porosity of aquifer	n	5.90E-01	fraction	
Hydraulic gradient	i	6.22E+00	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	8.64E-02	m/d	from Level 2
Distance to compliance point	x	1.00E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	1.32E+05	l/kg	*see options*
Longitudinal dispersivity	ax	1.000	m	*see options*
Transverse dispersivity	az	0.100	m	*see options*
Vertical dispersivity	ay	0.010	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	9.10E-01	m/d
Retardation factor	Rf	4.66E+05	fraction
Decay rate used	λ	1.90E-04	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	6.22E+00	fraction
Rate of contaminant flow due to retardation	u	1.95E-06	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	1.41E-41	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**7.12E+40**	**fraction**
Soil leachate concentration	Co	4.50E-03	

Remedial Targets

Level 3 Remedial Target		**1.21E+36**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		1.59E+41	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**10**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**1.41E-41**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for non-polar organic chemicals

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — [redacted] l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — 1.07E-01 — fraction
Organic carbon partition coefficient — Koc — 1.23E+06 — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — [redacted] l/kg
Sorption coefficient for ionised species — $K_{oc,i}$ — [redacted] l/kg
pH value — pH — [redacted]
Acid dissociation constant — pKa — [redacted]
Fraction of organic carbon in aquifer — foc — [redacted] fraction

Soil water partition coefficient — Kd — 1.32E+05 — l/kg

Define dispersivity (click brown cell and use pull down list)

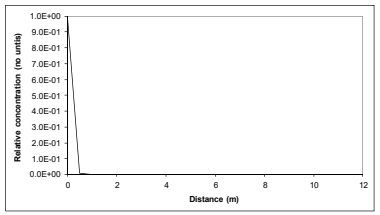
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	1.00E+00	8.30E-01	m
Transverse dispersivity	**az**	0.00E+00	1.00E-01	8.30E-02	m
Vertical dispersivity	**ay**	0.00E+00	1.00E-02	8.30E-03	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}X)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	4.50E-03
0.5	9.21E-03	4.14E-05
1.0	8.47E-05	3.81E-07
1.5	7.77E-07	3.50E-09
2.0	7.09E-09	3.19E-11
2.5	6.44E-11	2.90E-13
3.0	5.83E-13	2.62E-15
3.5	5.27E-15	2.37E-17
4.0	4.76E-17	2.14E-19
4.5	4.29E-19	1.93E-21
5.0	3.87E-21	1.74E-23
5.5	3.49E-23	1.57E-25
6.0	3.15E-25	1.42E-27
6.5	2.84E-27	1.28E-29
7.0	2.57E-29	1.16E-31
7.5	2.32E-31	1.04E-33
8.0	2.10E-33	9.43E-36
8.5	1.90E-35	8.53E-38
9.0	1.71E-37	7.72E-40
9.5	1.55E-39	6.98E-42
10.0	1.41E-41	6.32E-44

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Herbert Road			
Site Address:				
Completed by:	Ruth Howells			
Date:	31.10.2016		Version:	1
Contaminant	Cadmium			
Target Concentration (C_T)	0.0002	mg/l	Origin of C_T:	Water Framework Directive

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Cadmium**		
Target concentration	C_T	**0.0002**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	0.00E+00	dimensionless	
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	3.20E+01	l/kg	*USEPA - Risk Screening Envionmental Indicators Model*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.

The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**3.20E+01**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**6.44E-03**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.0002	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Cadmium**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	**C_T**	**0.0002** **mg/l**	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m		
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**2.00E-04**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		6.45E-03	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Herbert Road			
Site Address:				
Completed by:	Ruth Howells			
Date:	31.10.2016		Version:	1
Contaminant	Copper			
Target Concentration (C_T)	0.00367	mg/l	Origin of C_T:	Water Framework Directive

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Copper**		
Target concentration	C_T	**0.00367**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	0.00E+00	dimensionless	
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.50E+02	l/kg	*USEPA - Risk Screening Envionmental Indicators Model*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

Soil water partition coefficient used in Level Assessment	**Kd**	**1.50E+02**	**l/kg**	*Specified value*

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	**5.51E-01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.00367	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Copper**		from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	**C_T**	**0.00367**	**mg/l**	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m		
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**3.67E-03**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		5.51E-01	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Copper		from Level 1
Target Concentration	C_T	0.00367	mg/l	from Level 1
Dilution Factor	DF	1.00E+00		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil leachate concentration as mg/l		
Enter soil leachate concentration		0.0068	mg/l	
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Surampalli et al*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	1.20E+02	m	from Level 2
Plume thickness in aquifer at source	Sy	5.00E-01	m	from Level 2
Bulk density of aquifer materials	ρ	2.09E+00	g/cm^3	*Geotech Testing*
Effective porosity of aquifer	n	5.90E-01	fraction	
Hydraulic gradient	i	6.22E+00	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	8.64E-02	m/d	from Level 2
Distance to compliance point	x	1.00E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	1.50E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.000	m	*see options*
Transverse dispersivity	az	0.100	m	*see options*
Vertical dispersivity	ay	0.010	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	9.10E-01	m/d
Retardation factor	Rf	5.32E+02	fraction
Decay rate used	λ	7.70E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	6.22E+00	fraction
Rate of contaminant flow due to retardation	u	1.71E-03	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	7.36E-01	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**1.36E+00**	**fraction**
Soil leachate concentration	Co	6.80E-03	

Remedial Targets

Level 3 Remedial Target		**4.98E-03**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		7.49E-01	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**10**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**7.36E-01**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 1.50E+02 l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — 1.40E+01 l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg

Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg

pH value — pH

Acid dissociation constant — pKa

Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 1.50E+02 — l/kg

Define dispersivity (click brown cell and use pull down list)

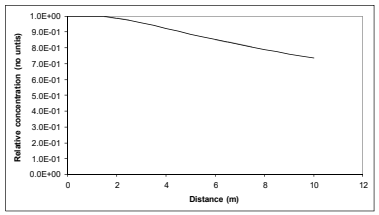
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	1.00E+00	8.30E-01	m
Transverse dispersivity	**az**	0.00E+00	1.00E-01	8.30E-02	m
Vertical dispersivity	**ay**	0.00E+00	1.00E-02	8.30E-03	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}X)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	6.80E-03
0.5	1.00E+00	6.80E-03
1.0	1.00E+00	6.80E-03
1.5	9.96E-01	6.77E-03
2.0	9.88E-01	6.71E-03
2.5	9.75E-01	6.63E-03
3.0	9.59E-01	6.52E-03
3.5	9.41E-01	6.40E-03
4.0	9.23E-01	6.28E-03
4.5	9.04E-01	6.15E-03
5.0	8.86E-01	6.03E-03
5.5	8.68E-01	5.90E-03
6.0	8.51E-01	5.79E-03
6.5	8.34E-01	5.67E-03
7.0	8.19E-01	5.57E-03
7.5	8.03E-01	5.46E-03
8.0	7.89E-01	5.36E-03
8.5	7.75E-01	5.27E-03
9.0	7.61E-01	5.18E-03
9.5	7.49E-01	5.09E-03
10.0	7.36E-01	5.01E-03

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Herbert Road			
Site Address:				
Completed by:	Ruth Howells			
Date:	28.10.2016		Version:	1
Contaminant	Fluoranthene			
Target Concentration (C_T)	0.0000063	mg/l	Origin of C_T:	Water Framework Directive

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

Calculate for non-polar organic chemicals

Contaminant		**Fluoranthene**	
Target concentration	C_T	**0.0000063**	**mg/l**

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	4.20E-04	dimensionless	*EA 2003*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd		l/kg	
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc	1.70E-02	fraction	Laboratory Soil Chemical Testing
Organic carbon partition coefficient	Koc	1.07E+05	l/kg	*EA 2003*
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	
Soil water partition coefficient used in Level Assessment	**Kd**	**1.82E+03**	**l/kg**	*Calculated value*

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	**1.15E-02**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.0000063	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Fluoranthene**		from Level 1
Target concentration	C_T	**0.0000063**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m		
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**6.30E-06**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		1.15E-02	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Fluoranthene		from Level 1
Target Concentration	C_T	0.0000063	mg/l	from Level 1
Dilution Factor	DF	1.00E+00		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil leachate concentration as mg/l		
Enter soil leachate concentration		0.0034	mg/l	
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+03	days	*Surampalli et al*
Calculated decay rate	λ	1.90E-04	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	1.20E+02	m	from Level 2
Plume thickness in aquifer at source	Sy	5.00E-01	m	from Level 2
Bulk density of aquifer materials	ρ	2.09E+00	g/cm^3	*Geotech Testing*
Effective porosity of aquifer	n	5.90E-01	fraction	
Hydraulic gradient	i	6.22E+00	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	8.64E-02	m/d	from Level 2
Distance to compliance point	x	1.00E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	1.82E+03	l/kg	*see options*
Longitudinal dispersivity	ax	1.000	m	*see options*
Transverse dispersivity	az	0.100	m	*see options*
Vertical dispersivity	ay	0.010	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	9.10E-01	m/d
Retardation factor	Rf	6.44E+03	fraction
Decay rate used	λ	1.90E-04	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	6.22E+00	fraction
Rate of contaminant flow due to retardation	u	1.41E-04	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	3.59E-04	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**2.79E+03**	**fraction**
Soil leachate concentration	Co	3.40E-03	

Remedial Targets

Level 3 Remedial Target		**1.76E-02**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		3.20E+01	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**10**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**3.59E-04**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for non-polar organic chemicals

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer	foc	1.70E-02	fraction
Organic carbon partition coefficient	Koc	1.07E+05	l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		
Acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction

Soil water partition coefficient — Kd — 1.82E+03 — l/kg

Define dispersivity (click brown cell and use pull down list)

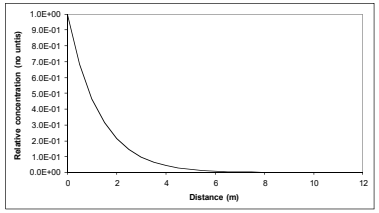
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	1.00E+00	8.30E-01	m
Transverse dispersivity	**az**	0.00E+00	1.00E-01	8.30E-02	m
Vertical dispersivity	**ay**	0.00E+00	1.00E-02	8.30E-03	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}X)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	3.40E-03
0.5	6.83E-01	2.32E-03
1.0	4.66E-01	1.58E-03
1.5	3.17E-01	1.08E-03
2.0	2.15E-01	7.30E-04
2.5	1.45E-01	4.92E-04
3.0	9.73E-02	3.31E-04
3.5	6.52E-02	2.22E-04
4.0	4.37E-02	1.48E-04
4.5	2.92E-02	9.94E-05
5.0	1.96E-02	6.65E-05
5.5	1.31E-02	4.45E-05
6.0	8.76E-03	2.98E-05
6.5	5.87E-03	1.99E-05
7.0	3.93E-03	1.34E-05
7.5	2.63E-03	8.95E-06
8.0	1.77E-03	6.00E-06
8.5	1.18E-03	4.03E-06
9.0	7.95E-04	2.70E-06
9.5	5.34E-04	1.81E-06
10.0	3.59E-04	1.22E-06

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment

Site Name:	**Herbert Road**			
Site Address:				
Completed by:	**Ruth Howells**			
Date:	**31.10.2016**		**Version:**	**1**
Contaminant	**Lead**			
Target Concentration (C_T)	**0.0012**	**mg/l**	**Origin of C_T:**	**Water Framework Directive**

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Environment Agency

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Lead**		
Target concentration	C_T	**0.0012**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	0.00E+00	dimensionless	
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	5.80E+02	l/kg	*USEPA - Risk Screening Envionmental Indicators Model*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.

The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**5.80E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**6.96E-01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.0012	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Lead**		from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	C_T	**0.0012**	**mg/l**	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m		
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**1.20E-03**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		6.96E-01	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Lead		from Level 1
Target Concentration	C_T	0.0012	mg/l	from Level 1
Dilution Factor	DF	1.00E+00		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil leachate concentration as mg/l		
Enter soil leachate concentration		0.0088	mg/l	
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Surampalli et al*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	1.20E+02	m	from Level 2
Plume thickness in aquifer at source	Sy	5.00E-01	m	from Level 2
Bulk density of aquifer materials	ρ	2.09E+00	g/cm^3	*Geotech Testing*
Effective porosity of aquifer	n	5.90E-01	fraction	
Hydraulic gradient	i	6.22E+00	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	8.64E-02	m/d	from Level 2
Distance to compliance point	x	1.00E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	5.80E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.000	m	*see options*
Transverse dispersivity	az	0.100	m	*see options*
Vertical dispersivity	ay	0.010	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	9.10E-01	m/d
Retardation factor	Rf	2.06E+03	fraction
Decay rate used	λ	7.70E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	6.22E+00	fraction
Rate of contaminant flow due to retardation	u	4.43E-04	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	7.36E-01	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**1.36E+00**	**fraction**
Soil leachate concentration	Co	8.80E-03	

Remedial Targets

Level 3 Remedial Target		**1.63E-03**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		9.46E-01	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**10**	**m**	assumes Level 1 Remedial Target calculated from soil-water
				partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**7.36E-01**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 5.80E+02 l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — 1.40E+01 l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg

Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg

pH value — pH

Acid dissociation constant — pKa

Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 5.80E+02 — l/kg

Define dispersivity (click brown cell and use pull down list)

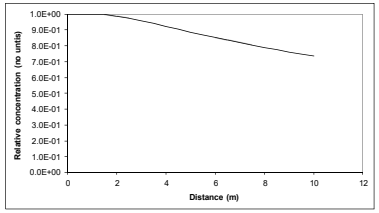
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	1.00E+00	8.30E-01	m
Transverse dispersivity	**az**	0.00E+00	1.00E-01	8.30E-02	m
Vertical dispersivity	**ay**	0.00E+00	1.00E-02	8.30E-03	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}X)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration	Concentration
	(No units)	mg/l
0	1.0E+00	8.80E-03
0.5	1.00E+00	8.80E-03
1.0	1.00E+00	8.80E-03
1.5	9.96E-01	8.76E-03
2.0	9.88E-01	8.69E-03
2.5	9.75E-01	8.58E-03
3.0	9.59E-01	8.44E-03
3.5	9.41E-01	8.28E-03
4.0	9.23E-01	8.12E-03
4.5	9.04E-01	7.96E-03
5.0	8.86E-01	7.80E-03
5.5	8.68E-01	7.64E-03
6.0	8.51E-01	7.49E-03
6.5	8.34E-01	7.34E-03
7.0	8.19E-01	7.20E-03
7.5	8.03E-01	7.07E-03
8.0	7.89E-01	6.94E-03
8.5	7.75E-01	6.82E-03
9.0	7.61E-01	6.70E-03
9.5	7.49E-01	6.59E-03
10.0	7.36E-01	6.48E-03

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Herbert Road			
Site Address:				
Completed by:	Ruth Howells			
Date:	31.10.2016		Version:	1
Contaminant	Zinc			
Target Concentration (C_T)	0.009	mg/l	Origin of C_T:	Water Framework Directive

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Zinc**		
Target concentration	C_T	**0.009**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	0.00E+00	dimensionless	
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	3.10E+01	l/kg	*USEPA - Risk Screening Envionmental Indicators Model*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

Soil water partition coefficient used in Level Assessment	**Kd**	**3.10E+01**	**l/kg**	*Specified value*

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	**2.81E-01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.009	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Zinc**		from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	**C_T**	**0.009**	**mg/l**	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m		
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**9.00E-03**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		2.81E-01	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Zinc		from Level 1
Target Concentration	C_T	0.009	mg/l	from Level 1
Dilution Factor	DF	1.00E+00		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil leachate concentration as mg/l		
Enter soil leachate concentration		0.216	mg/l	
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Surampalli et al*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	1.20E+02	m	from Level 2
Plume thickness in aquifer at source	Sy	5.00E-01	m	from Level 2
Bulk density of aquifer materials	ρ	2.09E+00	g/cm^3	*Geotech Testing*
Effective porosity of aquifer	n	5.90E-01	fraction	
Hydraulic gradient	i	6.22E+00	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	8.64E-02	m/d	from Level 2
Distance to compliance point	x	1.00E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	3.10E+01	l/kg	*see options*
Longitudinal dispersivity	ax	1.000	m	*see options*
Transverse dispersivity	az	0.100	m	*see options*
Vertical dispersivity	ay	0.010	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	9.10E-01	m/d
Retardation factor	Rf	1.11E+02	fraction
Decay rate used	λ	7.70E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	6.22E+00	fraction
Rate of contaminant flow due to retardation	u	8.21E-03	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	7.36E-01	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**1.36E+00**	**fraction**
Soil leachate concentration	Co	2.16E-01	

Remedial Targets

Level 3 Remedial Target		**1.22E-02**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		3.82E-01	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**10**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**7.36E-01**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 3.10E+01 — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction
Organic carbon partition coefficient — Koc — 1.40E+01 — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg
Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg
pH value — pH
Acid dissociation constant — pKa
Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 3.10E+01 — l/kg

Define dispersivity (click brown cell and use pull down list)

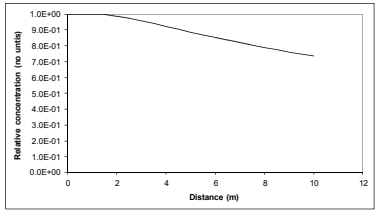
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	1.00E+00	8.30E-01	m
Transverse dispersivity	**az**	0.00E+00	1.00E-01	8.30E-02	m
Vertical dispersivity	**ay**	0.00E+00	1.00E-02	8.30E-03	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}X)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	31.10.2016
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	2.16E-01
0.5	1.00E+00	2.16E-01
1.0	1.00E+00	2.16E-01
1.5	9.96E-01	2.15E-01
2.0	9.88E-01	2.13E-01
2.5	9.75E-01	2.11E-01
3.0	9.59E-01	2.07E-01
3.5	9.41E-01	2.03E-01
4.0	9.23E-01	1.99E-01
4.5	9.04E-01	1.95E-01
5.0	8.86E-01	1.91E-01
5.5	8.68E-01	1.88E-01
6.0	8.51E-01	1.84E-01
6.5	8.34E-01	1.80E-01
7.0	8.19E-01	1.77E-01
7.5	8.03E-01	1.73E-01
8.0	7.89E-01	1.70E-01
8.5	7.75E-01	1.67E-01
9.0	7.61E-01	1.64E-01
9.5	7.49E-01	1.62E-01
10.0	7.36E-01	1.59E-01

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Herbert Road			
Site Address:				
Completed by:	Ruth Howells			
Date:	28.10.2016		Version:	1
Contaminant	Benzo(a)pyrene			
Target Concentration (C_T)	0.00000017	mg/l	Origin of C_T:	Water Framework Directive

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Environment Agency

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

Calculate for non-polar organic chemicals

Contaminant		**Benzo(a)pyrene**		
Target concentration	**C_T**	**0.00000017**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	1.86E-05	dimensionless	*EA 2003*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd		l/kg	
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc	3.60E-02	fraction	Laboratory Soil Chemical Testing
Organic carbon partition coefficient	Koc	1.02E+06	l/kg	*EA 2003*
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

Soil water partition coefficient used in Level Assessment	**Kd**	**3.68E+04**	**l/kg**	*Calculated value*

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	**6.26E-03**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.00000017	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Benzo(a)pyrene**	from Level 1	This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).
Target concentration	**C_T**	**0.00000017** **mg/l**	from Level 1	

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m		
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**1.70E-07**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		6.26E-03	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Benzo(a)pyrene		from Level 1
Target Concentration	C_T	0.00000017	mg/l	from Level 1
Dilution Factor	DF	1.00E+00		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil leachate concentration as mg/l		
Enter soil leachate concentration		0.007	mg/l	
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+03	days	*Surampalli et al*
Calculated decay rate	λ	1.90E-04	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	1.20E+02	m	from Level 2
Plume thickness in aquifer at source	Sy	5.00E-01	m	from Level 2
Bulk density of aquifer materials	ρ	2.09E+00	g/cm^3	*Geotech Testing*
Effective porosity of aquifer	n	5.90E-01	fraction	*SR3*
Hydraulic gradient	i	6.22E+00	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	8.64E-02	m/d	from Level 2
Distance to compliance point	x	1.00E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	3.68E+04	l/kg	*see options*
Longitudinal dispersivity	ax	1.000	m	*see options*
Transverse dispersivity	az	0.100	m	*see options*
Vertical dispersivity	ay	0.010	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	9.10E-01	m/d
Retardation factor	Rf	1.30E+05	fraction
Decay rate used	λ	1.90E-04	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	6.22E+00	fraction
Rate of contaminant flow due to retardation	u	6.98E-06	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	1.88E-21	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**5.32E+20**	**fraction**
Soil leachate concentration	Co	7.00E-03	

Remedial Targets

Level 3 Remedial Target		**9.04E+13**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		3.33E+18	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**10**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**1.88E-21**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for non-polar organic chemicals

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — 3.60E-02 — fraction
Organic carbon partition coefficient — Koc — 1.02E+06 — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg
Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg
pH value — pH
Acid dissociation constant — pKa
Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 3.68E+04 — l/kg

Define dispersivity (click brown cell and use pull down list)

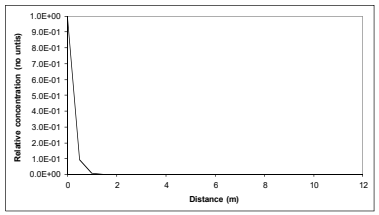
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	1.00E+00	8.30E-01	m
Transverse dispersivity	**az**	0.00E+00	1.00E-01	8.30E-02	m
Vertical dispersivity	**ay**	0.00E+00	1.00E-02	8.30E-03	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	7.00E-03
0.5	9.34E-02	6.54E-04
1.0	8.72E-03	6.10E-05
1.5	8.12E-04	5.68E-06
2.0	7.52E-05	5.26E-07
2.5	6.93E-06	4.85E-08
3.0	6.37E-07	4.46E-09
3.5	5.84E-08	4.09E-10
4.0	5.35E-09	3.74E-11
4.5	4.89E-10	3.43E-12
5.0	4.48E-11	3.13E-13
5.5	4.10E-12	2.87E-14
6.0	3.75E-13	2.63E-15
6.5	3.44E-14	2.41E-16
7.0	3.15E-15	2.20E-17
7.5	2.89E-16	2.02E-18
8.0	2.65E-17	1.85E-19
8.5	2.43E-18	1.70E-20
9.0	2.23E-19	1.56E-21
9.5	2.05E-20	1.43E-22
10.0	1.88E-21	1.32E-23

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Herbert Road			
Site Address:				
Completed by:	Ruth Howells			
Date:	28.10.2016		Version:	1
Contaminant	Benzo(ghi)perylene			
Target Concentration (C_T)	0.0000082	mg/l	Origin of C_T:	Water Framework Directive

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

Calculate for non-polar organic chemicals

Contaminant		**Benzo(ghi)perylene**	
Target concentration	C_T	**0.0000082**	**mg/l**

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	4.70E-01	fraction	SR3
Air filled soil porosity	θa	1.20E-01	fraction	SR3
Bulk density of soil zone material	ρ	2.09E+00	g/cm^3	SR3
Henry's Law constant	H	3.03E-05	dimensionless	*EA 2003*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd		l/kg	
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc	1.72E-01	fraction	Laboratory Soil Chemical Testing
Organic carbon partition coefficient	Koc	4.07E+05	l/kg	*EA 2003*
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	
Soil water partition coefficient used in Level Assessment	**Kd**	**7.01E+04**	**l/kg**	*Calculated value*

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	**5.75E-01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.0000082	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Benzo(ghi)perylene**		from Level 1
Target concentration	**C_T**	**0.0000082**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	1.79E-03	m/d	**met office - cardiff monitoring station**	
Area of contaminant source	A	1.80E+04	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	1.50E+02	m		
Saturated aquifer thickness	da	5.00E-01	m	**0.5m assumed of 3.8m made ground thickness**	
Hydraulic Conductivity of aquifer in which dilution occurs	K	8.64E-02	m/d	**Primarily well compacted clay soil**	
Hydraulic gradient of water table	i	6.25E-04	fraction	**10cm over 100m (assumed)**	
Width of contaminant source perpendicular to groundwater flow	w	1.20E+02	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l	**Unknown**	
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	5.00E-01	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**1.00E+00**		
Level 2 Remedial Target		**8.20E-06**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		5.75E-01	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	7.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		7.00E+00	mg/l	0

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Benzo(ghi)perylene		from Level 1
Target Concentration	C_T	0.0000082	mg/l	from Level 1
Dilution Factor	DF	1.00E+00		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil leachate concentration as mg/l		
Enter soil leachate concentration		0.0067	mg/l	
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+03	days	*Surampalli et al*
Calculated decay rate	λ	1.90E-04	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	1.20E+02	m	from Level 2
Plume thickness in aquifer at source	Sy	5.00E-01	m	from Level 2
Bulk density of aquifer materials	ρ	2.09E+00	g/cm^3	*Geotech Testing*
Effective porosity of aquifer	n	5.90E-01	fraction	
Hydraulic gradient	i	6.22E+00	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	8.64E-02	m/d	from Level 2
Distance to compliance point	x	1.00E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	7.01E+04	l/kg	*see options*
Longitudinal dispersivity	ax	1.000	m	*see options*
Transverse dispersivity	az	0.100	m	*see options*
Vertical dispersivity	ay	0.010	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	9.10E-01	m/d
Retardation factor	Rf	2.48E+05	fraction
Decay rate used	λ	1.90E-04	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	6.22E+00	fraction
Rate of contaminant flow due to retardation	u	3.67E-06	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	5.14E-30	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**1.94E+29**	**fraction**
Soil leachate concentration	Co	6.70E-03	

Remedial Targets

Level 3 Remedial Target		**1.59E+24**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		1.12E+29	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**10**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	**5.14E-30**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for non-polar organic chemicals

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — 1.72E-01 — fraction
Organic carbon partition coefficient — Koc — 4.07E+05 — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg
Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg
pH value — pH
Acid dissociation constant — pKa
Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 7.01E+04 — l/kg

Define dispersivity (click brown cell and use pull down list)

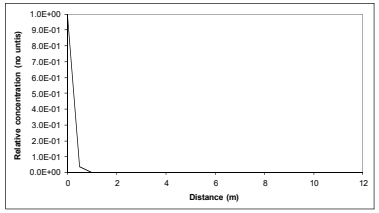
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	1.00E+00	8.30E-01	m
Transverse dispersivity	**az**	0.00E+00	1.00E-01	8.30E-02	m
Vertical dispersivity	**ay**	0.00E+00	1.00E-02	8.30E-03	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}X)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Herbert Road
Completed by:	Ruth Howells
Date:	28.10.2016
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	6.70E-03
0.5	3.48E-02	2.33E-04
1.0	1.21E-03	8.13E-06
1.5	4.22E-05	2.82E-07
2.0	1.46E-06	9.76E-09
2.5	5.01E-08	3.36E-10
3.0	1.72E-09	1.15E-11
3.5	5.88E-11	3.94E-13
4.0	2.01E-12	1.35E-14
4.5	6.86E-14	4.59E-16
5.0	2.34E-15	1.57E-17
5.5	8.00E-17	5.36E-19
6.0	2.73E-18	1.83E-20
6.5	9.33E-20	6.25E-22
7.0	3.19E-21	2.14E-23
7.5	1.09E-22	7.31E-25
8.0	3.73E-24	2.50E-26
8.5	1.28E-25	8.56E-28
9.0	4.38E-27	2.93E-29
9.5	1.50E-28	1.00E-30
10.0	5.14E-30	3.44E-32

ANNEX I
Copies of Correspondence

terrafirma

Our Ref: RL/12032

Your Ref:

Contact: Ruth Howells

Terra Firma (Wales) Ltd.
Consulting Geotechnical & Geo-Environmental Engineers
Site Investigation Contractors

5 Deryn Court, Wharfedale Road,
Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 Fax: 029 2073 5433
Email: info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

22nd June 2015

Riversee Limited
Orchard House
21 Castle Rise
Llanvaches
Newport
NP26 3BS

For the attention of Mr Darran Watts

Dear Darran

CHEMICAL TESTING: STOCKPILED MATERIAL INTENDED AS ENGINEERED FILL

1.0 Introduction

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

Riversee Limited currently has a large stockpile and adjacent smaller stockpile of material intended for use as engineered fill. The stockpiles are understood to total 22,000m^3 in volume.

Terra Firma (Wales) Limited was commissioned by Riversee Limited to undertake sampling and chemical testing of this material to assess its suitability for use.

This has been carried out in accordance with Terra Firma (Wales) Limited's Remediation Strategy prepared for the site, which specifies that for each 250m^3 (per source) that 1 representative sample be taken for screening. This strategy was agreed with Newport City Council. The stockpile is made up of several indistinguishable sources, and has therefore been treated as a singular source.

A series of 13 trial holes were excavated into the top of the main stockpile to a depth of 3m. Samples were taken at varying depths. The remainder (bottom) of the main stockpile, and the smaller stockpile, will be sampled and tested in due course, once the 3m cover has been removed.

The trial pits/soils were logged and a total of 36 samples were taken (equating to an estimated 9000m^3 of soil).

2.0 Soil Test Results

The soils were submitted to the laboratories of Derwentside Environmental Testing Services for testing. All results are summarised in the following tables, and have been compared to regulatory residential soil guidelines (without plant uptake).

Chemical test certificates can are enclosed.

Table 2.1 Summary of Soil Chemical Test Results Standard Suite

Substance	Threshold (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Arsenic	32	CLEA SGV	<0.2	19	0
Cadmium	10	CLEA SGV	<0.1	2.1	0
Chromium III	910	CIEH C4UL	<0.15	53	0
Chromium VI	6.0	CIEH C4UL	<1.0	<1.0	0
Copper	2400	CIEH C4UL	<0.2	140	0
Lead	200	C4SL	<0.3	130	0
Mercury	170	CLEA SGV	<0.05	0.27	0
Nickel	130	CLEA SGV	<1.0	53	0
Selenium	350	CLEA SGV	<0.5	43	0
Zinc	3700	CIEH C4UL	<1.0	1200	0
Cyanide	8.0	CLEA SGV	<0.1	0.2	0
Organic matter	-	-	0.7	9.7	-
Sulphate	2400	BRE	600	2700	-
pH	-	-	8.0	11.5	-
Phenol	420	CLEA SGV	<0.3	2.2	0
Total PAH	-	CLEA SGV	<0.1	4.3	*

Notes:

- * See speciated PAH results (see Table 2.2)

2.0 Soil Test Results (Continued)

Table 2.2 Summary of Soil Test Results Speciated PAH

Substance	Threshold (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Naphthalene	2.3	CIEH C4UL	<0.03	<0.03	0
Acenaphthylene	2900	CIEH C4UL	<0.03	<0.03	0
Acenapthene	3000	CIEH C4UL	<0.03	<0.03	0
Fluorene	2800	CIEH C4UL	<0.03	0.04	0
Phenanthrene	1300	CIEH C4UL	<0.03	0.5	0
Anthracene	31000	CIEH C4UL	<0.03	0.1	0
Fluoranthene	1500	CIEH C4UL	<0.03	1.2	0
Pyrene	3700	CIEH C4UL	<0.03	0.86	0
Benzo(a)anthracene	11	CIEH C4UL	<0.03	0.38	0
Chrysene	30	CIEH C4UL	<0.03	0.41	0
Benzo(b)fluoranthene	3.9	CIEH C4UL	<0.03	0.31	0
Benzo(k)fluoranthene	110	CIEH C4UL	<0.03	0.13	0
Benzo(a)pyrene	3.2	CIEH C4UL	<0.03	0.22	0
Benzo(ghi)perylene	45	CIEH C4UL	<0.03	0.11	0
Dibenzo(ah)anthracene	0.31	CIEH C4UL	<0.03	<0.03	0
Indeno(123cd)pyrene	360	CIEH C4UL	<0.03	0.1	0

Notes:

- GAC based on 1% soil organic matter content (SOM)

2.0 Soil Test Results (Continued)

Table 2.3 Summary of Soil Chemical Test Results Petroleum Hydrocarbons

Substance	Threshold (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of exceedences
			Minimum	Maximum	
PH- Aliphatic					
>C5-C6	42	CIEH C4UL	<0.01	<0.01	0
>C6-C8	100	CIEH C4UL	<0.01	<0.01	0
>C8-C10	27	CIEH C4UL	<0.01	<0.01	0
>C10-C12	130	CIEH C4UL	<1.5	<1.5	0
>C12-C16	1100	CIEH C4UL	<1.2	7.1	0
>C16-C21^	65000	CIEH C4UL	<1.5	15	0
>C21-C35^	65000	CIEH C4UL	<3.4	150	0
PH- Aromatic					
>C5-C7	370	CIEH C4UL	<0.01	<0.01	0
>C7-C8	860	CIEH C4UL	<0.01	0.01	0
>C8-C10	47	CIEH C4UL	<0.01	0.12	0
>C10-C12	250	CIEH C4UL	<0.9	<0.9	0
>C12-C16	1800	CIEH C4UL	<0.5	<0.5	0
>C16-C21	1900	CIEH C4UL	<0.6	14	0
>C21-C35	1900	CIEH C4UL	<1.4	260	0

Notes:

- GAC based on 1% soil organic matter content (SOM)

2.0 Soil Test Results (Continued)

All samples were screened for asbestos. The results are as follows:

Table 2.4 Summary of Soil Chemical Test Results Asbestos

Sample Location	Asbestos Type	Form	Total Mass in Soil (%)
S1	NAD	-	-
S2	NAD	-	-
S3	NAD	-	-
S4	NAD	-	-
S5	NAD	-	-
S6	Chrysotile	Clumps of fibres	0.001
S7	Chrysotile	Bundle of fibres	<0.001
S8	NAD	-	-
S9	NAD	-	-
S10	NAD	-	-
S11	Chrysotile	Bundles of fibres	<0.001
S12	Amosite	Free fibres	<0.001
S13	Amosite Chrysotile	Clumps of fibres	0.024
S14	Chrysotile	Clumps of fibres	<0.001
S15	Chrysotile	Clumps of fibres	<0.001
S16	Chrysotile	Bundles of fibres	<0.001
S16	Chrysotile	Cement fragment	<0.001
S17	Chrysotile	Clumps of fibres	<0.001
S18	Chrysotile	Clumps of fibres	<0.001
S19	Chrysotile	Free fibres	<0.001
S20	Chrysotile	Bundles of fibres	<0.001
S21	Chrysotile	Bundles of fibres	<0.001
S22	Chrysotile	Bundles of fibres	<0.001
S23	Chrysotile	Free fibres	<0.001
S24	NAD	-	-
S25	Chrysotile	Bundles of fibres	<0.001
S26	NAD	-	-
S27	NAD	-	-
S28	NAD	-	-
S29	NAD	-	-
S30	NAD	-	-
S31	NAD	-	-
S32	Chrysotile	Bundles of fibres	<0.001
S33	NAD	-	-
S34	NAD	-	-
S35	NAD	-	-
S36	NAD	-	-

Notes:

- NAD – No Asbestos Detected

3.0 Soil Leachate Results

All 36 samples were subject to leachate analysis in accordance with BS:EN:12457 for a standard suite, speciated PAH and petroleum hydrocarbons to ensure that the soils do not present a risk to groundwater or the River Usk.

Table 2.5
Summary of Leachate Chemical Test Results
Standard Suite

Substance	Threshold (mg/l)	Source	Measured Concentrations of Tested Substances (mg/l)		Number of Exceedences
			Minimum	Maximum	
Arsenic	0.05	WFD	0.0003	0.0065	0
Cadmium*	0.00008 – 0.00025	WFD	<0.00003	<0.00003	BLDL
Chromium III	0.0047	WFD	<0.001	0.0031	0
Chromium VI	0.0034	WFD	<0.003	<0.01	BLDL
Copper*	0.001 – 0.028	WFD	0.0008	0.011	++
Lead	0.0072	WFD	<0.0009	0.001	0
Mercury	0.0005	WFD	<0.00001	<0.00001	0
Nickel	0.02	WFD	<0.0005	0.0025	0
Selenium	0.01	DWD	<0.00025	0.0018	0
Zinc*	0.008 – 0.125	WFD	<0.00125	0.00389	0
Cyanide	0.001	WFD	<0.04	<0.04	0
Sulphate	250	DWD	4.4	15	0
Total Phenol	0.0077	WFD	<0.0005	<0.0005	0
pH	-	-	6.5	10.1	-
Total PAH	-	-	<0.0002	0.0019	-
Chloride	250	DWD	0.69	3.9	0

Notes:

- *Threshold dependant on hardness
- BLDL - Below Laboratory Detection Limit
- ++ 29 samples above lower threshold. Zero samples above upper threshold.

Table 2.6
Summary of Leachate Chemical Test Results
Speciated PAH and Petroleum Hydrocarbons

Substance	Threshold (mg/l)	Source	Measured Concentrations of Tested Substances (mg/l)		Number of Exceedences
			Minimum	Maximum	
PAH					
Naphthalene	0.0024	WFD	<0.00001	0.00002	0
Acenaphthylene	-	-	<0.00001	<0.00001	BLDL
Acenapthene	-	-	<0.00001	<0.00001	BLDL
Fluorene	-	-	<0.00001	<0.00001	BLDL
Phenanthrene	-	-	<0.00001	<0.00001	-
Anthracene	0.0001	WFD	<0.00001	<0.00001	0
Fluoranthene	0.0001	WFD	<0.00001	<0.00001	0
Pyrene	-	-	<0.00001	<0.00001	BLDL
Benzo(a)anthracene	-	-	<0.00001	<0.00001	BLDL
Chrysene	-	-	<0.00001	<0.00001	BLDL
Benzo(b)fluoranthene	0.00003	WFD	<0.00001	<0.00001	0
Benzo(k)fluoranthene	0.00003	WFD	<0.00001	<0.00001	0
Benzo(a)pyrene	0.00005	WFD	<0.00001	<0.00001	0
Dibenzo(ah)anthracene	-	-	<0.00001	<0.00001	BLDL
Benzo(ghi)perylene	0.000002	WFD	<0.00001	<0.00001	0
Indeno(123cd)pyrene	0.00002	WFD	<0.00001	<0.00001	0
Petroleum Hydrocarbons					
PH- Aliphatic					
>C5-C6	-	-	<0.0001	<0.0001	BLDL
>C6-C8	-	-	<0.0001	<0.0001	BLDL
>C8-C10	-	-	<0.0001	<0.0001	BLDL
>C10-C12	-	-	<0.001	<0.001	BLDL
>C12-C16	-	-	<0.001	<0.001	BLDL
>C16-C21	-	-	<0.001	<0.001	BLDL
>C21-C35	-	-	<0.001	<0.001	BLDL
PH- Aromatic					
>C5-C7	0.01*	WFD	<0.0001	<0.0001	0
>C7-C8	0.05**	WFD	<0.0001	<0.0001	0
>C8-C10	0.03***	WFD	<0.0001	<0.0001	0
>C10-C12	-	-	<0.001	<0.001	BLDL
>C12-C16	-	-	<0.001	<0.001	BLDL
>C16-C21	-	-	<0.001	<0.001	BLDL
>C21-C35	-	-	<0.001	<0.001	BLDL

Notes:

- BLDL - Below Laboratory Detection Limit
- * Threshold for benzene
- ** Threshold for toluene
- ***Threshold for Xylene
- BLDL - Below Laboratory Detection Limit

4.0 Conclusions

All substances tested for in soil were found to be below their respective regulatory guidelines.

Asbestos was identified in numerous soil samples.

All substances were found to be non-leachable (below the limits of laboratory detection) or leachable to acceptable levels.

The soils are considered to be suitable for use as engineered fill provided the appropriate bespoke permit is granted from the NRW with regards to asbestos and capping of the fill with a geotextile membrane and 300mm clean cover is implemented as specified in the Remediation Strategy for the site.

We trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact us.

Yours sincerely
for: Terra Firma (Wales) Ltd

R. Howells

Mrs Ruth Howells

From: ruth@terrafirmawales.co.uk [mailto:ruth@terrafirmawales.co.uk]
Sent: 22 June 2015 16:37
To: JBale@cardiff.gov.uk; Geraint Nicholas Roberts
Subject: Re: 15/0408 - Herbert Road - proposed engineered fill (bottom half of stockpile)

Hi Geraint

Please find attached for approval (Planning Condition 20) my letter confirming that the top half of the stockpile intended as engineered fill is suitable for use (provided the NRW grant the anticipated permit regarding the asbestos).

Kind Regards

Ruth Howells
M.Geol

Geotechnical and Geo-environmental Engineer
Terra Firma (Wales) Limited
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Mob: 07932368483
OfficeTel: 02920 735354
Fax: 02920 735433

terrafirma

Our Ref: RL/12032

Your Ref:

Contact: Ruth Howells

Terra Firma (Wales) Ltd.
Consulting Geotechnical & Geo-Environmental Engineers
Site Investigation Contractors

5 Deryn Court, Wharfedale Road,
Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 Fax: 029 2073 5433
Email: info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

6th August 2015

Riversee Limited
Orchard House
21 Castle Rise
Llanvaches
Newport
NP26 3BS

For the attention of Mr Darran Watts

Dear Darran

CHEMICAL TESTING: STOCKPILED MATERIAL INTENDED AS ENGINEERED FILL – LOWER HALF OF STOCKPILE

1.0 Introduction

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

Riversee Limited currently has a large stockpile intended for use as engineered fill. The stockpile is an estimated 23,000m^3 in volume.

Terra Firma (Wales) Limited was commissioned by Riversee Limited to undertake sampling and chemical testing of this material to assess its suitability for use.

The upper half of the stockpile (9000m^3) has previously been sampled and tested.

This letter details testing of the remaining 14,000m^3 or material. The lower half of the stockpile is up to 3m in thickness and nineteen trial holes were excavated through the stockpile to obtain samples from varying depths. Sampling was carried out in two stages, on the 8th and 13th July 2015.

This has been carried out in accordance with Terra Firma (Wales) Limited's Remediation Strategy prepared for the site, which specifies that for each 250m^3 (per source) that 1 representative sample be taken for screening. This strategy was agreed with Newport City Council. The stockpile is made up of several indistinguishable sources, and has therefore been treated as a singular source.

Fifty-six samples were taken in total.

2.0 Soil Test Results

The soils were submitted to the laboratories of Derwentside Environmental Testing Services for testing. All results are summarised in the following tables, and have been compared to regulatory residential soil guidelines (without plant uptake).

Chemical test certificates can are enclosed.

Table 2.1 Summary of Soil Chemical Test Results Standard Suite

Substance	Threshold (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Arsenic	32	CLEA SGV	4.2	23	0
Cadmium	10	CLEA SGV	0.3	3.0	0
Chromium III	910	CIEH C4UL	16	130	0
Chromium VI	6.0	CIEH C4UL	<1.0	<1.0	0
Copper	7100	CIEH C4UL	11	65	0
Lead	310	C4SL	20	**330**	**1**
Mercury	170	CLEA SGV	<0.05	0.66	0
Nickel	130	CLEA SGV	14	44	0
Selenium	350	CLEA SGV	<0.5	1.0	0
Zinc	40000	CIEH C4UL	52	190	0
Cyanide	8.0	CLEA SGV	<0.1	0.5	0
Organic matter	-	-	0.5	10	-
Sulphate	2400	BRE	600	4100	**5**
pH	-	-	7.6	11.5	-
Phenol	420	CLEA SGV	<0.3	0.8	0
Total PAH	-	CLEA SGV	<0.1	11	*

Notes:

- * See speciated PAH results (see Table 2.2)

2.0 Soil Test Results (Continued)

Table 2.2 Summary of Soil Test Results Speciated PAH

Substance	Threshold (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Naphthalene	2.3	CIEH C4UL	<0.03	1.3	0
Acenaphthylene	2900	CIEH C4UL	<0.03	<0.03	0
Acenapthene	3000	CIEH C4UL	<0.03	0.22	0
Fluorene	2800	CIEH C4UL	<0.03	0.18	0
Phenanthrene	1300	CIEH C4UL	<0.03	1.4	0
Anthracene	31000	CIEH C4UL	<0.03	0.34	0
Fluoranthene	1500	CIEH C4UL	<0.03	2.1	0
Pyrene	3700	CIEH C4UL	<0.03	1.8	0
Benzo(a)anthracene	11	CIEH C4UL	<0.03	0.82	0
Chrysene	30	CIEH C4UL	<0.03	0.92	0
Benzo(b)fluoranthene	3.9	CIEH C4UL	<0.03	0.94	0
Benzo(k)fluoranthene	110	CIEH C4UL	<0.03	0.31	0
Benzo(a)pyrene	3.2	CIEH C4UL	<0.03	0.69	0
Indeno(123cd)pyrene	45	CIEH C4UL	<0.03	0.32	0
Dibenzo(ah)anthracene	0.31	CIEH C4UL	<0.03	0.1	0
Benzo(ghi)perylene	360	CIEH C4UL	<0.03	0.37	0

Notes:

- GAC based on 1% soil organic matter content (SOM)

2.0 Soil Test Results (Continued)

Table 2.3 Summary of Soil Chemical Test Results Petroleum Hydrocarbons

Substance	Threshold (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of exceedences
			Minimum	Maximum	
PH- Aliphatic					
>C5-C6	42	CIEH C4UL	<0.01	0.22	0
>C6-C8	100	CIEH C4UL	<0.01	0.26	0
>C8-C10	27	CIEH C4UL	<0.01	0.14	0
>C10-C12	130	CIEH C4UL	<1.5	1.8	0
>C12-C16	1100	CIEH C4UL	<1.2	8.8	0
>C16-C21^	65000	CIEH C4UL	<1.5	13	0
>C21-C35^	65000	CIEH C4UL	<3.4	140	0
PH- Aromatic					
>C5-C7	370	CIEH C4UL	<0.01	0.01	0
>C7-C8	860	CIEH C4UL	<0.01	0.03	0
>C8-C10	47	CIEH C4UL	<0.01	0.15	0
>C10-C12	250	CIEH C4UL	<0.9	<0.9	0
>C12-C16	1800	CIEH C4UL	<0.5	3.1	0
>C16-C21	1900	CIEH C4UL	<0.6	22	0
>C21-C35	1900	CIEH C4UL	<1.4	290	0

Notes:

- GAC based on 1% soil organic matter content (SOM)

2.0 Soil Test Results (Continued)

All samples were screened for asbestos. The results are as follows:

Table 2.4 Summary of Soil Chemical Test Results Asbestos

Sample Location	Asbestos Type	Form	Total Mass in Soil (%)
TP1 1.00m	NAD	-	-
TP1 2.00m	NAD	-	-
TP1 3.00m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP2 1.00m	NAD	-	-
TP2 2.00m	Chrysotile	Chrysotile present as small fibre bundles	<0.001
TP2 2.90m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP3 0.50m	NAD	-	-
TP3 1.50m	NAD	-	-
TP3 3.50m	NAD	-	-
TP4 0.50m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP4 2.00m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP4 3.00m	Chrysotile	Chrysotile present as small fibre bundle	<0.001
TP5 1.00m	NAD	-	-
TP5 2.00m	NAD	-	-
TP5 3.00m	Chrysotile	Chrysotile present as fibre bundles	0.005
TP6 0.50m	NAD	-	-
TP6 2.00m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP6 3.00m	Chrysotile	Chrysotile present as fibre bundles	0.003
TP7 0.30m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP7 0.60m	Chrysotile	Chrysotile present as small fibre bundle	<0.001
TP7 2.00m	NAD	-	-
TP8 0.50m	NAD	-	-
TP8 2.00m	NAD	-	-
TP8 2.50m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP9 0.30m	Chrysotile Amosite	Chrysotile present as fibre bundles Amosite also present as small bundle	<0.001
TP9 1.00m	NAD	-	-
TP9 1.60m	Chrysotile	Chrysotile present as fibre bundles	0.002
TP10 0.50m	Amosite	Amosite present as small fibre bundle	<0.001
TP10 1.40m	NAD	-	-
TP10 2.20m	Chrysotile	Chrysotile present as fibre bundles	<0.001
TP11 0.50m	Chrysotile	Chrysotile present as small fibre bundle	<0.001
TP11 1.00m	NAD	-	-
TP12 1.00	NAD	none	-
TP12 2.00	Chrysotile	small bundle of Chrysotile	0.001
TP12 3.00	NAD	-	-
TP13 1.00	NAD	-	-
TP13 2.00	NAD	-	-
TP13 3.00	NAD	-	-

Table 2B (Continued) Summary of Soil Chemical Test Results Asbestos			
TP14 1.00	NAD	-	-
TP14 2.00	Chrysotile	small bundle of Chrysotile	0.001
TP14 3.00	NAD	-	-
TP15 0.30	NAD	-	-
TP15 1.00	NAD	-	-
TP15 2.20	Chrysotile	small bundle of Chrysotile	<0.001
TP16 0.50	NAD	-	-
TP16 1.50	NAD	-	-
TP16 2.50	NAD	-	-
TP17 0.50	NAD	-	-
TP17 1.50	NAD	-	-
TP17 2.50	NAD	-	-
TP18 0.50	Chrysotile	small bundle of Chrysotile	<0.001
TP18 1.50	NAD	-	-
TP18 2.50	NAD	-	-
TP19 0.50	NAD	-	-
TP19 1.50	NAD	-	-
TP19 2.50	NAD	-	-

3.0 Soil Leachate Results

All 56 samples were subject to leachate analysis in accordance with BS:EN:12457 for a standard suite, speciated PAH and petroleum hydrocarbons to ensure that the soils do not present a risk to groundwater or the River Usk.

Table 2.5
Summary of Leachate Chemical Test Results
Standard Suite

Substance	Threshold (mg/l)	Source	Measured Concentrations of Tested Substances (mg/l)		Number of Exceedences
			Minimum	Maximum	
Arsenic	0.05	WFD	0.0007	0.0075	0
Cadmium*	0.00008 – 0.00025	WFD	<0.00003	0.00047	1
Chromium III	0.0047	WFD	<0.001	0.0024	0
Chromium VI	0.0034	WFD	<0.003	<0.003	0
Copper*	0.001 – 0.028	WFD	0.0011	0.092	++
Lead	0.0072	WFD	<0.00009	0.0033	0
Mercury	0.0005	WFD	<0.00001	0.00003	0
Nickel	0.02	WFD	0.0006	0.0022	0
Selenium	0.01	DWD	0.00044	0.00067	0
Zinc*	0.008 – 0.125	WFD	<0.00125	0.0062	0
Cyanide	0.001	WFD	<0.04	<0.04	BLDL
Sulphate	250	DWD	2.0	51	0
Total Phenol	0.0077	WFD	<0.0005	0.0018	0
pH	-	-	7.1	10.7	-
Total PAH	-	-	<0.0002	0.011	-
Chloride	250	DWD	0.57	130	0

Notes:

- *Threshold dependant on hardness
- BLDL - Below Laboratory Detection Limit
- ++ 53 samples above lower threshold. Zero samples above upper threshold.

Table 2.6
Summary of Leachate Chemical Test Results
Speciated PAH and Petroleum Hydrocarbons

Substance	Threshold (mg/l)	Source	Measured Concentrations of Tested Substances (mg/l)		Number of Exceedences
			Minimum	Maximum	
PAH					
Naphthalene	0.0012	WFD	<0.00001	0.004	1
Acenaphthylene	-	-	<0.00001	<0.00001	1 ALDL
Acenapthene	-	-	<0.00001	0.00002	7 ALDL
Fluorene	-	-	<0.00001	0.0001	6 ALDL
Phenanthrene	-	-	<0.00001	0.00058	33 ALDL
Anthracene	0.0001	WFD	<0.00001	0.00002	0
Fluoranthene	0.0001	WFD	<0.00001	0.0045	6
Pyrene	-	-	<0.00001	0.0039	37 ALDL
Benzo(a)anthracene	-	-	<0.00001	0.00025	25 ALDL
Chrysene	-	-	<0.00001	0.0002	27 ALDL
Benzo(b)fluoranthene	0.00003	WFD	<0.00001	0.00025	14
Benzo(k)fluoranthene	0.00003	WFD	<0.00001	0.00002	5
Benzo(a)pyrene	0.00005	WFD	<0.00001	0.00017	6
Dibenzo(ah)anthracene	-	-	<0.00001	0.00004	6 ALDL
Benzo(ghi)perylene	0.000002	WFD	<0.00001	0.00019	22
Indeno(123cd)pyrene	0.00002	WFD	<0.00001	<0.00001	11
Petroleum Hydrocarbons					
PH- Aliphatic					
>C5-C6	-	-	<0.0001	<0.0001	BLDL
>C6-C8	-	-	<0.0001	<0.0001	BLDL
>C8-C10	-	-	<0.0001	<0.0001	**1 ALDL**
>C10-C12	-	-	<0.001	<0.001	BLDL
>C12-C16	-	-	<0.001	<0.001	BLDL
>C16-C21	-	-	<0.001	0.067	**3 ALDL**
>C21-C35	-	-	<0.001	<0.001	BLDL
PH- Aromatic					
>C5-C7	0.008*	WFD	<0.0001	<0.0001	0
>C7-C8	0.04**	WFD	<0.0001	<0.0001	0
>C8-C10	0.03***	WFD	<0.0001	<0.0001	0
>C10-C12	-	-	<0.001	<0.001	BLDL
>C12-C16	-	-	<0.001	<0.001	BLDL
>C16-C21	-	-	<0.001	0.0061	**1 ALDL**
>C21-C35	-	-	<0.001	<0.001	BLDL

Notes:

- BLDL - Below Laboratory Detection Limit
- ALDL – Above Laboratory Detection Limit
- * Threshold for benzene
- ** Threshold for toluene
- ***Threshold for Xylene

4.0 Conclusions

One sample, taken form TP4 (3.0m) was found to have a lead content of 330mg/kg, exceeding the threshold of 300mg/kg. However, given the depth that this soil will be buried at depth and capped with at least 1.3m of imported fill prior to residential development, the lead is not considered to pose a risk to the human health of site end users. Also, the lead was not found to be leachable to unacceptable levels.

Five samples had an elevated sulphate content. However, this would not pose a risk to human health, especially as it is to be buried at depth. The sulphate content should be taken into account when determining the class of any concrete used on site that may extend into or through the fill.

Asbestos was identified in numerous soil samples. Those substances found to exceed their detection limit are detail in Table 2.7 below.

Table 2.7
Substances Present Above Threshold Levels or Laboratory Detection Limit in Leachate

Substance	Location	Depth Sampled in Stockpile (m)	Recorded Concentration (mg/l	Guideline Value (mg/l)
PH Aliphatic C16-C21	TP12	1.0	0.0014	Results above laboratory detection limit. No guideline available
	TP17	1.5	0.004	
	TP18	1.5	0.0067	
PH Aliphatic C8-C10	TP6	0.5	0.0006	
PH Aromatic C16-C21	TP18	1.5	0.0061	
Cadmium	TP4	3.0	0.00047	0.00025 Upper threshold limit
Naphthalene	TP16	2.5	0.004	0.0012
Fluoranthene	TP13	3.0	0.00056	0.0001
	TP16	2.5	0.0045	
	TP18	1.5	0.00011	
	TP3	3.5	0.00011	
	TP5	3.0	0.0001	
	TP9	0.3	0.00031	
Benzo(k)fluoranthene	TP1	2.0	0.00004	0.00003
	TP3	1.5	0.00004	
	TP3	3.5	0.00005	
	TP4	3.0	0.00005	
	TP9	0.3	0.00009	

Table 2.7 (Continued)
Substances Present Above Threshold Levels or Laboratory Detection Limit in Leachate

Indeno(123cd)pyrene	TP1	2.0	0.00009	0.00002
	TP1	3.0	0.00006	
	TP3	1.5	0.00003	
	TP4	2.0	0.00003	
	TP5	1.0	0.00004	
	TP5	2.0	0.00004	
	TP5	3.0	0.00006	
	TP6	2.0	0.00007	
	TP6	3.0	0.00006	
	TP9	0.3	0.00016	
	TP10	1.4	0.00006	
Benzo(b)fluoranthene	TP1	2.0	0.00012	0.00003
	TP1	3.0	0.00009	
	TP2	2.9	0.00004	
	TP3	1.5	0.00007	
	TP3	3.0	0.0007	
	TP4	2.0	0.00005	
	TP4	3.0	0.00013	
	TP5	1.0	0.00005	
	TP5	2.0	0.00006	
	TP5	3.0	0.00009	
	TP6	2.0	0.0001	
	TP6	3.0	0.00008	
	TP9	0.3	0.00025	
	TP10	1.4	0.00007	

Table 2.7 (Continued)
Substances Present Above Threshold Levels or Laboratory Detection Limit in Leachate

Benzo(a)pyrene	TP1	2.0	0.00011	0.00005
	TP1	3.0	0.00006	
	TP3	3.5	0.00011	
	TP4	3.0	0.0001	
	TP6	2.0	0.00006	
	TP9	0.3	0.00017	
Benzo(ghi)perylene	TP1	1.0	0.00005	0.000002
	TP1	2.0	0.0002	
	TP1	3.0	0.00008	
	TP2	1.0	0.00002	
	TP2	2.9	0.00004	
	TP3	1.5	0.00003	
	TP3	3.5	0.00022	
	TP4	0.5	0.00002	
	TP4	2.0	0.00004	
	TP4	3.0	0.00021	
	TP5	1.0	0.00005	
	TP5	2.0	0.00004	
	TP5	3.0	0.00008	
	TP6	0.5	0.00002	
	TP6	2.0	0.00007	
	TP6	3.0	0.00006	
	TP7	0.3	0.00002	
	TP8	0.5	0.00002	
	TP8	2.5	0.00002	
	TP9	0.3	0.00019	
	TP10	1.4	0.00007	
	TP10	2.2	0.00002	

It is considered that the result for naphthalene is marginal and will not present any risks to the aquatic environment.

Results that exceed laboratory detection limits are similarly considered marginal and such levels would soon be rendered negligible through any effects of dilution and attenuation.

The soils are considered to be suitable for use as engineered fill provided the NRW find the results acceptable and that the fill is capped with a geotextile membrane and 300mm clean cover is implemented as specified in the Remediation Strategy.

We trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact us.

Yours sincerely
for: Terra Firma (Wales) Ltd

Mrs Ruth Howells

Hi Geraint

Please find attached our letter report following testing of the lower part or the stockpile being used as engineered fill.

Also attached is our Remediation Strategy where Section 3.2.1 has been amended slightly in accordance with the results.

Copies have been sent directly to Jason Bale already.

Kind Regards

Ruth Howells
M.Geol

Geotechnical and Geo-environmental Engineer
Terra Firma (Wales) Limited
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Mob: 07932368483
OfficeTel: 02920 735354
Fax: 02920 735433

This e-mail transmission is strictly confidential and intended solely for the person or organisation to whom it is addressed. It may contain privileged and confidential information and if you are not the intended recipient, you must not copy, distribute or take any action in reliance on it. If you have received this e-mail in error, please notify us as soon as possible and delete it. We have an anti-virus system installed on all our PCs and therefore any files leaving us via e-mail will have been checked for known viruses. Terra Firma (Wales) Ltd accepts no responsibility once an e-mail and any attachments leave us.

Cyfoeth Naturiol Cymru
Natural Resources Wales

Ein cyf/Our ref: SE/2015/119016/03-L01

Eich cyf/Your ref: CONEX/15/0977

Rivers House, St Mellons Business Park, St Mellons, Cardiff, CF3 0EY

Ebost/Email: andrew.hurst@naturalresourceswales.gov.uk

Ffôn/Phone: 03000 653074

Geraint Roberts
Newport City Council
Regeneration, Investment & Housing
Civic Centre
Godfrey Road
Newport
NP20 4UR

14 August 2015

Annwyl Mr Roberts/Dear Mr Roberts

PARTIAL DISCHARGE OF CONDITIONS 05 (REMEDIATION STRATEGY TO SAFEGUARD THE AQUATIC ENVIRONMENT) AND 06 (REMEDIATION STRATEGY TO SAFEGUARD RESIDENTIAL AMENITIES) OF PLANNING PERMISSION 00/0768 FOR REPLACEMENT PRIMARY SCHOOL, ALL WEATHER PITCH, SOFT AND HARD PLAY AREAS AND RESIDENTIAL DEVELOPMENT (IN RELATION TO THE RESIDENTIAL AREA ONLY AND AMENDMENT TO APPROVAL 15/0408) AT LAND TO SOUTH OF AND INCLUDING GLEBELANDS STADIUM, BANK STREET, NEWPORT

Thank you for consulting Cyfoeth Naturiol Cymru/Natural Resources Wales about the above, with additional information which was received on 11 August 2015.

We have reviewed the following updated information submitted in support of this application:

- Stockpiled Chemical Summary, Terra Firma, 6th August 2015, Ref: RL/12032

It is recognised that comparing leachate data to EQS is conservative in terms of assessing whether the material is 'suitable for use'. The statement in Section 4.0 *'results that exceed laboratory detection limits are similarly considered marginal and such levels would soon be rendered negligible through any effects of dilution and attenuation'* is acknowledged. However, the results indicate several exceedences of around 2 orders of magnitude (above the EQS) for Benzo(ghi)perylene, yet this is not mentioned specifically in the text. Whilst, again we recognise that comparison to EQS is conservative and not site specific, further information in terms of the ultimate destination of the stockpiled material (in relation to the sensitive River USK SAC and direct pathway reen) would help further assess the risk posed by these exceedences.

Additionally, the exceedence in relation to lead in soil is noted. We would advise that the

opinion of the local authority (as regulator for human health) is sought in relation to this matter.

We trust our advice is clear. If you have any queries, please do not hesitate to get in touch.

Yn gywir/Yours faithfully

Andrew Hurst
Development Planning Assistant
Cyfoeth Naturiol Cymru/Natural Resources Wales
Ffôn/Tel: (03000) 653074

E-bost/E-mail
andrew.hurst@cyfoethnaturiolcymru.gov.uk andrew.hurst@naturalresourceswales.gov.uk

Gwefan/Website:
www.cyfoethnaturiolcymru.gov.uk/www.naturalresourceswales.gov.uk

RH/12032/let20

19th August 2015

Natural Resources Wales
Rivers House
St Mellons Business Park
Fortran Road
Cardiff
CF3 0EY

For the attn. of Mr Matthew Llewhellin

Dear Matthew

STOCKPILE CHEMICAL SUMMARY: HERBERT ROAD, NEWPORT

I write in reference to correspondence between Mr Andrew Hurst and Mr Geraint Roberts of Newport City Council (Ref: SE/2015/119016/03-L01) dated 14th August 2015, and our telephone conversation yesterday.

I note your reference to the leachate levels of benzo(ghi)perylene and the occurrence of some concentrations of this substance reaching 2 orders of magnitude above the threshold level of 0.000002mg/l.

This magnitude of exceedence was found at four locations, TP1 (2.0m), TP3 (3.5m), TP4 (3.0m) and TP9 (0.3m).

When looking at the sampling locations within the stockpile, TP1, TP3 and TP4 are seen to be adjacent to one another, excavated within the far southern end of the stockpile. TP9 located at the northern end of the stockpile, and the sample was taken from the top soil horizon on the stockpile, which itself reached only 0.4m in thickness. This soil type was not noted in the six surrounding locations and can therefore be considered localised.

When considering the speciated PAH results, the reen that runs along the northern edge of the fill area is deemed to be a potential receptor. The reen flows into the River Usk, and similarly is a potential receptor via this route.

The groundwater beneath the site does not have continuity with the River Usk so this also is not considered a potentially contaminative pathway.

Although the risk to the reen and River Usk are deemed low as the effects of dilution would be significant, it is proposed that the risk be managed by control of where the fill materials from the lower half of the stockpile are deposited on site.

The site is roughly rectangular in shape and measures approximately 200m in length (north to south). I would suggest that materials from the bottom half of the stockpile be placed no closer than 50m from the proposed final reen location (it is understood that the reen is to be widened in places).

Following placement a minimum of 500mm imported soil (source yet to be confirmed) will be placed over the stockpile sourced soils that once compacted will act to limit the infiltration of any water to the stockpile sourced soils.

I trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact me.

Yours sincerely
for: Terra Firma (Wales) Ltd

Mrs Ruth Howells

From: ruth@terrafirmawales.co.uk [mailto:ruth@terrafirmawales.co.uk]
Sent: 13 October 2015 13:14
To: Bale, Jason
Subject: herbert road - imported soil lead exceedence

Hi Jason

I have had some test results for soils at Herbert Road sourced from a Taylor Wimpey Aberbargoed site – please see attached.

As you will see, there is one exceedence of lead (5000mg/kg). All other soil results are fine. Given that this will be capped with at least 0.5m further fill and the lead is not leachable to unacceptable levels, may this soil be permitted to remain?

Thanks

Ruth Howells
M.Geol

Geotechnical and Geo-environmental Engineer
Terra Firma (Wales) Limited
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Mob: 07932368483
OfficeTel: 02920 735354
Fax: 02920 735433

This e-mail transmission is strictly confidential and intended solely for the person or organisation to whom it is addressed. It may contain privileged and confidential information and if you are not the intended recipient, you must not copy, distribute or take any action in reliance on it. If you have received this e-mail in error, please notify us as soon as possible and delete it. We have an anti-virus system installed on all our PCs and therefore any files leaving us via e-mail will have been checked for known viruses. Terra Firma (Wales) Ltd accepts no responsibility once an e-mail and any attachments leave us.

From: Bale, Jason
Sent: Thursday, October 15, 2015 11:41 AM
To: mailto:ruth@terrafirmawales.co.uk
Subject: RE: herbert road - imported soil lead exceedence

Hi Ruth,
Have you checked with the lab to ascertain if that result has been reported correctly, as it does not seem to be consistent with the other results?
Whilst I appreciate that the soil will be covered by further imported material and the leachate results does not suggest any concerns, I would have concerns in accepting soils with such high values, as ultimately you are introducing contamination to site. The value of 5000 mg/kg is of is over 2 x times the C4SL for **commercial use (2300 mg/kg),** and is over 20 x times the principal NBC concentration of 230 mg/kg.

Best regards
Jason

Jason Bale BSc MIEnvSc
Group Leader/Arweinydd Grwp
Pollution Control Division/Rheoli Llygredd
Shared Regulatory Service|Gwasanaethau Rheoliadol a Rennir
Bridgend, Cardiff & the Vale of Glamorgan| Pen-y-bont, Caerdydd ar Bro Morganwwg
Tel/Ffon: 02920 871 896
Fax/Ffacs: 02920 827 431
www.cardiff.gov.uk
P **Please consider the environment - Do you really need to print this e-mail? Ystyriwch yr amgylchedd - Oes rhaid i chi brintio'r e-bost hwn**

From: ruth@terrafirmawales.co.uk [mailto:ruth@terrafirmawales.co.uk]
Sent: 27 October 2015 14:29
To: Llewhellin, Matthew
Subject: Herbert Road - short leachate result query

Hi Matthew

In the results of one soil source brought on to site the petroleum hydrocarbon leachate test results are above the limits of detection but there are no guideline values. Just wondered how you would view these and whether you could advise if you find this material acceptable? Please note the asbestos in it, which I have discussed with Jason Bale at Cardiff Council, who is reluctant to accept the soil (asbestos quantification results are being scheduled today), though perhaps may do if the top 300mm of Riversee material (above the geotextile barrier) is increased to 600mm.

The material is already laid on site (the client had already brought it on to site before we were notified) so I am keen to prevent its removal if possible.

I would appreciate a quick response if at all possible – if you deem the leachate results inacceptable then I will cancel the asbestos quantification tests.

Kind Regards

Ruth Howells
M.Geol

Geotechnical and Geo-environmental Engineer
Terra Firma (Wales) Limited
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Mob: 07932368483
OfficeTel: 02920 735354
Fax: 02920 735433

This e-mail transmission is strictly confidential and intended solely for the person or organisation to whom it is addressed. It may contain privileged and confidential information and if you are not the intended recipient, you must not copy, distribute or take any action in reliance on it. If you have received this e-mail in error, please notify us as soon as possible and delete it. We have an anti-virus system installed on all our PCs and therefore any files leaving us via e-mail will have been checked for known viruses. Terra Firma (Wales) Ltd accepts no responsibility once an e-mail and any attachments leave us.

(12th November)

Hi Ruth,

Apologies for the delay on this.

I note the low concentrations of TPH referred to in the leachate analysis which seem mainly related to longer chain length aliphatic fractions. In the absence of an EQS we tend to use 10ug/l as a screening value i.e. for the purposes of progressing to the next tier within the RTM (p20) methodology etc (to assess risk). However, we are talking about very low levels here based on the lab analysis you provided and therefore I think pursuing the Remedial targets methodology (p20) or DQRA route in this instance would be a bit of an academic exercise. It would be helpful for our records if you could provide some brief qualitative justification as to why the concentrations are not likely to pose a risk to controlled waters and are therefore suitable for use. Please feel free to call me if you need to discuss.

Please note that I have not touched on the issues related to asbestos (that you are discussing with Jason Bale).

Kind Regards

Matt
Matt Llewhellin MSc BSc(Hons)
Arbenigwr Technegol/Technical Specialist (Contaminated Land)
Geowyddor/Geoscience
Cyfoeth Naturiol Cymru/Natural Resources Wales
Ffôn/Tel: 03000 654361

E-bost/E-mail:
matthew.llewhellin@cyfoethnaturiolcymru.gov.uk / matthew.llewhellin@naturalresourceswales.gov.uk
Ein diben yw sicrhau bod adnoddau naturiol Cymru yn cael eu cynnal, eu gwella a'u defnyddio yn gynaliadwy, yn awr ac yn y dyfodol.
Our purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future.

------See TFW letter 18th November

(17th Nov 2015)

Hi Jason

Further to our recent discussions about the Herbert Road imported engineered fill please find attached the asbestos quantification results.

To refresh your memory, soils from citivision (a Taylor Wimpey site in Newport) were brought on to site on two occasions. Whether the two batches were from the same area on the Taylor Wimpey site I don't know, but believe not otherwise the second batch would have been brought in as part of the first.

The results from the first batch (see 46635 attached – labelled as Aberbargoed but this is incorrect) had one exceedence of lead (as you commented on below – the labs confirmed that there was no mistake with the results). The second batch (see 47308 attached) has asbestos in both samples. The quantification shows a low % of fibres present.

I know that to keep both of these soil types on site is far from ideal, and normally the client wouldhave to remove the materials. However, in the best interest of my client, I would like prevent removal if possible (assuming the NRW are happy with leachate results which I am to address shortly) given the costs involved in hiring plant and disposal.

As previously discussed with yourself, a barrier and 300mm capping layer will comprise the top of the fill at this stage, prior to further raising of levels (by about 1m) by the later developer following a period of settlement (likely to take around a year). During this settlement period the site will be fenced off, as it is now, from off-site users. The nearest adjacent site users are pedestrians using the footpath between the site and the river.

Currently, I would say at least 500mm is still required on site to attain the fill level intended prior to the settlement period (to include the recommended 300mm). This is now not likely to occur until after Christmas.

If you do not consider that another approx minimum 200mm fill with overlying top 300mm layer and geotextile barrier (plus the additional 1m of cover at a later date) satisfactory then may I suggest that the barrier be laid at the base of the top 500mm of fill?

Also, I best mention the materials brought on to site from north of the reen that has been used as engineered fill. I found the old validation report and the results for imported capping materials north of the reen, but it was not clear which results specifically were for this fill - there were two sources used, one source used north of the reen, one elsewhere. A few results were not great so due to the uncertainty I told the client that the material should be tested to your specification even if it was largely stone type fill.

Please give me a call if you need clarification on anything.

Many Thanks

Ruth Howells
M.Geol

Geotechnical and Geo-environmental Engineer
Terra Firma (Wales) Limited
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Mob: 07932368483
OfficeTel: 02920 735354
Fax: 02920 735433

This e-mail transmission is strictly confidential and intended solely for the person or organisation to whom it is addressed. It may contain privileged and confidential information and if you are not the intended recipient, you must not copy, distribute or take any action in reliance on it. If you have received this e-mail in error, please notify us as soon as possible and delete it. We have an anti-virus system installed on all our PCs and therefore any files leaving us via e-mail will have been checked for known viruses. Terra Firma (Wales) Ltd accepts no responsibility once an e-mail and any attachments leave us.

terrafirma

Our Ref: RH/12032/let21

Your Ref:

Contact:

Terra Firma (Wales) Ltd.
Consulting Geo-Technical & Geo-Environmental Engineers
Site Investigation Contractors

5 Deryn Court, Wharfedale Road,
Pentwyn, Cardiff CF23 7HB
Tel: 029 2073 5354 Fax: 029 2073 5433
Email: info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

18th November 2015

Natural Resources Wales
Rivers House
St Mellons Business Park
Fortran Road
Cardiff
CF3 0EY

For the attn. of Mr Matthew Llewhellin

Dear Matthew

IMPORTED CITIVISION FILL: HERBERT ROAD, NEWPORT

Further to our recent correspondence regarding petroleum hydrocarbon leachate results for samples of imported fill soil I confirm the following:

Engineered fill of a maximum volume of 250m^3 was brought on to site from the nearby Taylor Wimpey Citivision site in Newport. Whilst stockpiled the fill was sampled by a Terra Firma engineer.

The samples were submitted for laboratory analysis and tested according to the Terra Firma Remediation Strategy Report for a range of substances. Leachate tests were carried out according to BS:EN:12457.

Please find the test results enclosed.

For one of the two samples the concentration of the aliphatic petroleum hydrocarbon fraction for band C12-C16 was 19ug/l (0.019mg/l), and for aliphatic band C16 – C21 29ug/l (0.029mg/l).

No guideline exists for comparison but if the NRW suggested 10ug/l screening value is applied then both these results are found to be in exceedence.

Potential receptors to the leachable petroleum hydrocarbons are the drainage reen along the northern edge of the fill area, the River Usk and groundwater. The reen flows into the River Usk.

The fill has been placed roughly 40m west of the River Usk and 50m south of the reen.

The potential receptors are considered to be at negligible risk for a number of reasons.

1. The recorded levels, although elevated, are still very low and would soon be rendered insignificant through the effects of dilution before reaching a potential receptor.
2. The volume of this fill imported is small and the other representative sample did not exhibit elevated levels of petroleum hydrocarbons.
3. The fill overlies at least 500mm of imported well compacted engineered clay fill which is largely impermeable due to the compaction.
4. No surface run-off from the site to the River Usk can occur due to the embankment between the site and the River Usk (along which a footpath runs).
5. Below the engineered fill and in-situ made ground alluvium is present. The underlying bands of alluvium are largely impermeable, limiting the migration of perched groundwater to the deeper groundwater environment. Groundwater beneath the site has been confirmed to not be in hydraulic conductivity with the River Usk.
6. The Citivision made ground is itself to be overlain (probably in the new year now) by approximately 500mm further well compacted fill. This should effectively form a barrier to much or all percolating waters, significantly reducing the probability that the leachable petroleum hydrocarbons will mobilise.

I trust the above provides adequate explanation as to why there are not considered to be any significant risks to controlled waters and justification for retaining the fill soils on site.

I trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact me.

Yours sincerely
for: Terra Firma (Wales) Ltd

Mrs Ruth Howells

From: Geraint Nicholas Roberts
Sent: Wednesday, November 25, 2015 3:05 PM
To: ruth@terrafirmawales.co.uk
Subject: RE: NRW Planning Response CONEX/15/0977

Dear Ruth

I still have this application before me. As it stands CNC/NRW are not recommending that the condition is discharged. The last thing I have on my file is a copy letter you sent to Mat Llewhelin at CNC/NRW on the 19/08/2015. No information has been formally put to me addressing CNC/NRW's concerns since that date.

Since I have heard nothing from you or from CNC/NRW. In the light of the uncertainty over the suitability of the stockpiled material I would have little choice other than to refuse the application as it stands.

As such if the application isn't withdrawn or substantial evidence produced to show the matter is being progressed I will proceed to refuse the application after 02/12/2015.

Please contact me as necessary.

Geraint N. Roberts
Prif Swyddog Cynllunio / Principal Planning Officer
Tim yr Dwyrain / East Team
Adfywio, Buddsoddi aThai / Regeneration, Investment and Housing
01633 210094

From: ruth@terrafirmawales.co.uk [mailto:ruth@terrafirmawales.co.uk]
Sent: 26 November 2015 09:54
To: Llewhellin, Matthew
Subject: Fw: NRW Planning Response CONEX/15/0977

Hi Matthew

Following my phone call please see below the recent email from Geraint Roberts. I am concerned as the stockpile soils are, as you know, already down (in accordance with proposals in my letter of the 19th) and his proposal to refuse the application.

I have attached the original NRW letter from Andrew Hurst to which I was responding to on the 19th August.

I am out of the office now until tomorrow afternoon. If you have any questions please call me on my mobile.

Many Thanks

Ruth Howells
M.Geol

Geotechnical and Geo-environmental Engineer
Terra Firma (Wales) Limited
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Mob: 07932368483
OfficeTel: 02920 735354
Fax: 02920 735433

This e-mail transmission is strictly confidential and intended solely for the person or organisation to whom it is addressed. It may contain privileged and confidential information and if you are not the intended recipient, you must not copy, distribute or take any action in reliance on it. If you have received this e-mail in error, please notify us as soon as possible and delete it. We have an anti-virus system installed on all our PCs and therefore any files leaving us via e-mail will have been checked for known viruses. Terra Firma (Wales) Ltd accepts no responsibility once an e-mail and any attachments leave us.

Sent: 26 November 2015 10:35
To: Hurst, Andrew <Andrew.Hurst@cyfoethnaturiolcymru.gov.uk>
Subject: FW: NRW Planning Response CONEX/15/0977

Hi Andrew,
Please see email from Ruth Howells at Terra Firma below. She submitted a letter and further info in response to our letter SE/2015/119016-3 to me and cc'd you in on the 19th of August (I'll forward that separately now). I'd agreed informally with her that I was happy with what was in her letter of the 19th of August but I'm not sure I ever responded formally through planning liaison (well it doesn't look like it based on Geraint Robert's email below). Are you able to discuss with Geraint and tell him that we will respond (no objection to partial discharge of condition 5 – based on additional info).
thanks
Ruth/

Ein cyf/Our ref: SE/2015/119016/03-L02

Eich cyf/Your ref: CONEX/15/0977

Rivers House, St Mellons Business Park, St Mellons, Cardiff, CF3 0EY

Ebost/Email: andrew.hurst@naturalresourceswales.gov.uk

Ffôn/Phone: 03000 653074

Geraint Roberts
Newport City Council
Regeneration, Investment & Housing
Civic Centre
Godfrey Road
Newport
NP20 4UR

2 December 2015

Annwyl Mr Roberts/Dear Mr Roberts

PARTIAL DISCHARGE OF CONDITIONS 05 (REMEDIATION STRATEGY TO SAFEGUARD THE AQUATIC ENVIRONMENT) AND 06 (REMEDIATION STRATEGY TO SAFEGUARD RESIDENTIAL AMENITIES) OF PLANNING PERMISSION 00/0768 FOR REPLACEMENT PRIMARY SCHOOL, ALL WEATHER PITCH, SOFT AND HARD PLAY AREAS AND RESIDENTIAL DEVELOPMENT (IN RELATION TO THE RESIDENTIAL AREA ONLY AND AMENDMENT TO APPROVAL 15/0408) AT LAND TO SOUTH OF AND INCLUDING GLEBELANDS STADIUM, BANK STREET, NEWPORT

Thank you for consulting Cyfoeth Naturiol Cymru/Natural Resources Wales about the above, with additional information which was received on 19th August 2015.

We note that the additional information has been submitted in relation to our previous response – our reference SE/2015/119016/03, your reference CONEX/15/0977, dated 19th August 2015.

We have reviewed the following additional information submitted in support of this application:

- Stockpile Chemical Summary: Herbert Road, Newport, Letter to Matt Llewhellin, Natural Resources Wales, Ref RH/12032/let20, dated 19th August 2015.

Having reviewed the additional information as submitted above we have no objection to the partial discharge of condition 05 (Remediation Strategy to safeguard the aquatic environment) and 06 (Remediation Strategy to safeguard residential amenities).

We trust our advice is clear. If you have any queries, please do not hesitate to get in touch.

Yn gywir/Yours faithfully

Andrew Hurst
Development Planning Assistant
Cyfoeth Naturiol Cymru/Natural Resources Wales
Ffôn/Tel: (03000) 653074

E-bost/E-mail
andrew.hurst@cyfoethnaturiolcymru.gov.uk andrew.hurst@naturalresourceswales.gov.uk

Gwefan/Website:
www.cyfoethnaturiolcymru.gov.uk/www.naturalresourceswales.gov.uk

Hello Ruth

Please see the attached.

Notwithstanding CNC/NRW's lack of objection we have concerns over the proposal.

In essence parts of the stockpile will not be placed within 50m of the reen. However in practical terms we would not know which parts of the stockpile (we presume the southern end as opposed to the 'lower half') had been deposited in what part of the site from simple observation.

Also it isn't clear if the geotextile membrane would still be installed under your revised proposal.

Permission 00/0768 does have a contamination remediation verification condition attached (condition 7).

Potentially this would be a mechanism by which you could demonstrate compliance with your proposed strategy but this seems likely to involve a sampling regime post deposition of material. It may be useful if your client starts to consider how any approved strategy will be verified as completed at an early stage and potentially build that verification strategy into this submission?

Alternatively you might simply agree to deposit none of the stockpile within 50m of the reen. This is something we could check by direct observation once we were notified the stockpile had been moved onto the site? Again this could be built into any strategy

In conclusion at the moment we don't think we can agree the discharge of the conditions as sought.

Please get back to me by 02.12.2015 in the first instance if you wish to discuss any of the above observations.

Geraint N. Roberts
Prif Swyddog Cynllunio / Principal Planning Officer
Tim yr Dwyrain / East Team
Adfywio, Buddsoddi aThai / Regeneration, Investment and Housing
01633 210094

Our Ref: RH/12032/let22

Your Ref:

Contact:

Terra Firma (Wales) Ltd.
Consulting Geotechnical & Geo-Environmental Engineers
Site Investigation Contractors

5 Deryn Court, Wharfedale Road,
Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 Fax: 029 2073 5433
Email: info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

10th December 2015

Via Email

Principal Planning Officer
East Team
Regeneration, Investment and Housing

For the attn. of Mr Geraint N. Roberts

Dear Geraint

CONEX 15/0977: Land South of Glan Usk School (Glebelands)

In response to your email dated 2nd December 2015 and our subsequent conversation, I confirm that the parts of the stockpile (lower half) found to have levels of leachable PAH (as detailed in my letter to Matthew Llewhellin of the NRW on 19th August 2015) were placed on site towards the end of August 2015.

My letter to the NRW proposed that the affected two areas of the stockpile identified should be placed on site at a distance at least 50m from the drainage reen. Due to time constraints the client brought this material on to site before receiving a response and approval from the NRW.

Terra Firma (Wales) Limited was employed full time on site during the earthworks so far completed. I can confirm that the affected stockpile areas were segregated and laid in the southeast quadrant of the development site. This area lies at least 100m from the reen to the north.

At present the fill works on site are on hold and are anticipated to resume around April 2016, when the weather improves.

The entire stockpile has now been placed on site. In addition to this soils sourced from a Taylor Wimpey Newport Citivision site have been brought in on two occasions. The client has also stripped off soils from the part of the site that lies north of the reen and used this as engineered fill. All appropriate testing has been completed and reported to Jason Bale at Cardiff City Council for approval.

There are a few outstanding issues (two occurrences of asbestos fibres and a soil exceedence of lead) that are to be addressed and I am currently awaiting a response from Jason on instruction on how to proceed.

Once the earthworks resume Terra Firma will again be employed to:

1. Document the source and volume of imported materials

2. Sample and test all intended imported materials and to determine their suitability

3. Provide Jason Bale and the NRW with soil test results if they do not meet the standards outlined in the Terra Firma Remediation Strategy Report and discuss whether soils may be permitted for use

4. Retain a full time presence during import of soils and placement on site. Where soils are laid and from which source (if applicable) will be documented daily. This will be illustrated on plans where necessary. The thickness of any fill placed will also be noted, but this is limited due to engineering specifications. The intended location of imported fill on site will not be known until it arrives or just before, and it will depend on the volume of each source and which areas of the site are ready to receive fill (dependant on the weather and in-situ geotechnical testing).

5. The geotextile barrier is still intended to be laid below the top 300mm of imported fill. The 300mm thickness is subject to change (i.e. 300mm thickness may be increased) depending on the requirements of Jason Bale.

6. Placement of the membrane will be carried out whilst Terra Firma are on site and will be documented through photographs

7. Regular photographs will be taken during all the fill works

8. Following completion of the fill works (i.e. to a level of 8.95m AOD) Terra Firma will compile an Earthworks Validation Report. This is required for both geotechnical and geo-environmental verification and will demonstrate that the proposals made in our Remediation Strategy Report have been carried out appropriately (with the exception of flux box monitoring and garden capping – to be reported separately in due course). It will detail all imported soil details (source, chemical test certificates, council/NRW correspondence etc) and where specific soils were laid, supported by drawings and photographs.

9. The Earthworks Validation Report will also include the results and assessment of groundwater samples taken. One round was carried out prior to filling as specified in the Remediation Strategy. The strategy also specifies that if earthworks are not complete within the intended time (approximately 2 months - which they weren't) then the second and third post-earthworks groundwater sampling and testing should follow at 5 and 6 months, respectively, from the start date of the earthworks. The second round will be completed in January 2016, and the third round in February 2016. Once the earthworks are complete (which should be in the summer of 2016) then we will advise the client that a further two monitoring rounds will be necessary.

I trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact me.

Yours sincerely
for: Terra Firma (Wales) Ltd

R. Howells.

Mrs Ruth Howells

From: Bale, Jason
Sent: Friday, January 22, 2016 12:18 PM
To: mailto:ruth@terrafirmawales.co.uk
Cc: 'Peter Mackintosh'
Subject: RE: Herbert Road

Hi Ruth
My sincere apologies, I did mean to respond to you on this previously.. My new role means I have less time these days for CL issues, so this has been the reason for the delay in the response.

I had spoken to Peter Mackintosh at Newport as he is the new Senior Scientific Officer for them and is responsible for CL issues. We were both of the agreement that the likely risk exposure from the asbestos was likely to be low, given the additional surcharging and capping works that would be required, and thus from an end of use scenario the material was possibly ok to stay on site.

However, we would request that you advise your client further in terms of future importation that materials are sourced and sampled prior to importation, and that it would be unacceptable for future imported materials to contain asbestos.

I have copied Peter into this email, as ultimately he will be taking this site forward with Newport as Cardiff were only covering whilst they filled the vacant post.

I trust that this is acceptable with you and please do not hesitate to contact me if you wish to discuss further.
Best regards
Jason
Jason Bale BSc MIEnvSc
Team Manager - Environment / Amgylchedd Rheolwr Tîm
Shared Regulatory Service|Gwasanaethau Rheoliadol a Rennir
Bridgend, Cardiff & the Vale of Glamorgan| Pen-y-Bont ar Ogwr, Caerdydd ar Bro Morgannwg
Tel/ Ffôn: 02920 871 896

19

24.10.2016

Hi Ruth,

In reviewing the risk assessment I am generally happy that the material is unlikely to cause a significant risk to human health (future site users) provided the approach outline in section 5.1.2 is fulfilled. However, for completeness I would ask that you include a gas risk assessment of the imported material to further site users/property with comments upon the organic content.

As previously stated, I strongly recommend you have conformation from NRW that the material is acceptable before it is placed on site.

Kind regards,

Pete

20

From: ruth@terrafirmawales.co.uk [mailto:ruth@terrafirmawales.co.uk]
Sent: 04 November 2016 15:44
To: Llewhellin, Matthew <Matthew.Llewhellin@cyfoethnaturiolcymru.gov.uk>
Subject: Re: herbert road - final risk assessment report

Hi Matthew

Following your comments last week please find attached my revised risk assessment report for review. This now includes assessment with target concentrations derived using the remedial targets methodology. Any questions please just give me a call.

Kind Regards

Ruth Howells
M.Geol

Geotechnical and Geo-environmental Engineer
Terra Firma (Wales) Limited

Hi Ruth,

I have reviewed your submitted risk assessment including the derived site specific levels and can confirm that I have no further concerns. As discussed before, my comments are only in relation to potential risks to controlled waters . For comments in relation to permit compliance you would need to speak to the department who issued the permit in 2015.

Kind Regards

Matt

Matt Llewhellin MSc BSc(Hons)
Arbenigwr Technegol/Technical Specialist (Contaminated Land)
Geowyddor/Geoscience
Cyfoeth Naturiol Cymru/Natural Resources Wales
Ffôn/Tel: 03000 654361

E-bost/E-mail:
matthew.llewhellin@cyfoethnaturiolcymru.gov.uk / matthew.llewhellin@naturalresourceswales.gov.uk
Ein diben yw sicrhau bod adnoddau naturiol Cymru yn cael eu cynnal, eu gwella a'u defnyddio yn gynaliadwy, yn awr ac yn y dyfodol.
Our purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future.

ANNEX J
Compaction Specification Reports

COMPACTION SPECIFICATION

Lower Half of Engineered Fill Source
Stockpile Herbert Road
Newport

Prepared for:
Riversee Limited

July 2015

Report No. 12032/CS2

REPORT TITLE	**:**	**Compaction Specification: Lower Half of Engineered Fill Source Stockpile, Herbert Road, Newport**
REPORT STATUS	**:**	**Final**
JOB NUMBER	**:**	**12032/CS2**
DATE	**:**	**July 2015**
PREPARED BY	**:**	R. Howells. …….. **(Mrs R. Howells)**
REVIEWED BY	**:**	louisedow …….. **(Miss L. Dow)**
APPROVED BY	**:**	…….. **(Dr G. C. Lake)**

Executive Summary

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

Proposed engineered fill materials are stockpiled on a nearby site on Herbert Road.

Samples of the lower top half of the stockpile was sampled by Terra Firma.

These samples taken were submitted to Geo Site and Testing Services Limited in Llanelli in order to assess their optimum moisture content/maximum dry density and to undertake grading analyses.

The initial moisture content of the soils was found to be between 17 and 29% with an optimum moisture content of between 8 and 15%.

In order for there to be tolerable settlements from the placed fill materials, it needs to be compacted at or close to 95% of its Optimum Moisture Content/Maximum Dry Density. Drying of the soils is likely to be required to achieve this.

In order to meet the above criterion it is clear that the materials will need to be dried.

Grading analysis results have been used to classify the soils as selected stony cohesive material (Type 2C, 7D, 1A and 6F2).

The materials should be laid and compacted in layers as given by the Specification Works for Highways 600.

TABLE OF CONTENTS

Section 1 Introduction

1.1 Limitations and Exceptions

Section 2 Soil Property Testing

2.1 Soil Sampling
2.2 Optimum Moisture Content/Maximum Dry Density
2.3 Grading Analysis Results
2.4 Compaction Specification

Section 3 Conclusions as to the Suitability of the Materials as Site Fill

Tables

Table 2.1 Sample Descriptions
Table 2.2 Optimum Moisture Content/Maximum Dry Density Test Results
Table 2.3 Grading Analysis Results and Soil Classification
Table 2.4 Compaction Specification - Method 2
Table 2.5 Compaction Specification - Method 6

Annexes

Annex A Grading Analysis and Optimum Moisture Content and Maximum Dry Density Test Results

SECTION 1 Introduction

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

The ground is to be brought up in layers, in accordance with the Department of Transport Specification for Highway Works, prior to construction and the importation of inert materials in landscaped areas.

Proposed engineered fill materials are stockpiled on a nearby site on Herbert Road.

Terra Firma (Wales) Limited has been commissioned by Riversee Limited to undertake sampling and testing of off-site stockpiled soil to assess its suitability as fill.

This report details the compaction specification for soils in the lower half of the stockpile only.

1.1 Limitations and Exceptions

The compaction specification report has been prepared for the sole internal reliance of Riversee Limited and its design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The report represents the findings and opinions of experienced geo-environmental and geo-technical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may also be required.

SECTION 2 Soil Property Testing

2.1 Soil Sampling

Terra Firma (Wales) Limited visited the stockpile site on the 8th and 13th July in order to obtain samples for geotechnical testing.

Ten representative samples were taken and submitted to Geo Site and Testing Services Limited in Llanelli in order to assess their optimum moisture content/maximum dry density and to undertake grading analyses.

The table below summarises the samples taken.

Table 2.1 Sample Descriptions

Sample Location	Depth in Stockpile (m)	Description
TP1	1.0	Brown, grey and red brown mixed slightly sandy gravelly cobbly CLAY
TP1	2.0	Grey, red brown and red gravelly cobbly CLAY
TP3	3.5	Brown clayey SAND and GRAVEL and COBBLE, occasional boulder
TP4	2.0	Dark grey and brown mixed CLAY with red inclusions
TP4	3.0	Dark grey gravelly cobbly CLAY with red and brown inclusions
TP6	2.0	Dark grey sandy gravelly cobbly CLAY
TP7	2.0	Light grey brown gravelly cobbly CLAY
TP12	2.0	Grey gravelly cobbly CLAY
TP13	2.0	Grey sandy clayey GRAVEL and COBBLE
TP17	1.5	Grey and red mixed gravelly cobbly CLAY

2.2 Optimum Moisture Content/Maximum Dry Density

The results of the optimum moisture content and maximum dry density tests are detailed in the table below.

These tests were conducted in accordance with BS 1377: Part 4: 1990.

Table 2.2 Optimum Moisture Content/Maximum Dry Density Test Results

Sample Location	Depth in Stockpile (m)	Initial Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density(mg/m^3)
TP1	1.0	21	10	1.95
TP1	2.0	24	9.7	2.03
TP3	3.5	17	8.5	2.05
TP4	2.0	20	11	1.97
TP4	3.0	23	10	1.84
TP6	2.0	20	8.0	2.07
TP7	2.0	29	15	1.62
TP12	2.0	26	10	1.81
TP13	2.0	18	14	1.81
TP17	1.5	26	10	1.85

The suitable fill materials should be placed at or close to i.e. 95% of their optimum moisture content/maximum dry density and compacted in layers as per the requirements of the Specification for Highway Works.

The test certificates are given in **Annex A.**

2.3 Grading Analysis

The ten samples were tested in the laboratory by dry and wet sieving analysis to determine their grading characteristics. These tests were conducted in accordance with BS1377: Part 2, Clause 9.2: 1990.

The test certificates are presented in **Annex A.**

Based upon the soil property test results, and referring to Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements and Table 6/2: Grading Requirements for Acceptable Earthworks Materials, of the 'Specification for Highway Works, Series 600', the samples can be classified as summarised in the table below.

Table 2.3 Grading Analysis Results and Soil Classification

Sample Location	Depth in Stockpile (m)	Type (Table 6/2)	Classification (Table 6/1)	Compaction Method
TP1	1.0	7D	Selected Stony Cohesive Material	Method 2
TP6	2.0			
TP12	2.0			
TP3	3.5	6F2	Selected Granular Material	Method 6
TP4	2.0			
TP13	2.0			
TP7	2.0	2C	Stony Cohesive Material	Method 2
TP1	2.0			
TP4	3.0			
TP17	1.5			

The dark grey gravelly cobbly sampled in TP4 (3.0m) did not contain coarse enough fragments to strictly classed as Class 2C. As the volume of this soil type appears to be limited it is recommended that it is mixed with other soils classed as 2C and compacted accordingly.

Similarly, the sample from TP13 (2.0m), although not strictly 6F2, is close to conforming to 6F2 grading and therefore may be compacted as such.

2.4 Compaction Specification

Compaction should be undertaken in accordance with the appropriate methodology as given in of Table 6/4 of the Specification for Highway Works, Series 600, as summarised in **Tables 2.4 and 2.5.**

Details for just a smoothed wheeled roller and vibratory roller are provided. If an alternative roller is proposed then Table 6/4 should be consulted.

Table 2.4 Compaction Specification - Method 2

Type of Compaction Plant	Mass per Metre Width of Roll (kg)	Maximum depth of Compacted Layer (mm)	Number of Passes
Smoothed Wheeled Roller	2100 – 2700 2700 – 5400 >5400	125 125 150	10 8 8
Vibratory Roller	270 – 450 450 – 700 700 – 1300 1300 – 1800 1800 – 2300 2300 – 2900 2900 – 3600 3600 – 4300 4300 – 5000 >5000	75 75 125 150 150 175 200 225 250 275	16 12 10 8 4 4 4 4 4 4

Table 2.5 Compaction Specification - Method 6

Type of Compaction Plant	Mass per Metre Width of Roll (kg)	Number of Passes		
		110mm layer	150mm layer	250mm layer
Smoothed Wheeled Roller	2100 – 2700 2700 – 5400 >5400	Unsuitable 16 8	Unsuitable Unsuitable 16	Unsuitable Unsuitable Unsuitable
Vibratory Roller	270 – 450 450 – 700 700 – 1300 1300 – 1800 1800 – 2300 2300 – 2900 2900 – 3600 3600 – 4300 4300 – 5000 >5000	Unsuitable Unsuitable 16 6 4 3 3 2 2 2	Unsuitable Unsuitable Unsuitable 16 6 5 5 4 4 3	Unsuitable Unsuitable Unsuitable Unsuitable 12 11 10 8 7 6

2.4 Compaction Specification (Continued)

Compaction should be undertaken in accordance with Table 6/1 and 6/4.

Where combinations of different types or categories of plant are used, the depth of the layer should be for the type of plant requiring the least depth of layer, and the number of passes should be that for the type of plant requiring the greatest number of passes.

Earthmoving plants are not recommended for use as compaction plant, nor are lighter categories of plants used to provide preliminary compaction to assist the use of heavier plant.

The soils should be sorted and all deleterious material, such as timber and plastic removed.

All roots and tree roots should be excavated and removed.

The stability of excavations or fills should not be compromised by the location of stock piled materials or use of plant or location of temporary buildings/structures.

All earthworks must be kept free of water including arranging for the rapid removal of water, water shed onto the earthworks and water entering the earthworks from any source.

Fill materials especially cohesive (silt and clay) fill should not be deposited and compacted during wet weather, where an increase in moisture content will increase the liquid limit of the soil.

The initial moisture content of the soil was found to be double the optimum moisture content in some instances, indicating that the clay soils will need to be dried out prior to filling to achieve adequate compaction.

All exposed fill surfaces must be adequately weather proofed during inclement weather or at the end of the working day/compaction process. Any exposed cohesive fill that becomes wet and slurrified due to water ingress or weather erosion must be stripped off, spread into thin layers and aerated. The fill should then be re-compacted.

Plant movement across compaction layers should be restricted to that plant necessary for its deposition, spreading and compaction.

Fill areas should be constructed evenly over their full width and their fullest possible extent and the contractor should control and direct constructional plant and other traffic uniformly over them. Damage by construction plant should be made good with material having the same characteristics and strength as the material had before it was damaged.

Embankments and other areas of unsupported fills should not be constructed with steeper side slopes than the materials effective shear strength, with exception to allowing the adequate compaction at the edges before trimming back, within the minimum period necessary for the safety of the works.

2.4 Compaction Specification (Continued)

Where fill is to be placed against a natural slope, or sloping earthworks face including embankments, cuttings and other fills and excavations, such faces should be appropriately benched immediately before placing the subsequent fill.

In-situ density tests (sand replacement method) should be undertaken to ensure the compaction process is performing satisfactory during the enabling works. In-situ testing should be undertaken at an appropriate spacing to reflect the adequacy of the compaction process beneath the entire development area.

It is also recommended that a number of in-situ plate load tests be performed mid way through the earthworks and at the final finished site level beneath the access road.

The earthworks should be supervised by a suitable engineer.

The tests should be conducted in accordance with BS 1377: Part 9: 1990 under the supervision of a qualified geotechnical engineer.

Should the in-situ testing show densities which indicate that the compaction process is inadequate, the deposited material must be excavated and re-laid.

Allowances should also be made for the removal of soft spots and their replacement with imported suitable selected inert granular materials or suitable inert site won materials.

SECTION 3 Conclusions as to the Suitability of the Materials as Site Fill

In order for there to be tolerable settlements from the placed fill materials, they need to be compacted at or close to their optimum moisture content and maximum dry density (95%). This will ensure that a minimum 95% compaction will be achieved.

In order to meet the above criterion it is clear that the materials will need to be dried. This can be achieved by excavating and allowing the materials to dry naturally.

Once the given moisture content has been achieved then the materials may be used as structural fill. The materials have been graded according to the Specification Works for Highways 600 and should be laid and compacted in layers by referring to the Specification as described in Section 2.4.

A programme of in-situ density testing should also be carried out during fill works in order to confirm the effectiveness of the compaction procedure.

ANNEX A
Grading Analysis and Proctor Test Results

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 27497

Client's Reference: **12032**

Report Date: **27-07-2015**

Client **Terrafirma Wales Ltd**
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Contract Title: **Herbert Road, Newport**

For the attention of: **Ruth Liley**

Date Received: **10-07-2015**

Date Commenced: **10-07-2015**

Date Completed: **27-07-2015**

Test Description	Qty
PSD Wet Sieve method 1377 : 1990 Part 2 : 9.2 - * UKAS	10
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.3 - * UKAS	10
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

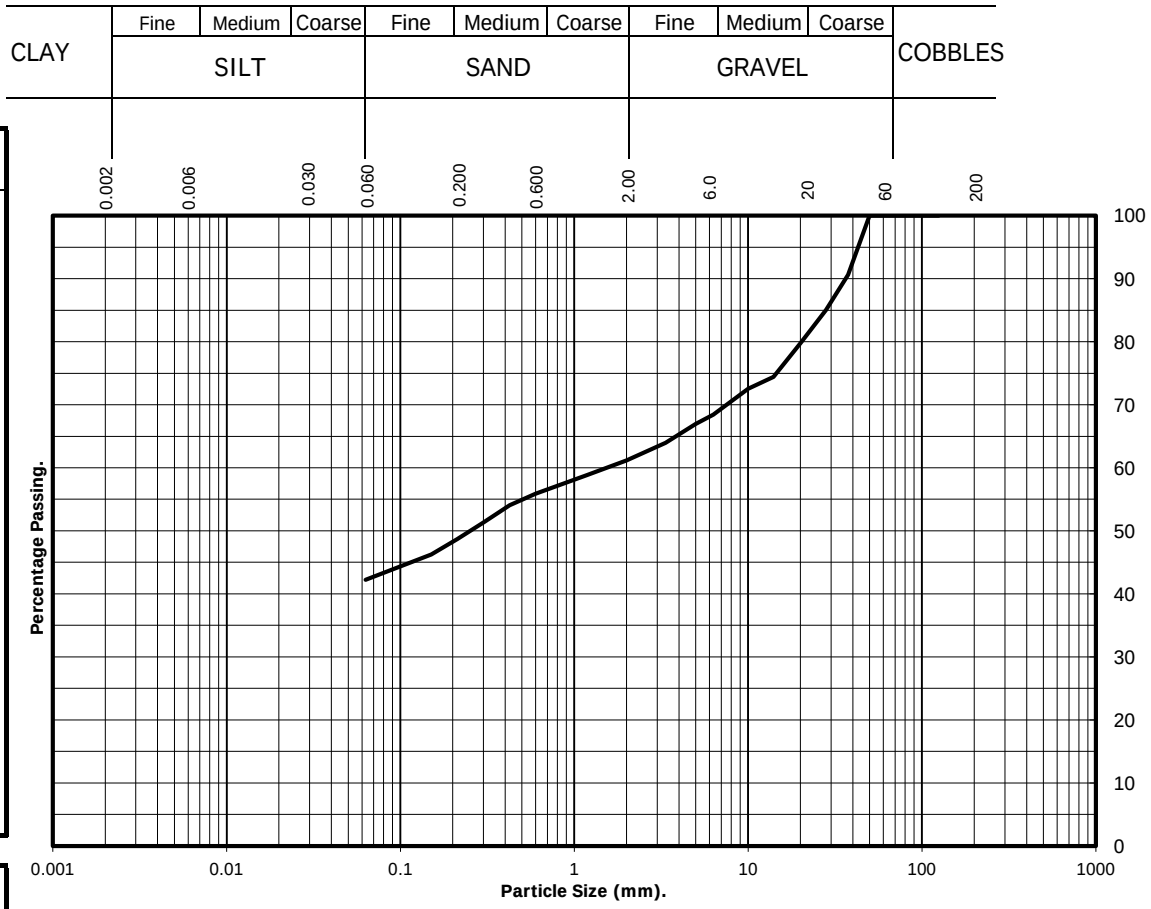
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP1**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**1.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy gravelly (fine-coarse) silty CLAY**



BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	91
28	85
20	80
14	74
10	73
6.3	68
5.0	67
3.35	64
2.00	61
1.18	59
0.60	56
0.425	54
0.300	51
0.212	49
0.150	46
0.063	42

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	42	19	39	0	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

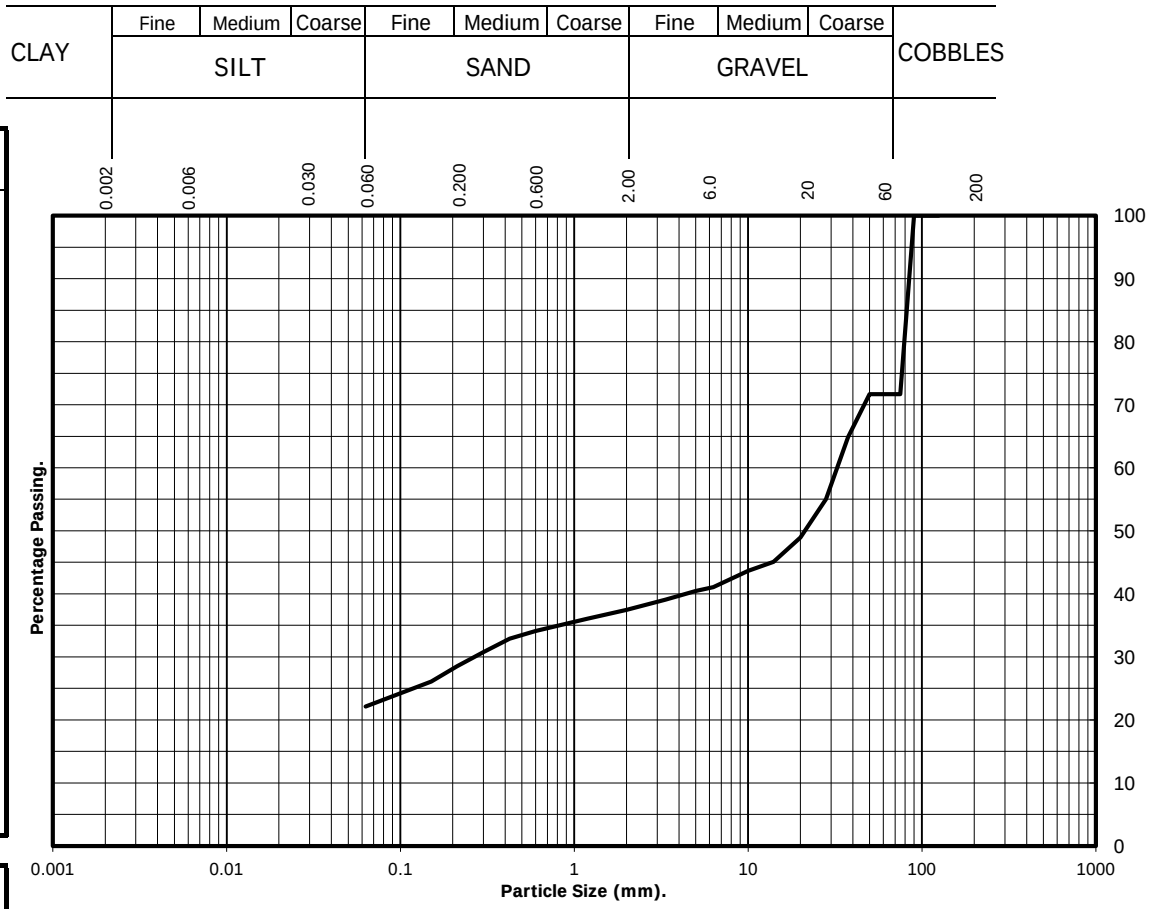
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP1**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	100
75	72
63	72
50	72
37.5	65
28	55
20	49
14	45
10	44
6.3	41
5.0	40
3.35	39
2.00	37
1.18	36
0.60	34
0.425	33
0.300	31
0.212	29
0.150	26
0.063	22

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	22	15	35	28	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

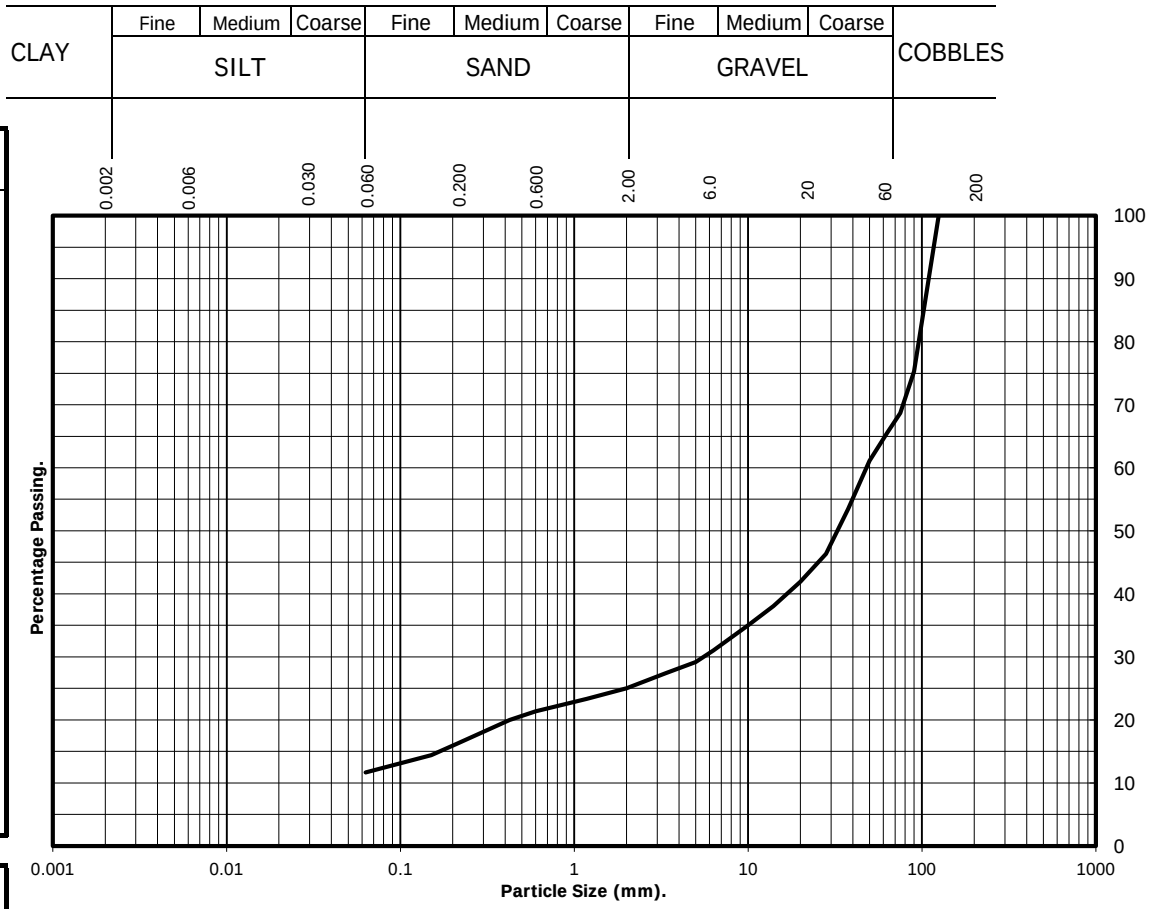
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP3**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**3.50**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	75
75	69
63	66
50	61
37.5	53
28	46
20	42
14	38
10	35
6.3	31
5.0	29
3.35	27
2.00	25
1.18	23
0.60	21
0.425	20
0.300	18
0.212	16
0.150	14
0.063	12

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	12	13	41	34	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

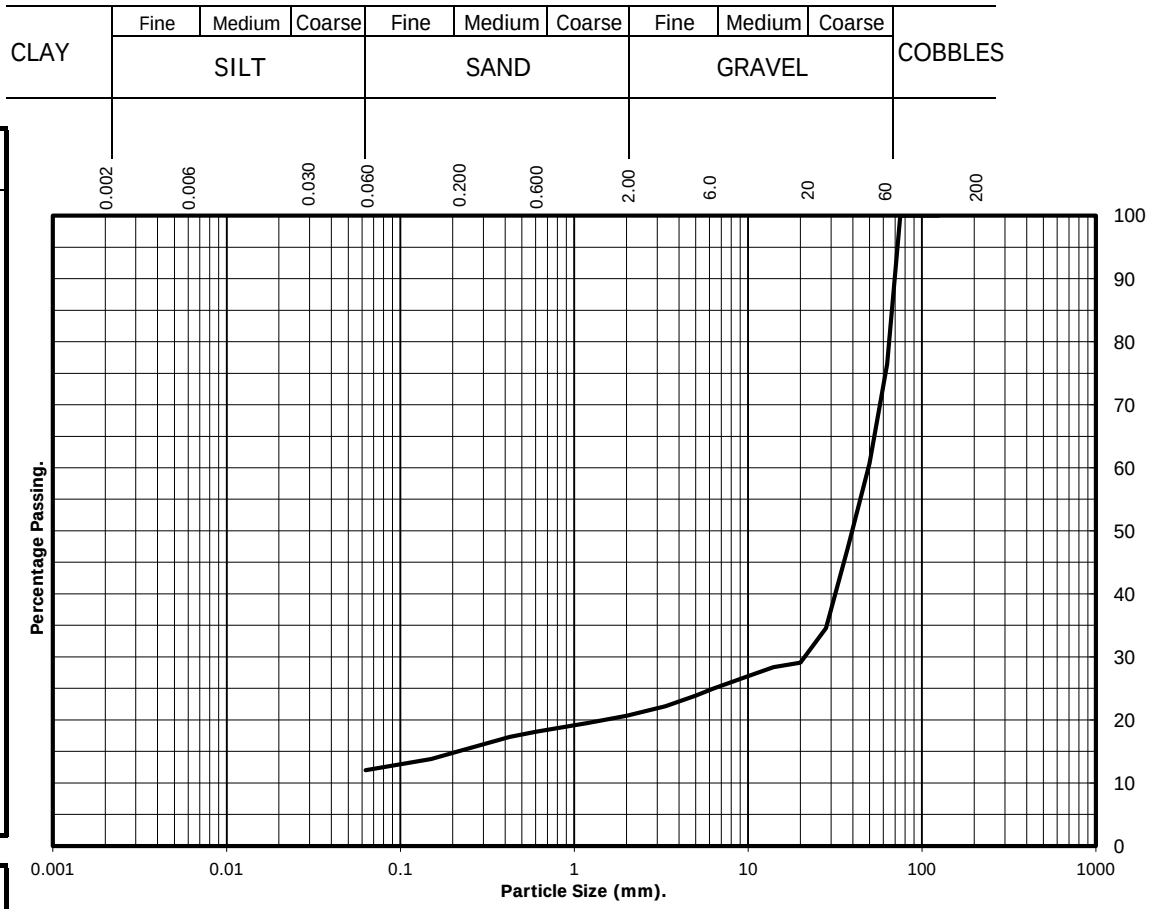
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP4**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	100
75	100
63	76
50	61
37.5	47
28	35
20	29
14	28
10	27
6.3	25
5.0	24
3.35	22
2.00	21
1.18	19
0.60	18
0.425	17
0.300	16
0.212	15
0.150	14
0.063	12

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	12	9	55	24	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:

Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

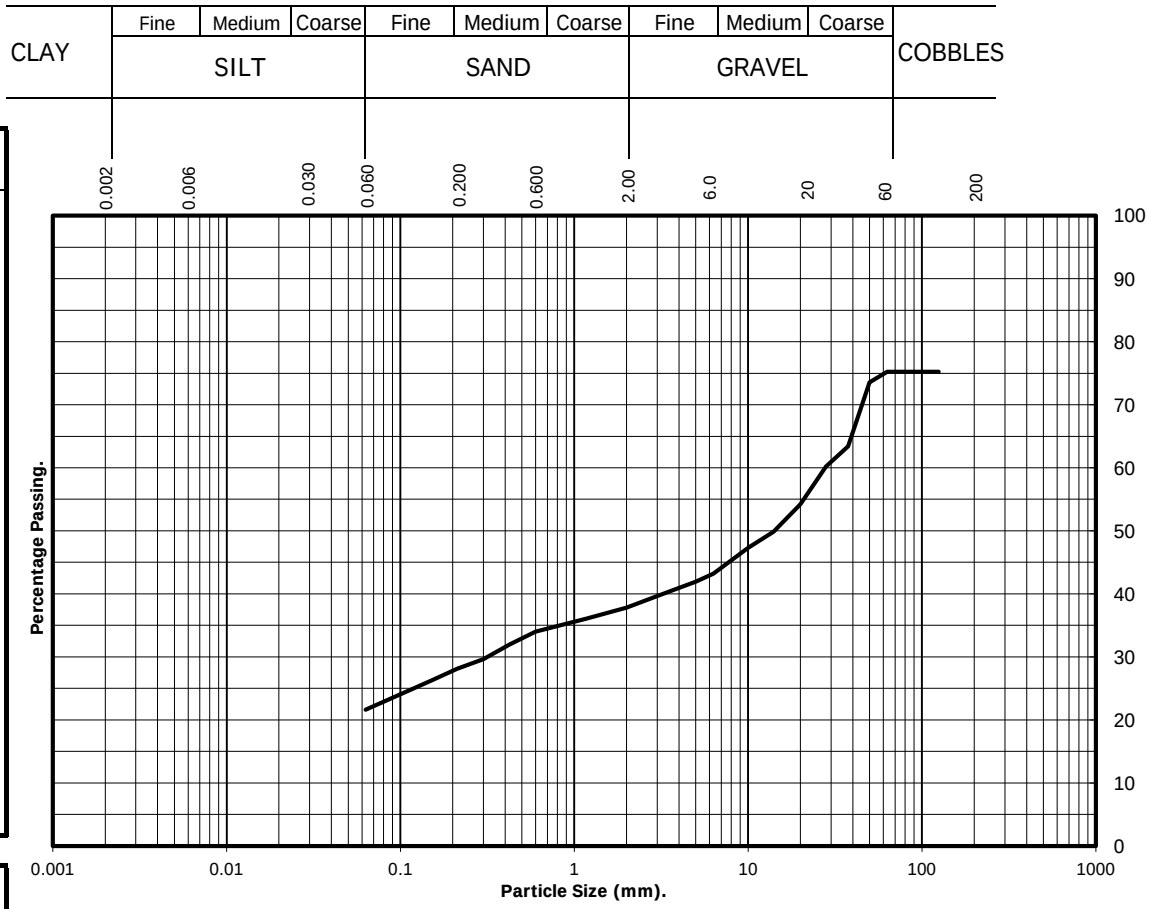
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP4**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**3.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	75
90	75
75	75
63	75
50	74
37.5	63
28	60
20	54
14	50
10	47
6.3	43
5.0	42
3.35	40
2.00	38
1.18	36
0.60	34
0.425	32
0.300	30
0.212	28
0.150	26
0.063	22

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	22	16	37	25	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

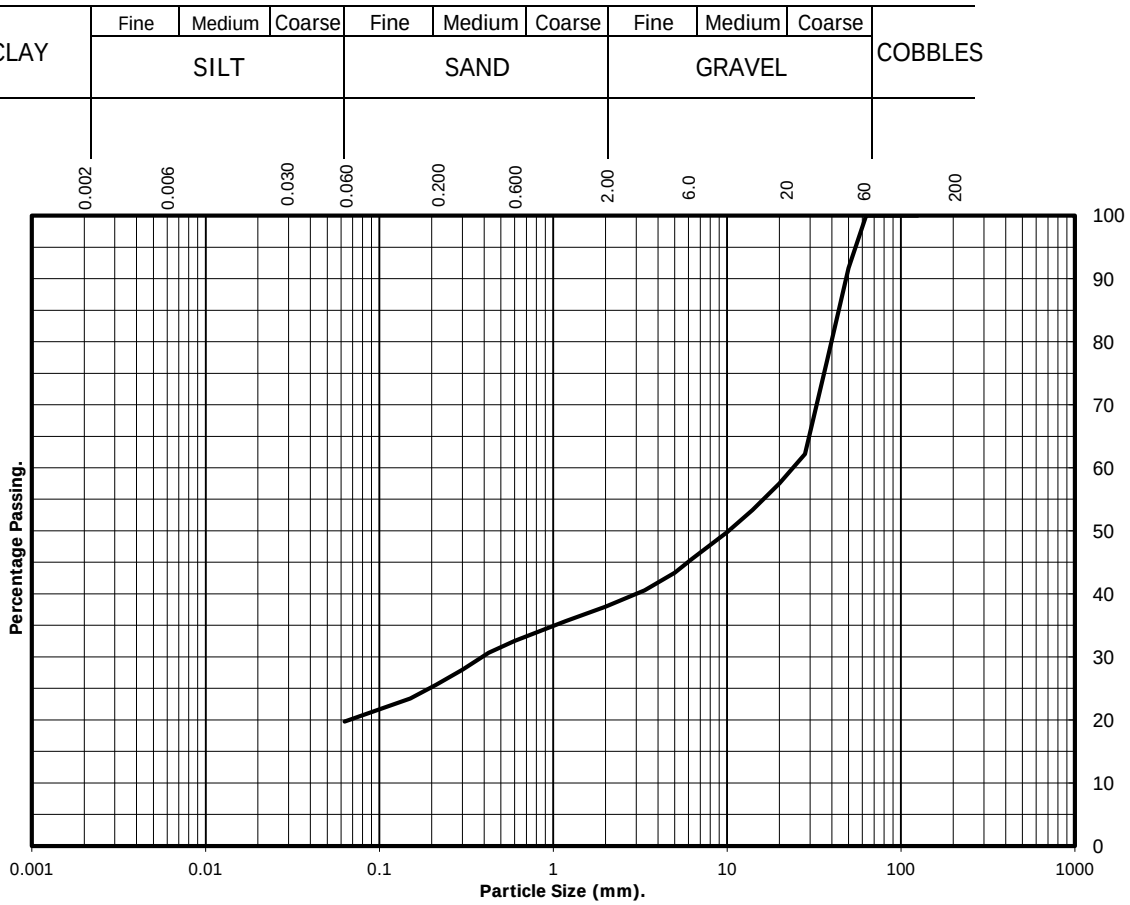
Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP6**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse)**

BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	92
37.5	77
28	62
20	57
14	53
10	50
6.3	46
5.0	43
3.35	41
2.00	38
1.18	36
0.60	33
0.425	31
0.300	28
0.212	26
0.150	23
0.063	20

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	20	18	62	0	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report:

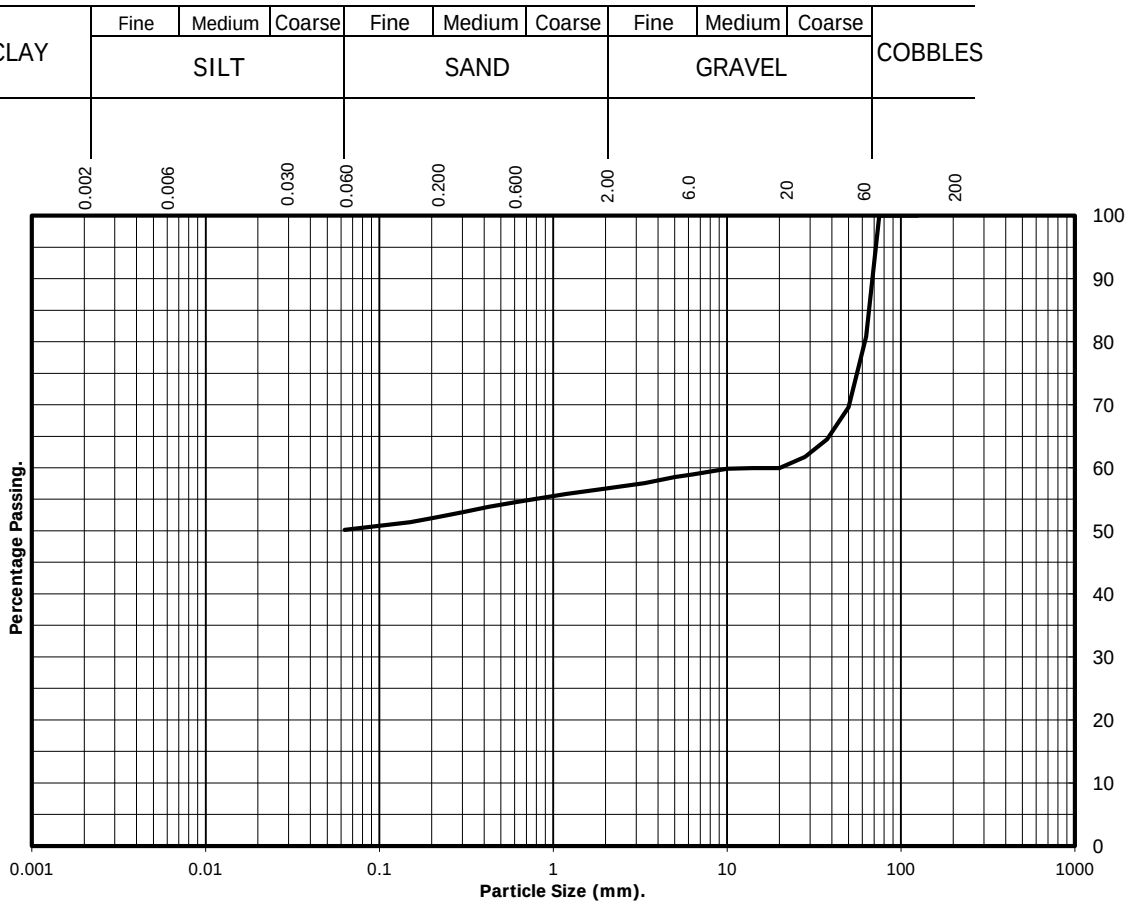
Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP7**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy gravelly (fine-coarse) silty CLAY with many cobbles**

BS Test Sieve	% Passing
125	100
90	100
75	100
63	81
50	70
37.5	65
28	62
20	60
14	60
10	60
6.3	59
5.0	59
3.35	58
2.00	57
1.18	56
0.60	55
0.425	54
0.300	53
0.212	52
0.150	51
0.063	50



Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	50	7	24	19	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:

Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

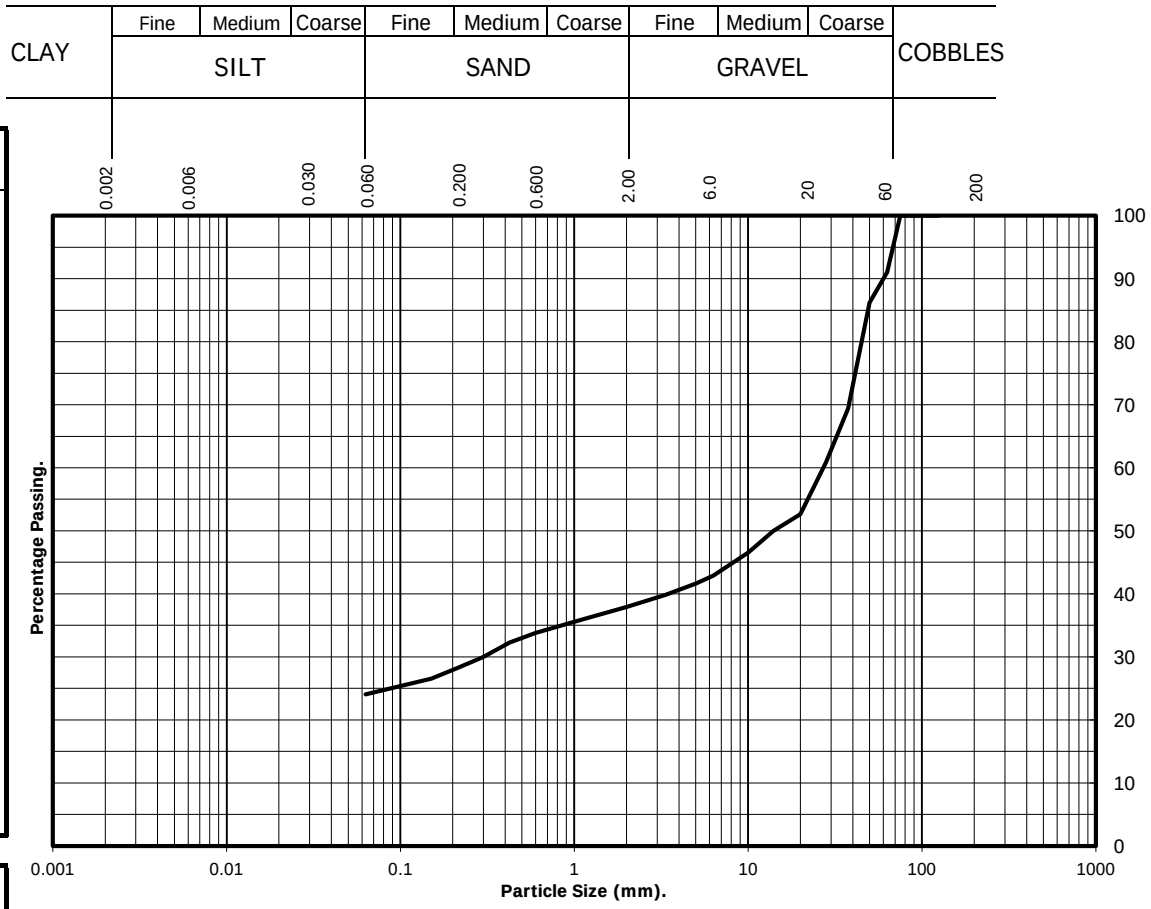
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP12**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with cobbles**



BS Test Sieve	% Passing
125	100
90	100
75	100
63	91
50	86
37.5	69
28	61
20	53
14	50
10	47
6.3	43
5.0	42
3.35	40
2.00	38
1.18	36
0.60	34
0.425	32
0.300	30
0.212	28
0.150	27
0.063	24

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	24	14	53	9	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

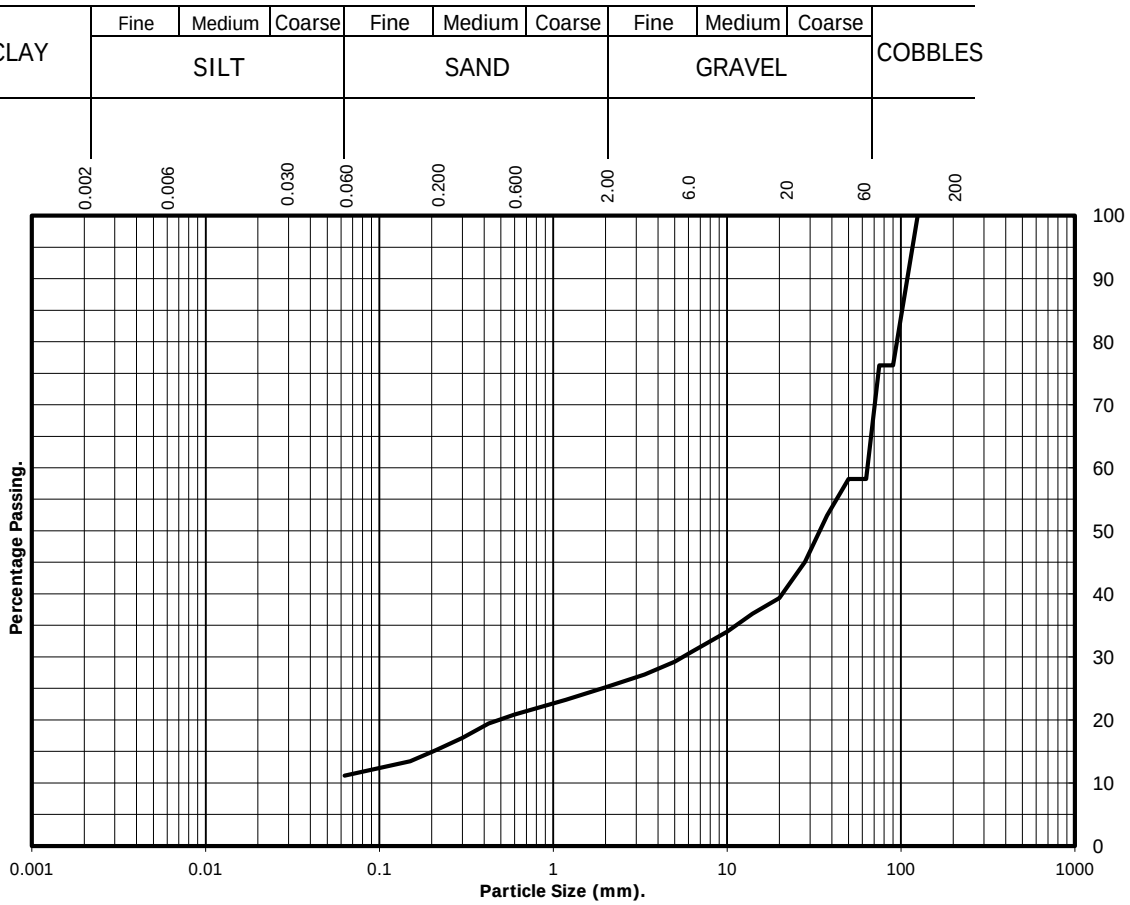
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP13**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**2.00**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	76
75	76
63	58
50	58
37.5	52
28	45
20	39
14	37
10	34
6.3	31
5.0	29
3.35	27
2.00	25
1.18	23
0.60	21
0.425	19
0.300	17
0.212	15
0.150	13
0.063	11

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	11	14	33	42	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

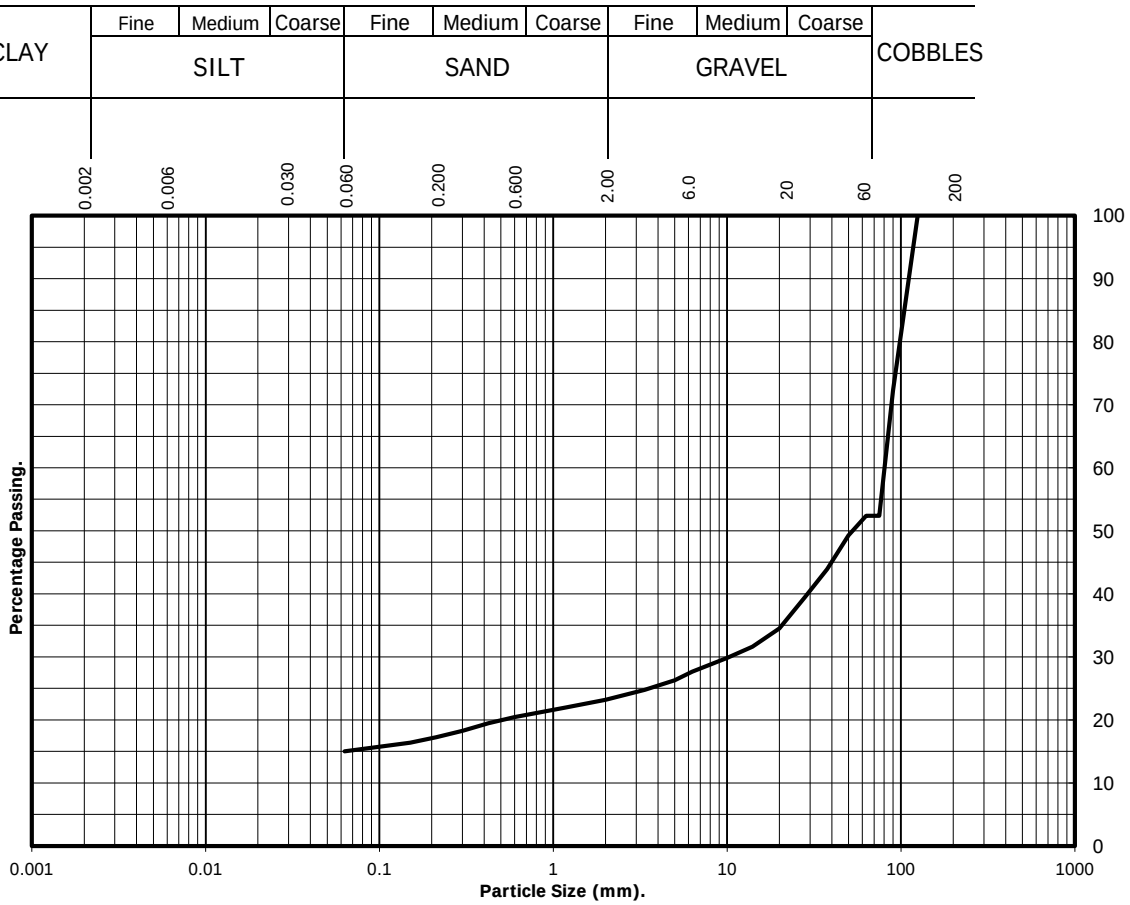
Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Contract Number:	**27497-100715**	**Hole Number:**	**TP17**
Location:	**Herbert Road, Newport**	**Depth from (m):**	**1.50**
Client ref:	**12032**	**Depth to (m):**	
		Sample Number:	
		Sample Type:	**B**

Description: **Brown sandy silty clayey GRAVEL (fine-coarse) with many cobbles**



BS Test Sieve	% Passing
125	100
90	72
75	52
63	52
50	49
37.5	44
28	40
20	34
14	32
10	30
6.3	28
5.0	26
3.35	25
2.00	23
1.18	22
0.60	20
0.425	20
0.300	18
0.212	17
0.150	16
0.063	15

Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	15	8	29	48	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:

Jonathan Tatam (Admin/Quality Assistant)

Date: 27.7.15

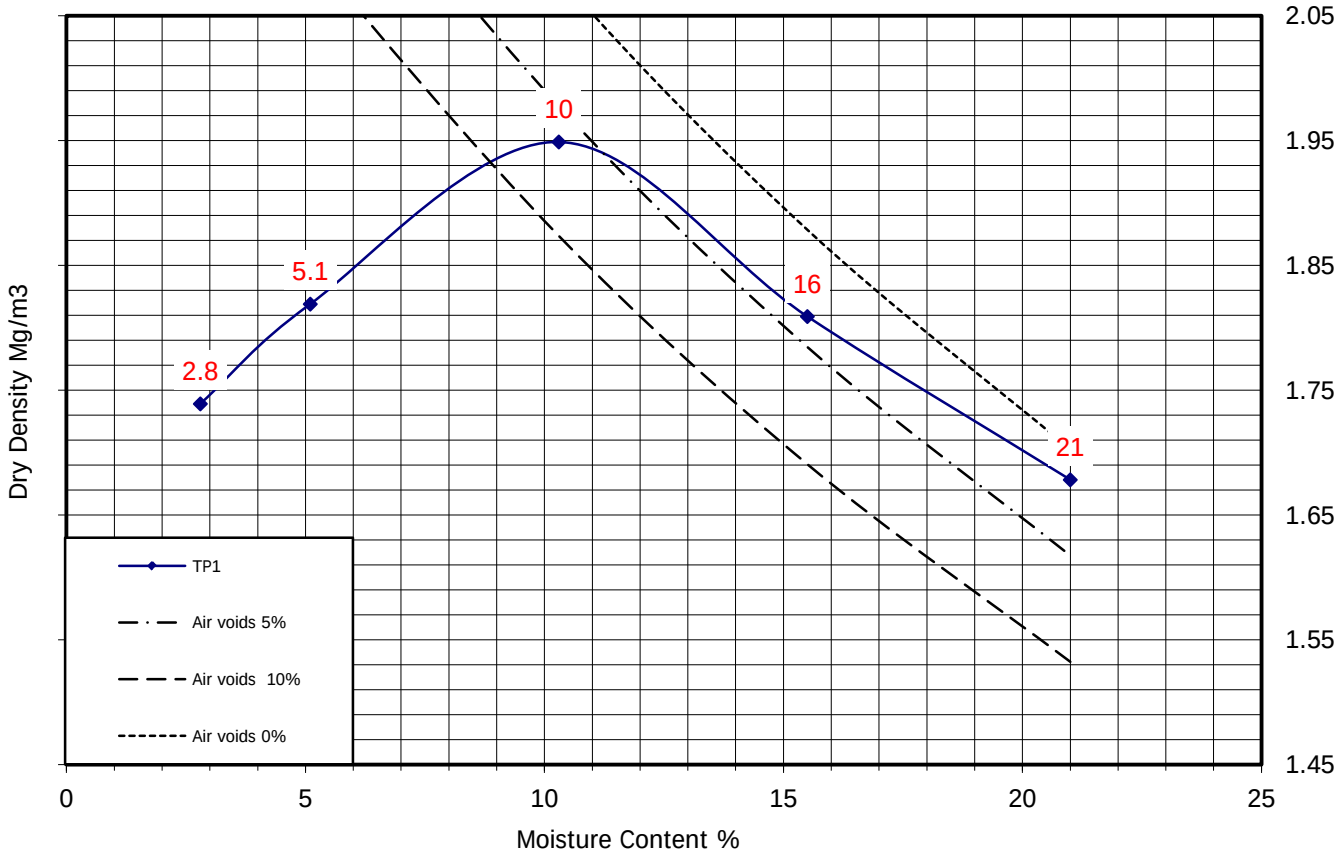
GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP1**
Sample Number:	
Depth (m):	**1.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.8	5.1	10	16	21
Bulk Density (Mg/m^3):	1.79	1.91	2.15	2.09	2.03
Dry Density (Mg/m^3):	1.74	1.82	1.95	1.81	1.68

Initial Moisture Content:	**21**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**9**
Maximum Dry Density (mg/m^3):	**1.95**	Material Retained on 20.0 mm Test Sieve (%):	**20**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.5.2**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

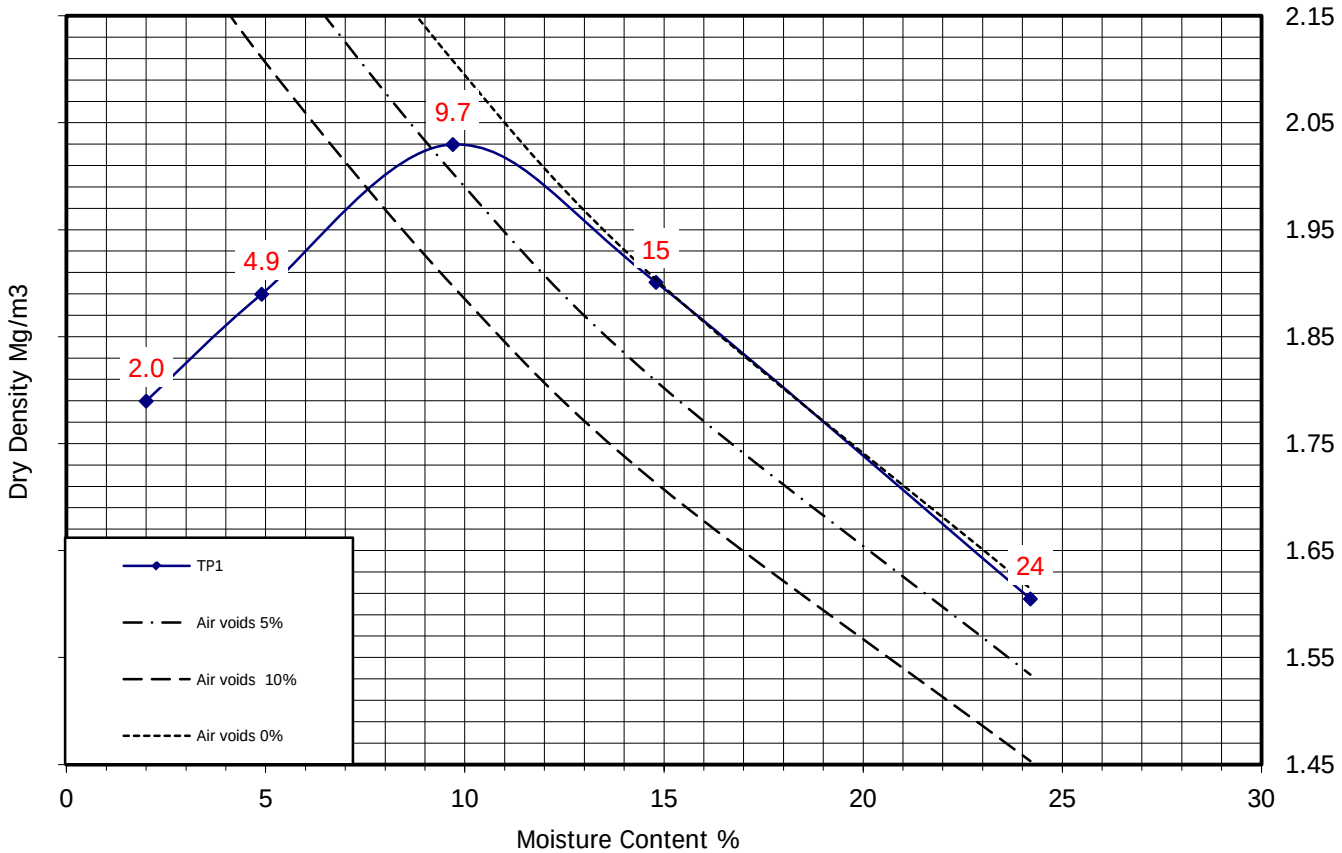
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP1**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.0	4.9	9.7	15	24
Bulk Density (Mg/m^3):	1.83	1.98	2.23	2.18	1.99
Dry Density (Mg/m^3):	1.79	1.89	2.03	1.90	1.60

Initial Moisture Content:	**24**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**35**
Maximum Dry Density (mg/m^3):	**2.03**	Material Retained on 20.0 mm Test Sieve (%):	**51**
Optimum Moisture Content (%):	**9.7**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

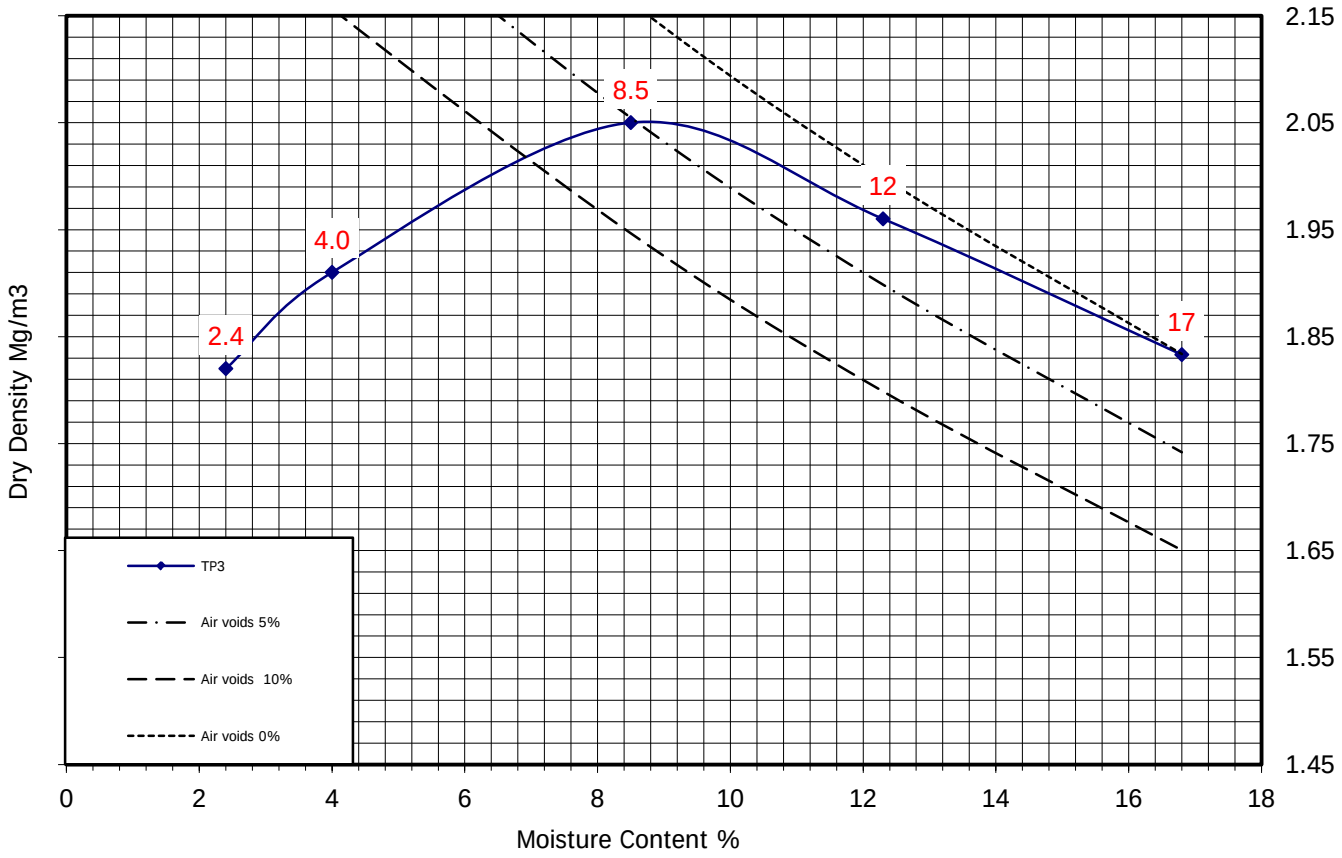
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP3**
Sample Number:	
Depth (m):	**3.50**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.4	4.0	8.5	12	17
Bulk Density (Mg/m^3):	1.86	1.99	2.22	2.20	2.14
Dry Density (Mg/m^3):	1.82	1.91	2.05	1.96	1.83

Initial Moisture Content:	**17**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**47**
Maximum Dry Density (mg/m^3):	**2.05**	Material Retained on 20.0 mm Test Sieve (%):	**58**
Optimum Moisture Content (%):	**8.5**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

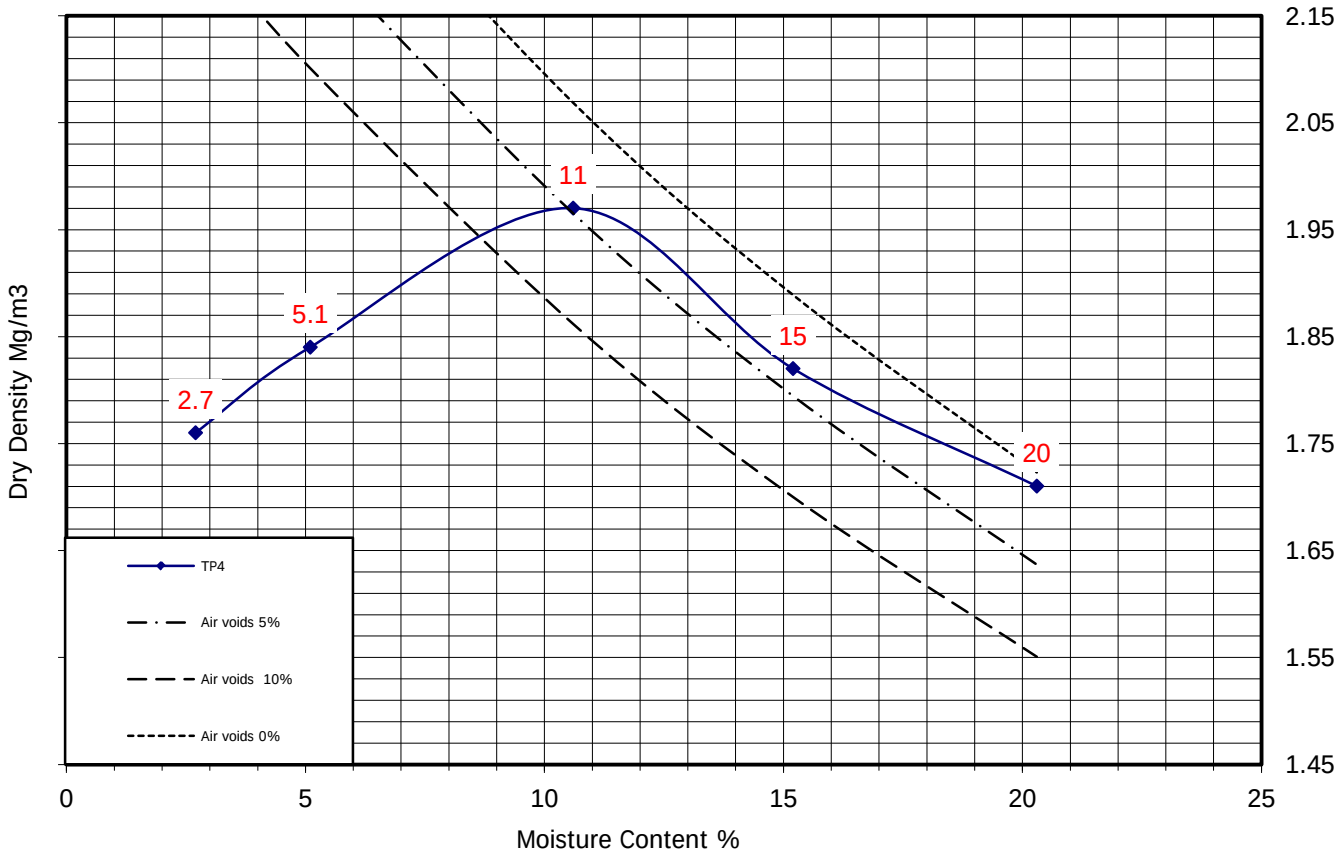
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP4**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.7	5.1	11	15	20
Bulk Density (Mg/m^3):	1.81	1.93	2.18	2.10	2.06
Dry Density (Mg/m^3):	1.76	1.84	1.97	1.82	1.71

Initial Moisture Content:	**20**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**53**
Maximum Dry Density (mg/m^3):	**1.97**	Material Retained on 20.0 mm Test Sieve (%):	**71**
Optimum Moisture Content (%):	**11**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

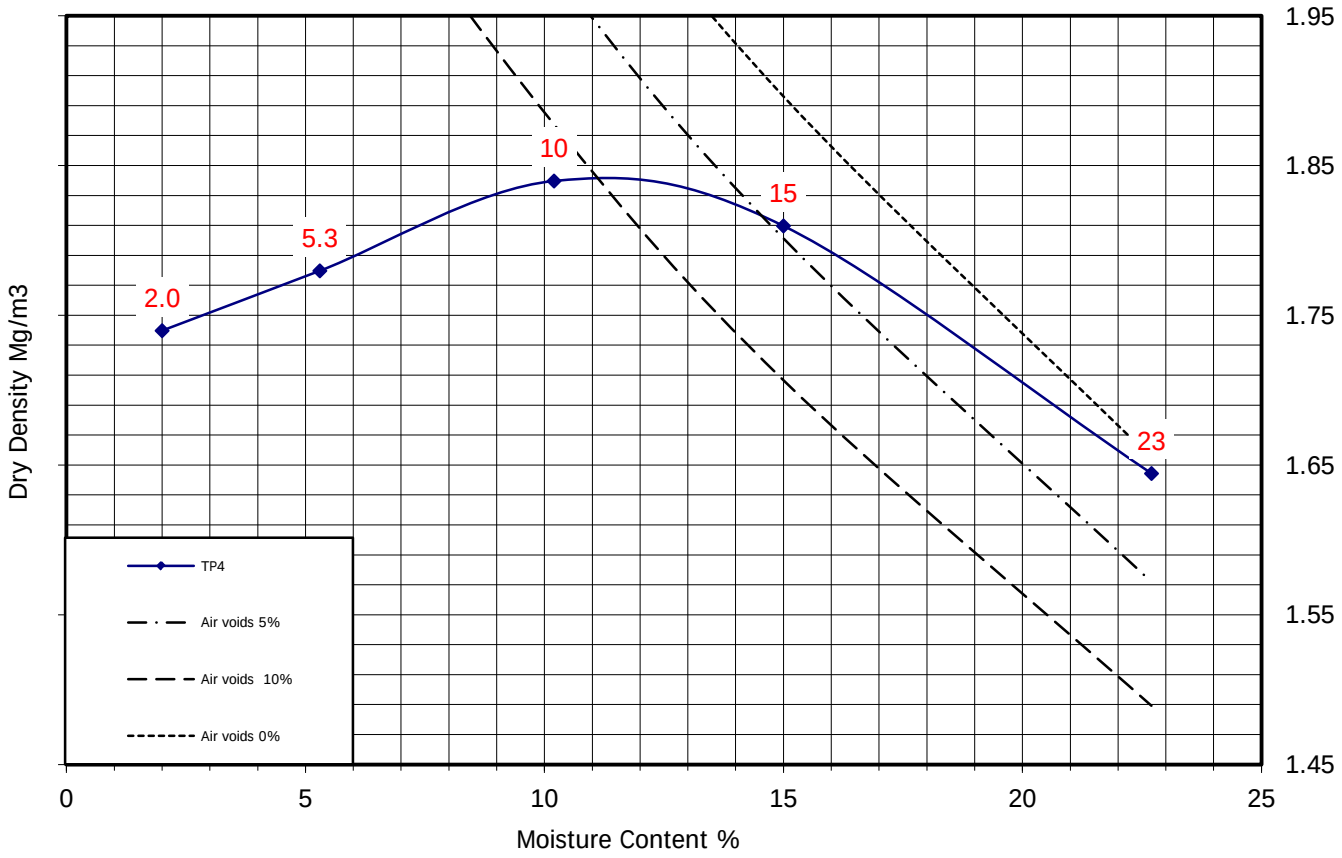
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP4**
Sample Number:	
Depth (m):	**3.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.0	5.3	10	15	23
Bulk Density (Mg/m^3):	1.77	1.87	2.03	2.08	2.02
Dry Density (Mg/m^3):	1.74	1.78	1.84	1.81	1.64

Initial Moisture Content:	**23**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**37**
Maximum Dry Density (mg/m^3):	**1.84**	Material Retained on 20.0 mm Test Sieve (%):	**46**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

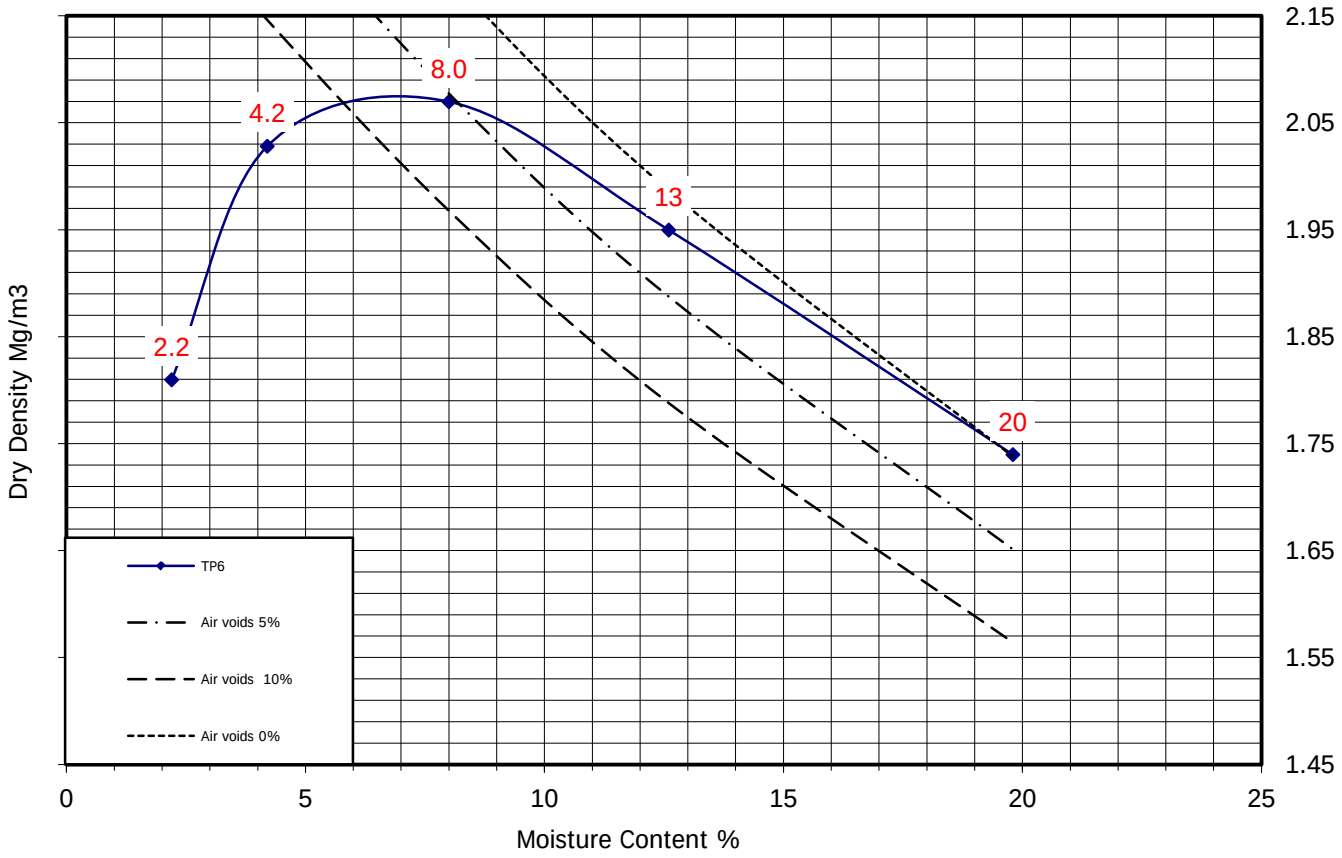
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP6**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.2	4.2	8.0	13	20
Bulk Density (Mg/m^3):	1.85	2.11	2.24	2.20	2.08
Dry Density (Mg/m^3):	1.81	2.03	2.07	1.95	1.74

Initial Moisture Content:	**20**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**23**
Maximum Dry Density (mg/m^3):	**2.07**	Material Retained on 20.0 mm Test Sieve (%):	**43**
Optimum Moisture Content (%):	**8.0**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

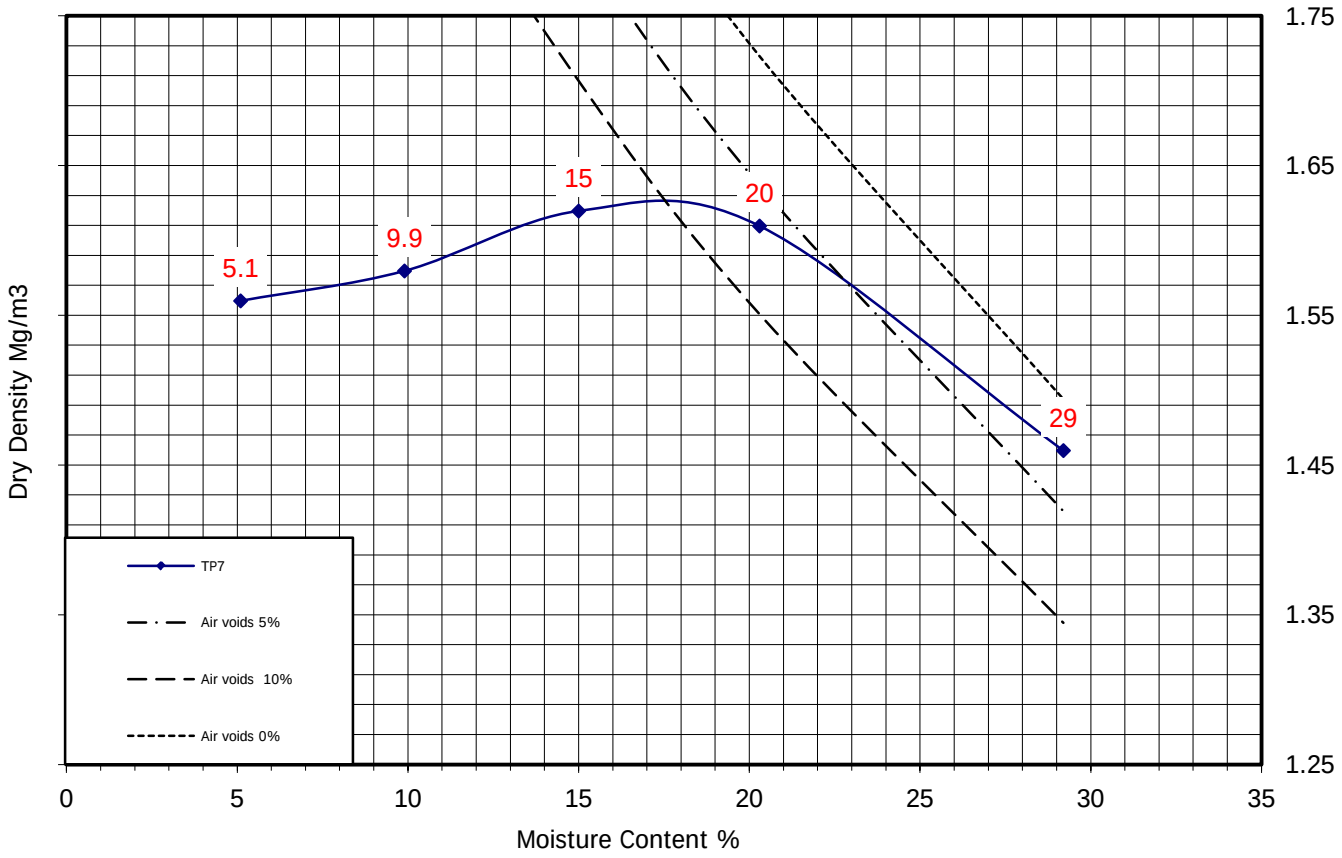
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP7**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.1	9.9	15	20	29
Bulk Density (Mg/m^3):	1.64	1.74	1.86	1.94	1.89
Dry Density (Mg/m^3):	1.56	1.58	1.62	1.61	1.46

Initial Moisture Content:	**29**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**35**
Maximum Dry Density (mg/m^3):	**1.62**	Material Retained on 20.0 mm Test Sieve (%):	**40**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

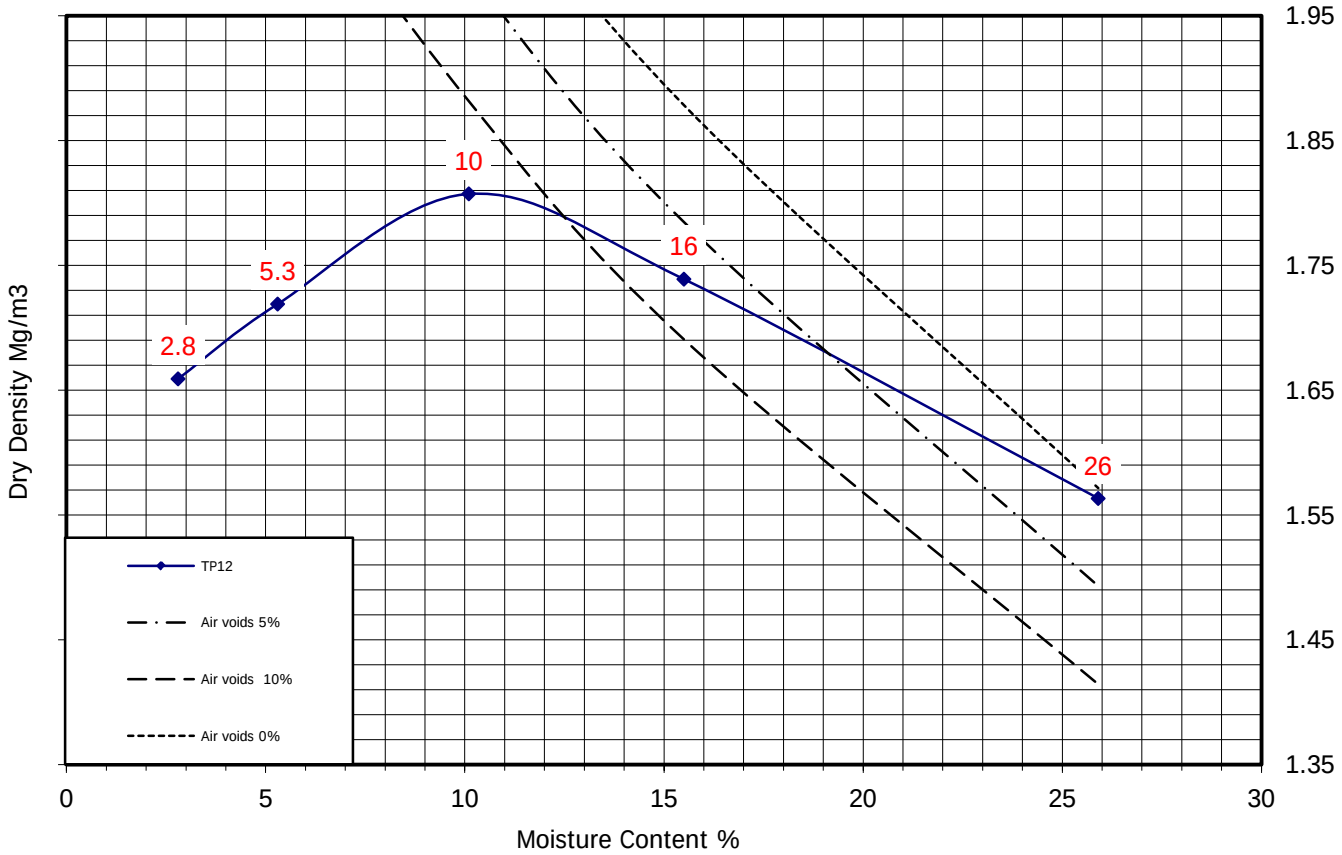
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP12**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.8	5.3	10	16	26
Bulk Density (Mg/m^3):	1.71	1.81	1.99	2.01	1.97
Dry Density (Mg/m^3):	1.66	1.72	1.81	1.74	1.56

Initial Moisture Content:	**26**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**31**
Maximum Dry Density (mg/m^3):	**1.81**	Material Retained on 20.0 mm Test Sieve (%):	**47**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

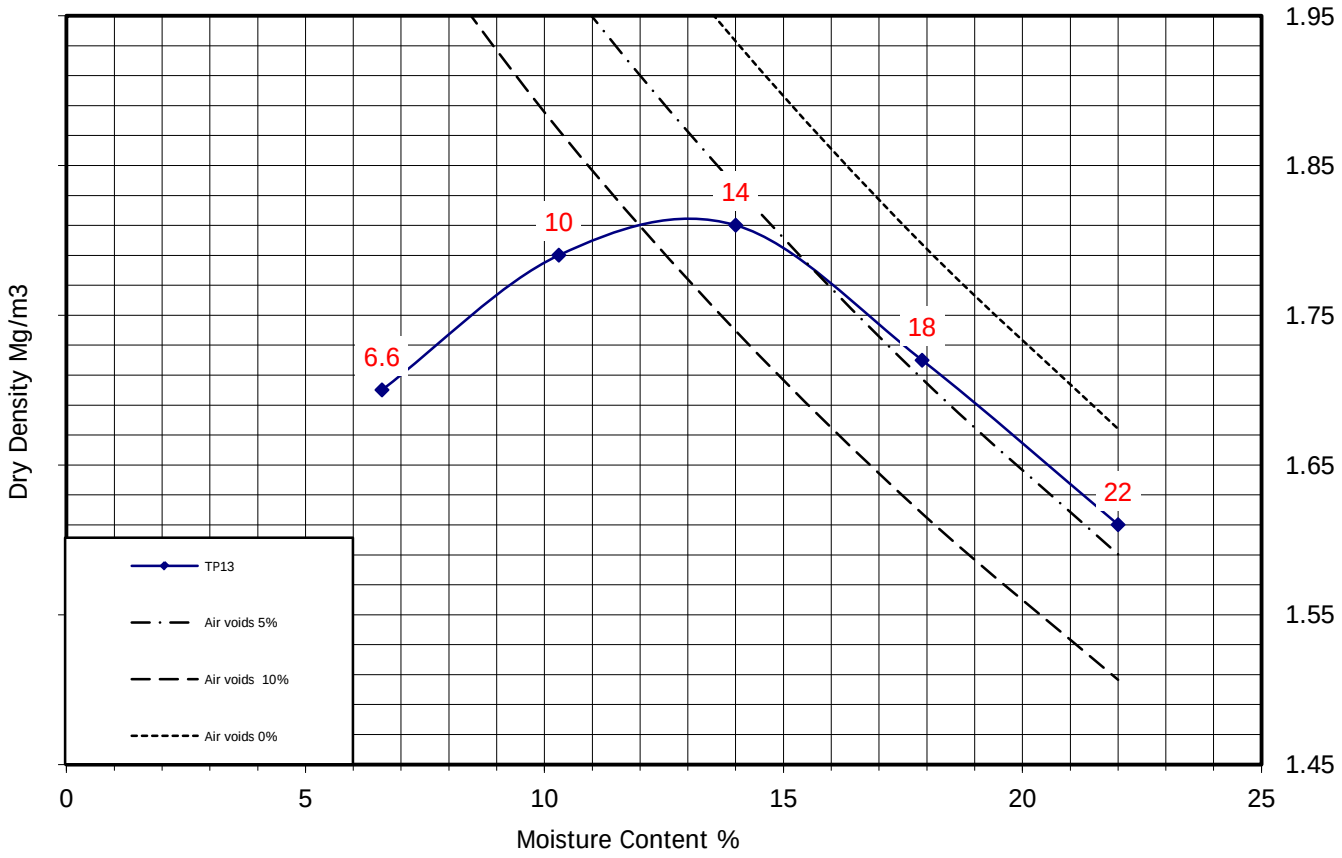
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP13**
Sample Number:	
Depth (m):	**2.00**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	6.6	10	14	18	22
Bulk Density (Mg/m^3):	1.81	1.97	2.06	2.03	1.96
Dry Density (Mg/m^3):	1.70	1.79	1.81	1.72	1.61

Initial Moisture Content:	**18**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**48**
Maximum Dry Density (mg/m^3):	**1.81**	Material Retained on 20.0 mm Test Sieve (%):	**61**
Optimum Moisture Content (%):	**14**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

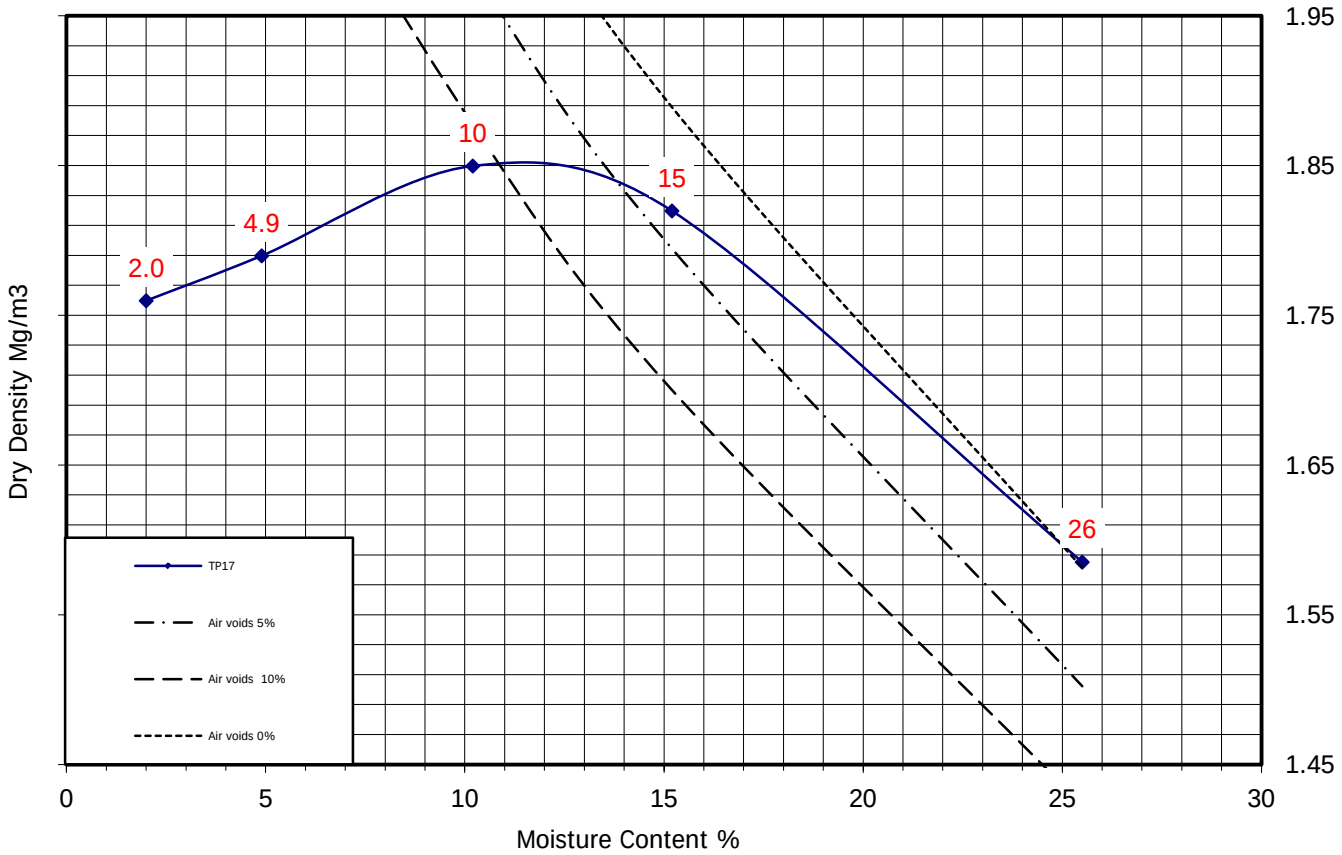
Date Approved: 27.7.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**12032**
Location:	**Herbert Road, Newport**
Contract Number:	**27497-100715**
Hole Number:	**TP17**
Sample Number:	
Depth (m):	**0.50**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	2.0	4.9	10	15	26
Bulk Density (Mg/m^3):	1.79	1.88	2.04	2.10	1.99
Dry Density (Mg/m^3):	1.76	1.79	1.85	1.82	1.59

Initial Moisture Content:	**26**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**56**
Maximum Dry Density (mg/m^3):	**1.85**	Material Retained on 20.0 mm Test Sieve (%):	**66**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**Non-Standard**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 27.7.15

UKAS TESTING
2788

COMPACTION SPECIFICATION

Top Half of Engineered Fill Source
Stockpile Herbert Road
Newport

Prepared for:
Riversee Limited

July 2015

Report No. 12032/CS1

REPORT TITLE	**:**	**Compaction Specification: Top Half of Engineered Fill Source Stockpile, Herbert Road, Newport**
REPORT STATUS	**:**	**Final**
JOB NUMBER	**:**	**12032/CS1**
DATE	**:**	**July 2015**
PREPARED BY	**:**	R. Howells. …….. **(Mrs R. Howells)**
REVIEWED BY	**:**	louisedow …….. **(Miss L. Dow)**
APPROVED BY	**:**	…….. **(Dr G. C. Lake)**

Executive Summary

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

Proposed engineered fill materials are stockpiled on a nearby site on Herbert Road.

Samples of the upper top half of the stockpile was sampled by Terra Firma.

These samples taken were submitted to Geo Site and Testing Services Limited in Llanelli in order to assess their optimum moisture content/maximum dry density and to undertake grading analyses.

The initial moisture content of the soils was found to be between 15 and 26% with an optimum moisture content of between 9.5 and 14%.

In order for there to be tolerable settlements from the placed fill materials, it needs to be compacted at or close to 95% of its Optimum Moisture Content/Maximum Dry Density. Drying of the soils is likely to be required to achieve this.

In order to meet the above criterion it is clear that the materials will need to be dried.

Grading analysis results have been used to classify the soils as selected stony cohesive material (Type 2C and 6F2).

The materials should be laid and compacted in layers as given by the Specification Works for Highways 600.

TABLE OF CONTENTS

Section 1 Introduction

1.1 Limitations and Exceptions

Section 2 Soil Property Testing

2.1 Soil Sampling
2.2 Optimum Moisture Content/Maximum Dry Density
2.3 Grading Analysis Results
2.4 Compaction Specification

Section 3 Conclusions as to the Suitability of the Materials as Site Fill

Tables

Table 2.1 Sample Descriptions
Table 2.2 Optimum Moisture Content/Maximum Dry Density Test Results
Table 2.3 Grading Analysis Results and Soil Classification
Table 2.4 Compaction Specification - Method 2
Table 2.5 Compaction Specification - Method 6

Annexes

Annex A Grading Analysis and Optimum Moisture Content and Maximum Dry Density Test Results

SECTION 1 Introduction

Riversee Limited is proposing to undertake earthworks on a proposed development site off Herbert Road, Newport, where the site is to be raised by up to 1.6m, taking it to a level of 8.8m AOD.

The ground is to be brought up in layers, in accordance with the Department of Transport Specification for Highway Works, prior to construction and the importation of inert materials in landscaped areas.

Proposed engineered fill materials are stockpiled on a nearby site on Herbert Road.

Terra Firma (Wales) Limited has been commissioned by Riversee Limited to undertake sampling and testing of off-site stockpiled soil to assess its suitability as fill.

This report details the compaction specification for soils in the upper half of the stockpile only.

1.1 Limitations and Exceptions

The compaction specification report has been prepared for the sole internal reliance of Riversee Limited and its design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The report represents the findings and opinions of experienced geo-environmental and geo-technical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may also be required.

SECTION 2 Soil Property Testing

2.1 Soil Sampling

Terra Firma (Wales) Limited attended the stockpile site on 11th February 2015 in order to obtain samples for geotechnical testing.

Eight representative samples were taken and submitted to Geo Site and Testing Services Limited in Llanelli in order to assess their optimum moisture content/maximum dry density and to undertake grading analyses.

The table below summarises the samples taken.

Table 2.1 Sample Descriptions

Sample	Depth in Stockpile (m)	Description
S1	1.7	Grey brown sandy gravelly cobbly clay
S2	1.0	Brown gravelly cobbly clay mixed with grey gravelly cobbly clay
S3	0.5	Grey sandy gravelly cobbly clay
S4	1.5	Brown gravelly cobbly clay mixed with grey gravelly cobbly clay
S5	0.5	Grey brown gravelly cobbly clay with pockets of red clay
S6	1.7	Grey clay mixed with red sandy clay
S7	3.0	Red sand, gravel and cobble
S8	0.5	Grey brown gravelly cobbly clay with pockets of red clay

2.2 Optimum Moisture Content/Maximum Dry Density

The results of the optimum moisture content and maximum dry density tests are detailed in the table below.

These tests were conducted in accordance with BS 1377: Part 4: 1990.

Table 2.2 Optimum Moisture Content/Maximum Dry Density Test Results

Sample	Initial Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density(mg/m^3)
S1	20	10	1.90
S2	22	10	1.95
S3	22	9.7	1.93
S4	15	12	1.89
S5	20	9.5	1.93
S6	21	10	1.90
S7	16	14	1.84
S8	26	10	1.88

The suitable fill materials should be placed at or close to i.e. 95% of their optimum moisture content/maximum dry density and compacted in layers as per the requirements of the Specification for Highway Works.

The test certificates are given in **Annex A.**

2.3 Grading Analysis

The eight samples were tested in the laboratory by dry and wet sieving analysis to determine their grading characteristics. These tests were conducted in accordance with BS1377: Part 2, Clause 9.2: 1990.

The test certificates are presented in **Annex A.**

Based upon the soil property test results, and referring to Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements and Table 6/2: Grading Requirements for Acceptable Earthworks Materials, of the 'Specification for Highway Works, Series 600', the samples can be classified as summarised in the table below.

Table 2.3 Grading Analysis Results and Soil Classification

Sample	Type (Table 6/2)	Classification (Table 6/1)	Compaction Method
S1	6F2	Selected Granular Material	Method 6
S2	2C	Stony Cohesive Material	Method 2
S3			
S4			
S5			
S6			
S7			
S8			

2.4 Compaction Specification

Compaction should be undertaken in accordance with the appropriate methodology as given in of Table 6/4 of the Specification for Highway Works, Series 600, as summarised in **Tables 2.4 and 2.5.**

Details for just a smoothed wheeled roller and vibratory roller are provided. If an alternative roller is proposed then Table 6/4 should be consulted.

Table 2.4 Compaction Specification - Method 2

Type of Compaction Plant	Mass per Metre Width of Roll (kg)	Maximum depth of Compacted Layer (mm)	Number of Passes
Smoothed Wheeled Roller	2100 – 2700 2700 – 5400 >5400	125 125 150	10 8 8
Vibratory Roller	270 – 450 450 – 700 700 – 1300 1300 – 1800 1800 – 2300 2300 – 2900 2900 – 3600 3600 – 4300 4300 – 5000 >5000	75 75 125 150 150 175 200 225 250 275	16 12 10 8 4 4 4 4 4 4

Table 2.5 Compaction Specification - Method 6

Type of Compaction Plant	Mass per Metre Width of Roll (kg)	Number of Passes		
		110mm layer	150mm layer	250mm layer
Smoothed Wheeled Roller	2100 – 2700 2700 – 5400 >5400	Unsuitable 16 8	Unsuitable Unsuitable 16	Unsuitable Unsuitable Unsuitable
Vibratory Roller	270 – 450 450 – 700 700 – 1300 1300 – 1800 1800 – 2300 2300 – 2900 2900 – 3600 3600 – 4300 4300 – 5000 >5000	Unsuitable Unsuitable 16 6 4 3 3 2 2 2	Unsuitable Unsuitable Unsuitable 16 6 5 5 4 4 3	Unsuitable Unsuitable Unsuitable Unsuitable 12 11 10 8 7 6

2.4 Compaction Specification (Continued)

Compaction should be undertaken in accordance with Table 6/1 and 6/4, as soon as practicable after deposition.

Where combinations of different types or categories of plant are used, the depth of the layer should be for the type of plant requiring the least depth of layer, and the number of passes should be that for the type of plant requiring the greatest number of passes.

Earthmoving plants are not recommended for use as compaction plant, nor are lighter categories of plants used to provide preliminary compaction to assist the use of heavier plant.

The soils should be sorted and all deleterious material, such as timber and plastic removed.

All roots and tree roots should be excavated and removed.

The stability of excavations or fills should not be compromised by the location of stock piled materials or use of plant or location of temporary buildings/structures.

All earthworks must be kept free of water including arranging for the rapid removal of water, water shed onto the earthworks and water entering the earthworks from any source.

Fill materials especially cohesive (silt and clay) fill should not be deposited and compacted during wet weather, where an increase in moisture content will increase the liquid limit of the soil.

The initial moisture content of the soil was found to be double the optimum moisture content in some instances, indicating that the clay soils will need to be dried out prior to filling to achieve adequate compaction.

All exposed fill surfaces must be adequately weather proofed during inclement weather or at the end of the working day/compaction process. Any exposed cohesive fill that becomes wet and slurrified due to water ingress or weather erosion must be stripped off, spread into thin layers and aerated. The fill should then be re-compacted.

Plant movement across compaction layers should be restricted to that plant necessary for its deposition, spreading and compaction.

Fill areas should be constructed evenly over their full width and their fullest possible extent and the contractor should control and direct constructional plant and other traffic uniformly over them. Damage by construction plant should be made good with material having the same characteristics and strength as the material had before it was damaged.

Embankments and other areas of unsupported fills should not be constructed with steeper side slopes than the materials effective shear strength, with exception to allowing the adequate compaction at the edges before trimming back, within the minimum period necessary for the safety of the works.

2.4 **Compaction Specification** (Continued)

Where fill is to be placed against a natural slope, or sloping earthworks face including embankments, cuttings and other fills and excavations, such faces should be appropriately benched immediately before placing the subsequent fill.

In-situ density tests (sand replacement method) should be undertaken to ensure the compaction process is performing satisfactory during the enabling works. In-situ testing should be undertaken at an appropriate spacing to reflect the adequacy of the compaction process beneath the entire development area.

It is also recommended that a number of in-situ plate load tests be performed mid way through the earthworks and at the final finished site level beneath the access road.

The earthworks should be supervised by a suitable engineer.

The tests should be conducted in accordance with BS 1377: Part 9: 1990 under the supervision of a qualified geotechnical engineer.

Should the in-situ testing show densities which indicate that the compaction process is inadequate, the deposited material must be excavated and re-laid.

Allowances should also be made for the removal of soft spots and their replacement with imported suitable selected inert granular materials or suitable inert site won materials.

SECTION 3 Conclusions as to the Suitability of the Materials as Site Fill

In order for there to be tolerable settlements from the placed fill materials, they need to be compacted at or close to their optimum moisture content and maximum dry density (95%). This will ensure that a minimum 95% compaction will be achieved.

In order to meet the above criterion it is clear that the materials will need to be dried. This can be achieved by excavating and allowing the materials to dry naturally.

Once the given moisture content has been achieved then the materials may be used as structural fill. The materials have been graded according to the Specification Works for Highways 600 and should be laid and compacted in layers by referring to the Specification as described in Section 2.4.

A programme of in-situ density testing should also be carried out during fill works in order to confirm the effectiveness of the compaction procedure.

ANNEX A
Grading Analysis and Proctor Test Results

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 25872

Client's Reference: **TBC**

Report Date: **25-02-2015**

Client **Terrafirma Wales Ltd**
5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HB

Contract Title: **Herbert Road, Newport**

For the attention of: **Ruth Liley**

Date Received: **12-02-2015**

Date Commenced: **12-02-2015**

Date Completed: **25-02-2015**

Test Description	Qty
PSD Wet Sieve method 1377 : 1990 Part 2 : 9.2 - * UKAS	8
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.3 - * UKAS	8

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Williams (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **1**

Depth from (m):

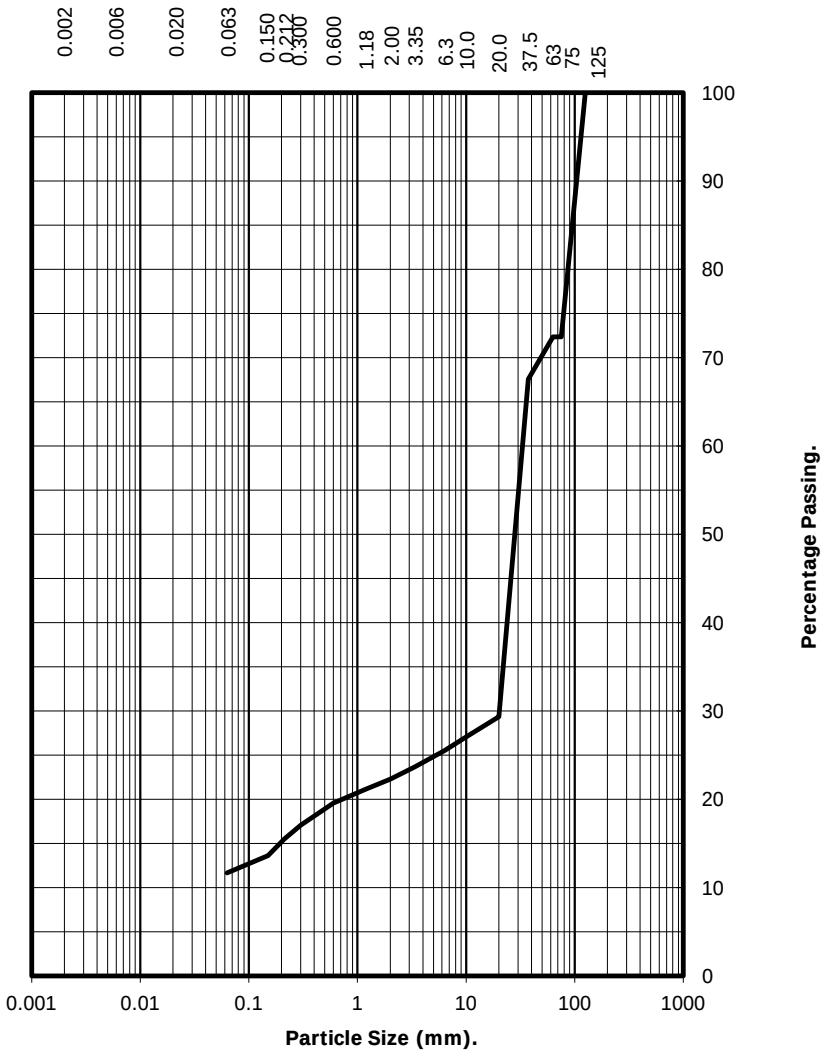
Depth to (m):

Sample Type: **B**

Description: **Brown/grey silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	72
63	72
37.5	68
20	29
10	27
6.3	25
3.35	24
2.00	22
1.18	21
0.60	20
0.300	17
0.212	16
0.150	14
0.063	12

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	12	**10**	**50**	**28**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **2**

Depth from (m):

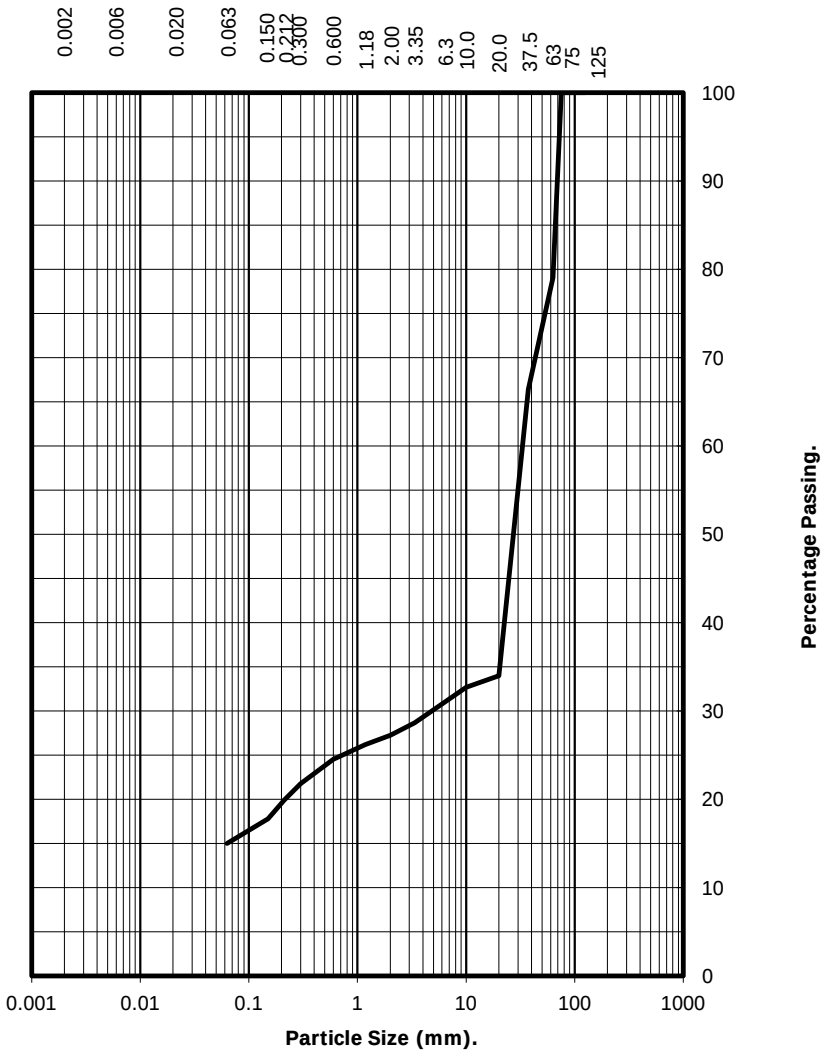
Depth to (m):

Sample Type: **B**

Description: **Brown/grey silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	100
63	79
37.5	66
20	34
10	33
6.3	31
3.35	29
2.00	27
1.18	26
0.60	25
0.300	22
0.212	20
0.150	18
0.063	15

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	15	**12**	**52**	**21**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **3**

Depth from (m):

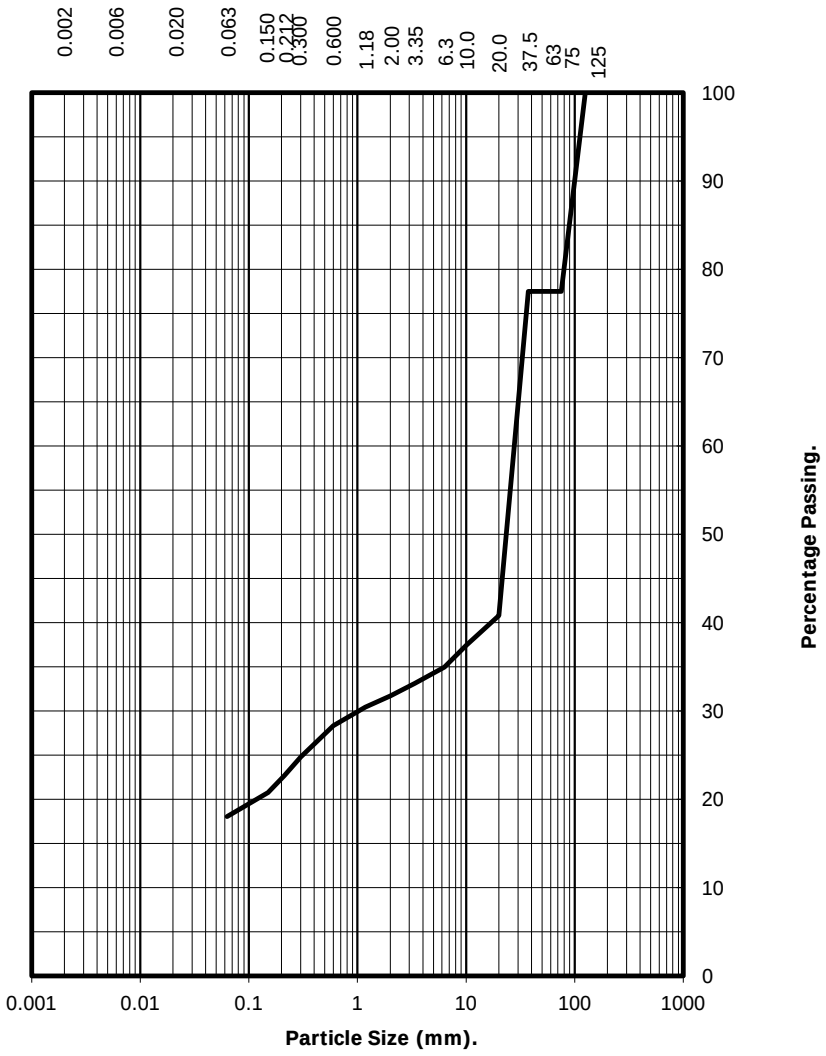
Depth to (m):

Sample Type: **B**

Description: **Brown/grey silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	77
63	77
37.5	77
20	41
10	37
6.3	35
3.35	33
2.00	32
1.18	30
0.60	28
0.300	25
0.212	23
0.150	21
0.063	18

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	18	**14**	**45**	**23**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **4**

Depth from (m):

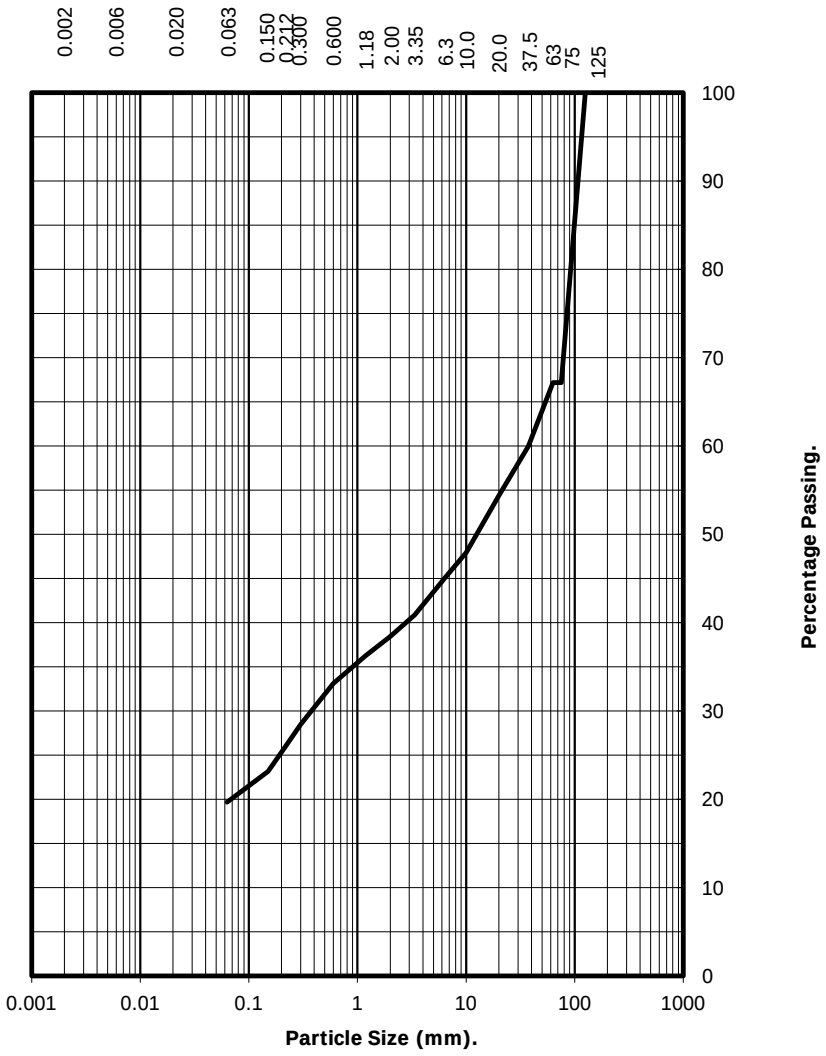
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	67
63	67
37.5	60
20	54
10	48
6.3	45
3.35	41
2.00	38
1.18	36
0.60	33
0.300	28
0.212	26
0.150	23
0.063	20

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	20	**18**	**29**	**33**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **5**

Depth from (m):

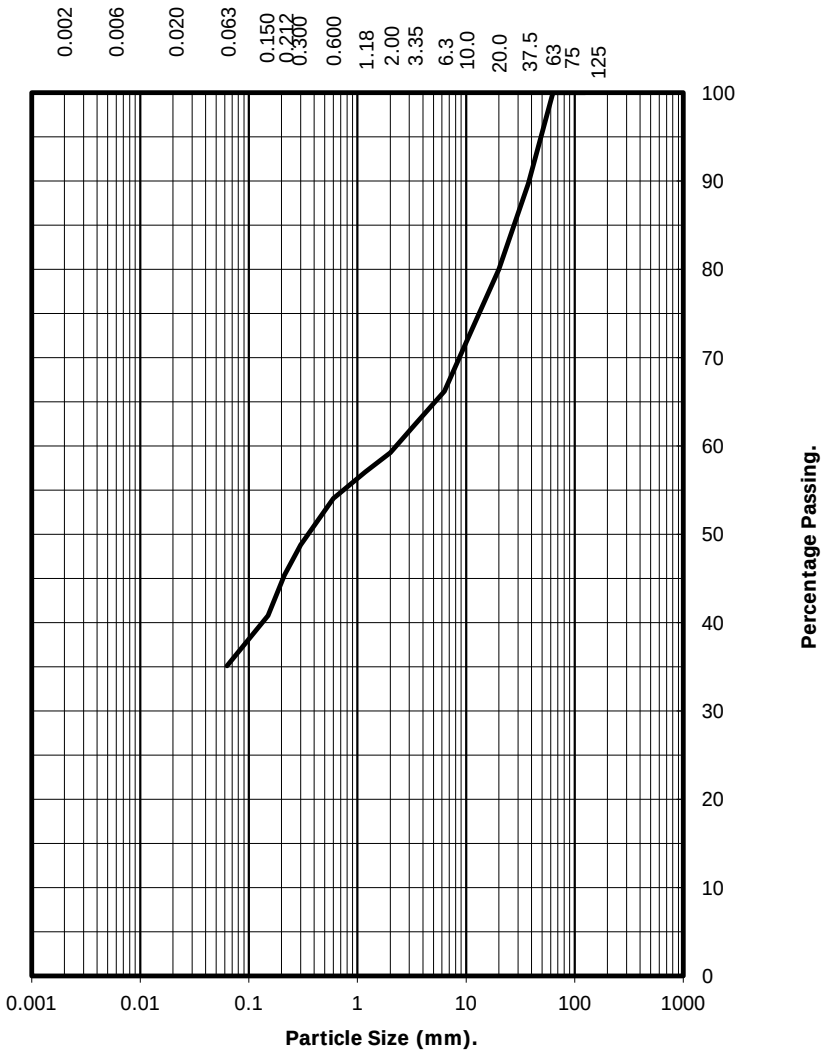
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse)**

BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	90
20	80
10	72
6.3	66
3.35	62
2.00	59
1.18	57
0.60	54
0.300	49
0.212	45
0.150	41
0.063	35

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	35	**24**	**41**	**0**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **6**

Depth from (m):

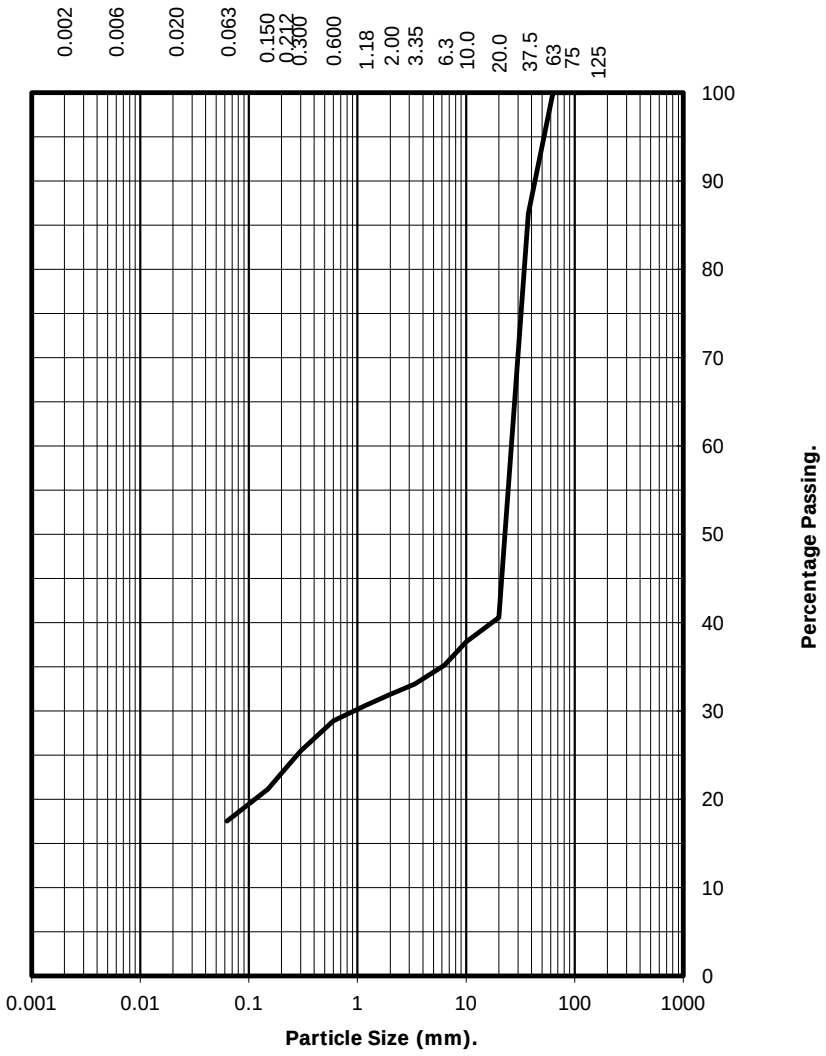
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse)**

BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	86
20	41
10	38
6.3	35
3.35	33
2.00	32
1.18	31
0.60	29
0.300	25
0.212	23
0.150	21
0.063	18

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	18	**14**	**68**	**0**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **7**

Depth from (m):

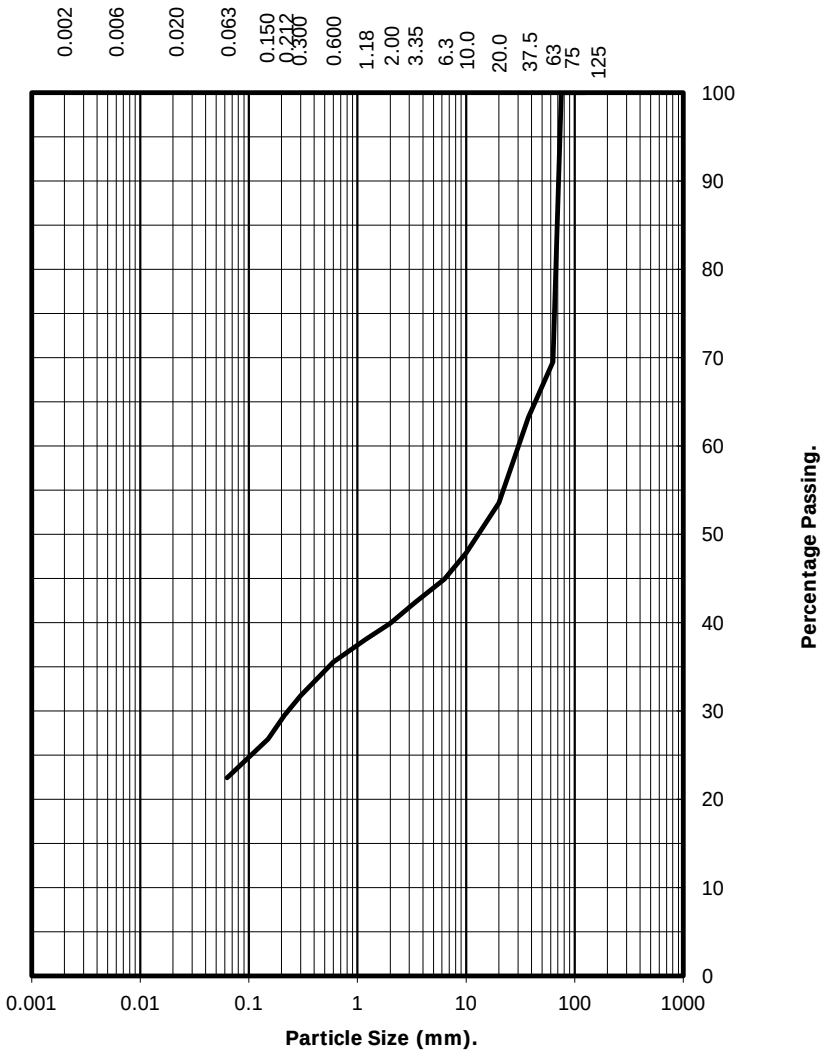
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	100
63	70
37.5	63
20	54
10	48
6.3	45
3.35	42
2.00	40
1.18	38
0.60	36
0.300	32
0.212	30
0.150	27
0.063	22

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	22	**18**	**30**	**30**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Test Report: **Particle Size Distribution Test**

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:

Location: **Herbert Road**

Contract Number: **25872-120215**

Hole Number:

Sample Number: **8**

Depth from (m):

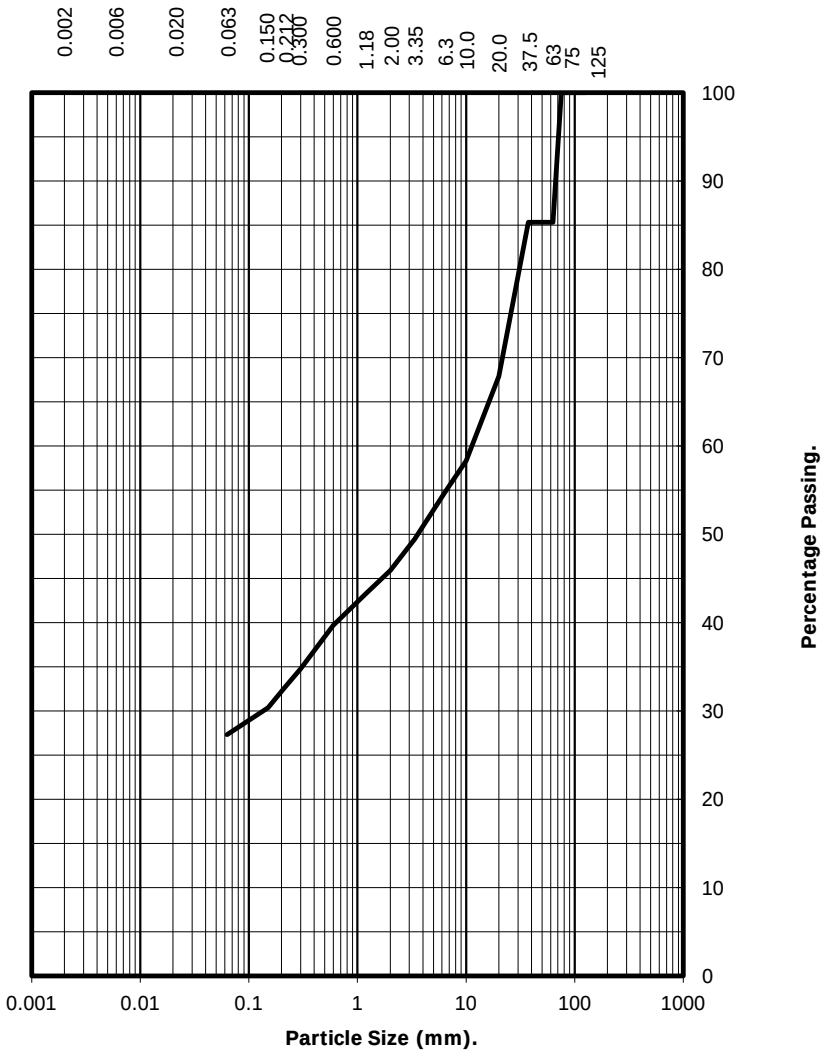
Depth to (m):

Sample Type: **B**

Description: **Brown silty clayey sandy GRAVEL (fine-coarse) with many cobbles**

BS Test Sieve	Percentage Passing
125	100
75	100
63	85
37.5	85
20	68
10	58
6.3	55
3.35	49
2.00	46
1.18	43
0.60	40
0.300	35
0.212	33
0.150	30
0.063	27

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#



	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	27	**19**	**39**	**15**	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: **Jonathan Tatam (Admin/Quality Assistant)**

Date: 25.2.15

GSTL GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

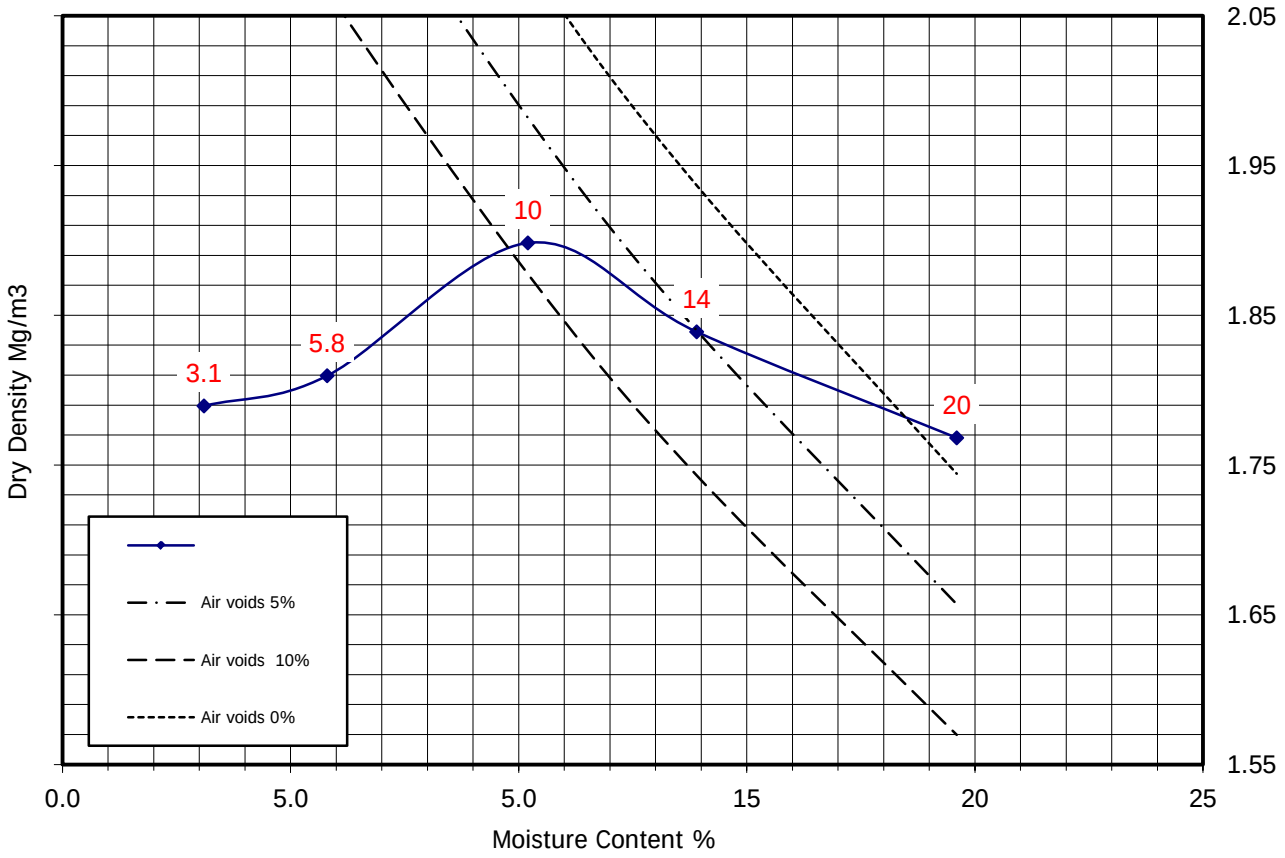
Contract Number: **25872-120215**

Hole Number:

Sample Number: **1**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.1	5.8	10	14	20
Bulk Density (Mg/m^3):	1.84	1.91	2.09	2.09	2.11
Dry Density (Mg/m^3):	1.79	1.81	1.90	1.84	1.77

Initial Moisture Content:	**20**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**32**
Maximum Dry Density (mg/m^3):	**1.90**	Material Retained on 20.0 mm Test Sieve (%):	**71**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 25.2.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

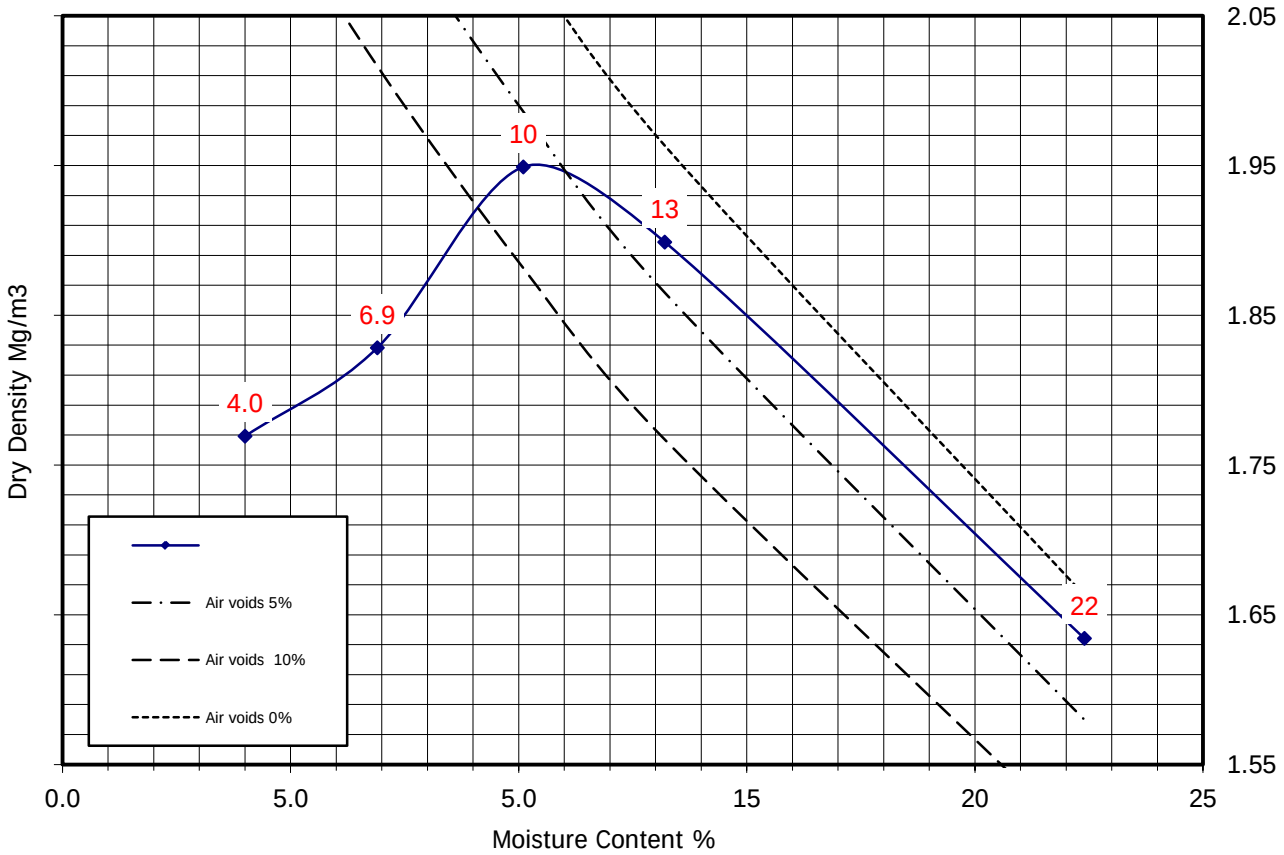
Contract Number: **25872-120215**

Hole Number:

Sample Number: **2**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	4.0	6.9	10	13	22
Bulk Density (Mg/m^3):	1.84	1.95	2.15	2.15	2.00
Dry Density (Mg/m^3):	1.77	1.83	1.95	1.90	1.63

Initial Moisture Content:	**22**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**34**
Maximum Dry Density (mg/m^3):	**1.95**	Material Retained on 20.0 mm Test Sieve (%):	**66**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 25.2.15

UKAS TESTING 2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

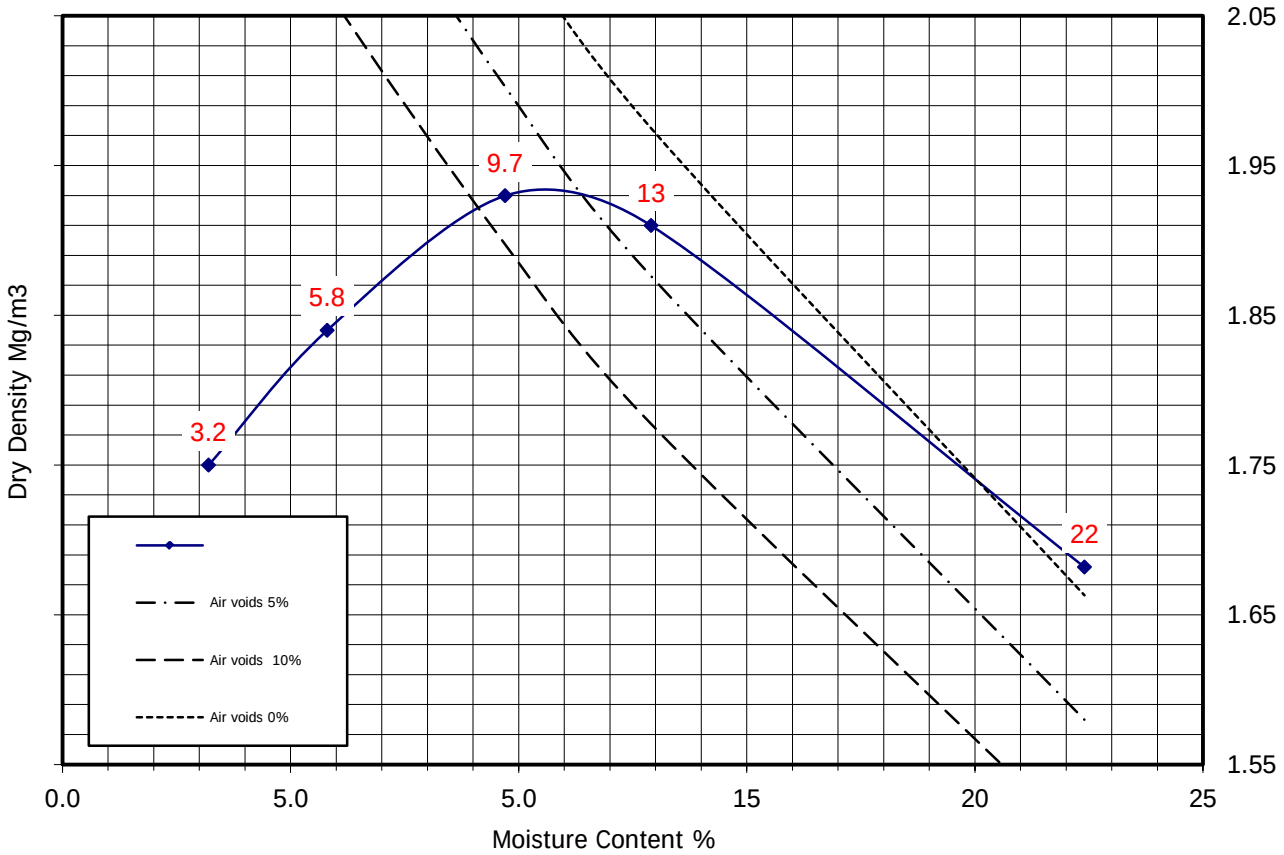
Contract Number: **25872-120215**

Hole Number:

Sample Number: **3**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.2	5.8	9.7	13	22
Bulk Density (Mg/m^3):	1.81	1.95	2.12	2.16	2.06
Dry Density (Mg/m^3):	1.75	1.84	1.93	1.91	1.68

Initial Moisture Content:	**22**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**23**
Maximum Dry Density (mg/m^3):	**1.93**	Material Retained on 20.0 mm Test Sieve (%):	**59**
Optimum Moisture Content (%):	**9.7**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: **25.2.15**

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

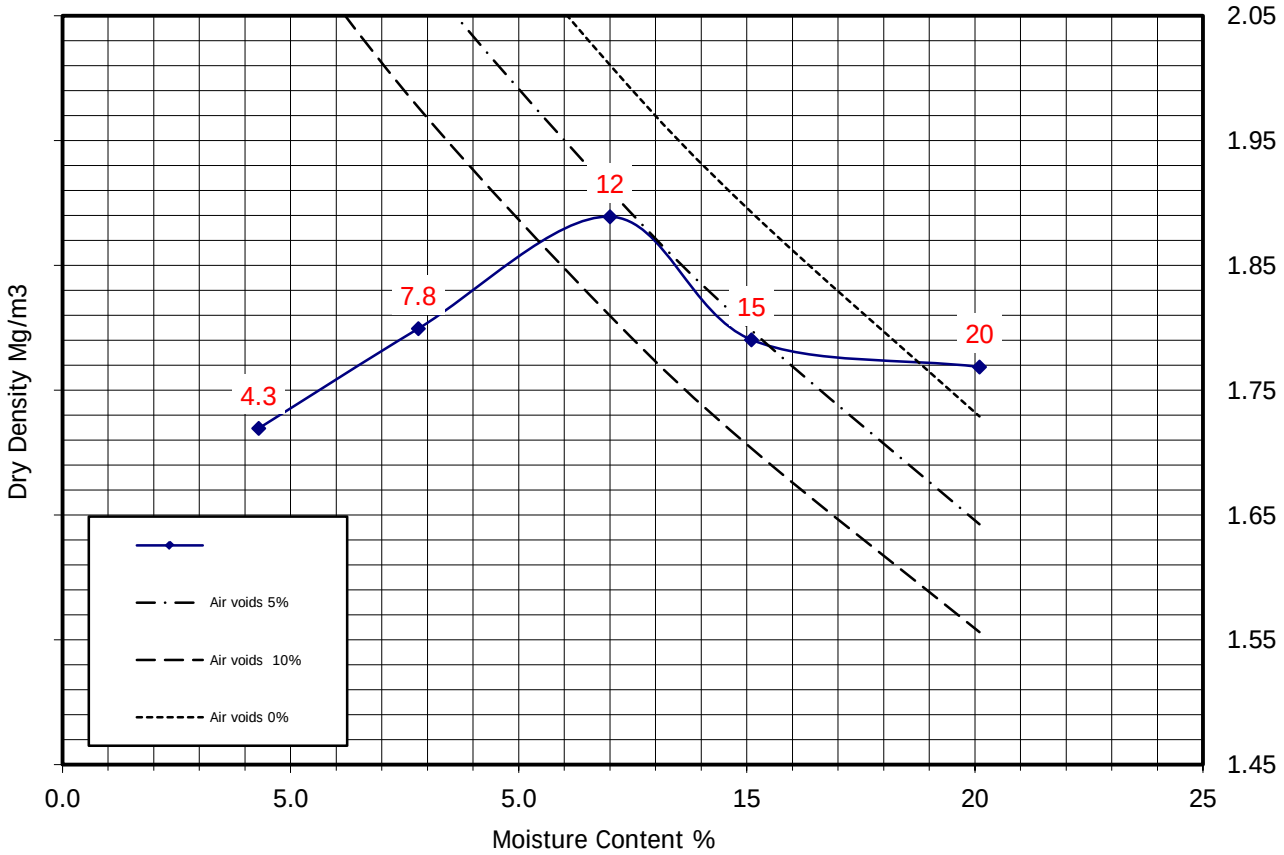
Contract Number: **25872-120215**

Hole Number:

Sample Number: **4**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	4.3	7.8	12	15	20
Bulk Density (Mg/m^3):	1.79	1.94	2.12	2.06	2.12
Dry Density (Mg/m^3):	1.72	1.80	1.89	1.79	1.77

Initial Moisture Content:	**15**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**40**
Maximum Dry Density (mg/m^3):	**1.89**	Material Retained on 20.0 mm Test Sieve (%):	**46**
Optimum Moisture Content (%):	**12**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: **25.2.15**

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

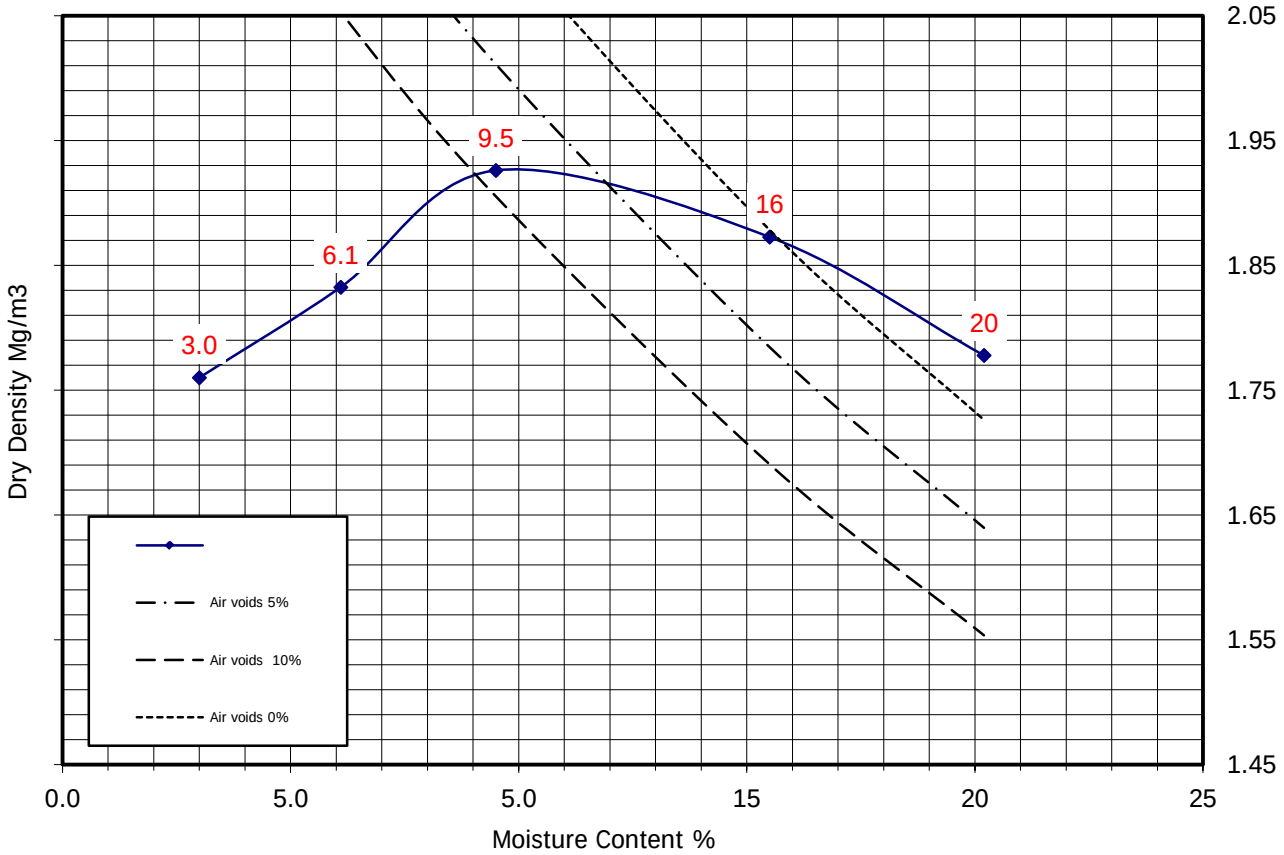
Contract Number: **25872-120215**

Hole Number:

Sample Number: **5**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.0	6.1	9.5	16	20
Bulk Density (Mg/m^3):	1.81	1.94	2.11	2.16	2.14
Dry Density (Mg/m^3):	1.76	1.83	1.93	1.87	1.78

Initial Moisture Content:	**20**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**10**
Maximum Dry Density (mg/m^3):	**1.93**	Material Retained on 20.0 mm Test Sieve (%):	**20**
Optimum Moisture Content (%):	**9.5**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: **25.2.15**

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

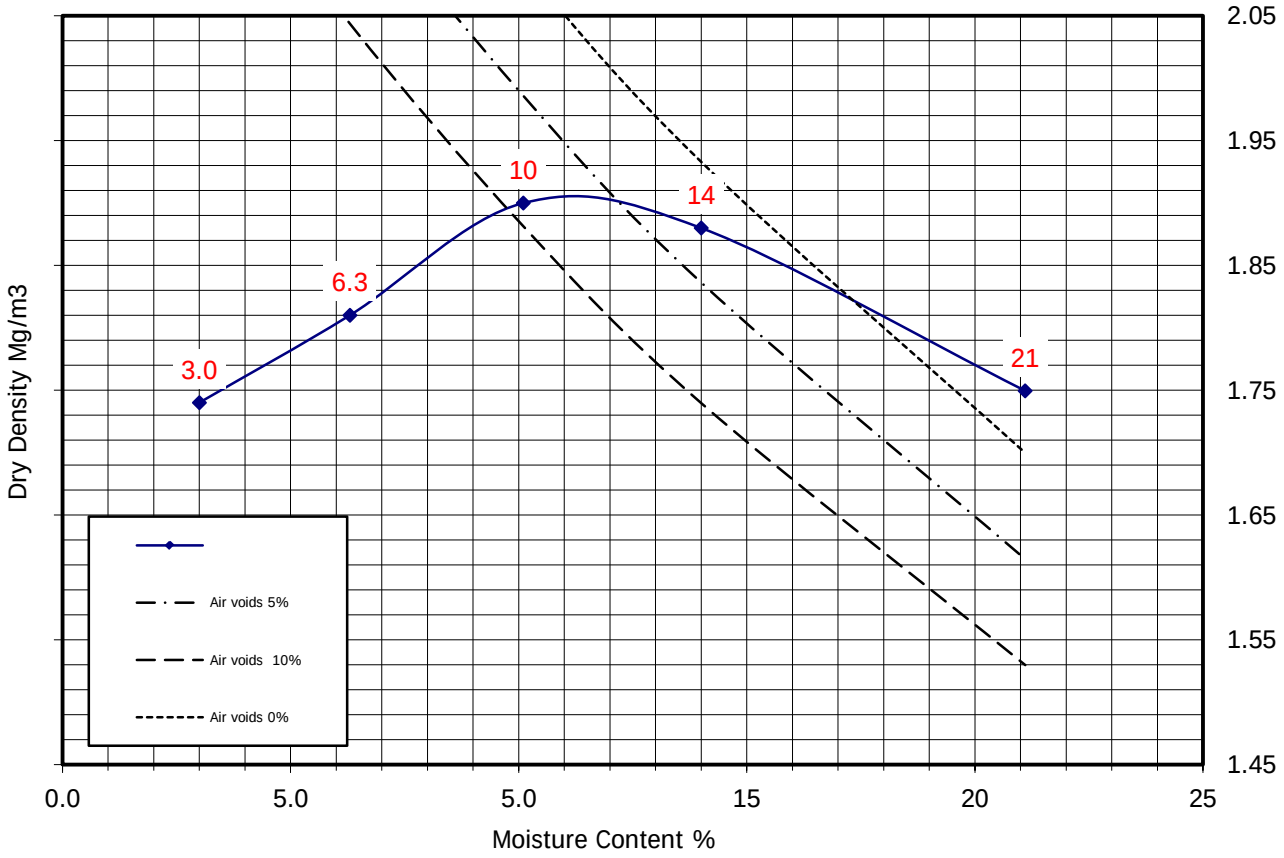
Contract Number: **25872-120215**

Hole Number:

Sample Number: **6**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.0	6.3	10	14	21
Bulk Density (Mg/m^3):	1.79	1.92	2.09	2.14	2.12
Dry Density (Mg/m^3):	1.74	1.81	1.90	1.88	1.75

Initial Moisture Content:	**21**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**14**
Maximum Dry Density (mg/m^3):	**1.90**	Material Retained on 20.0 mm Test Sieve (%):	**59**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 25.2.15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

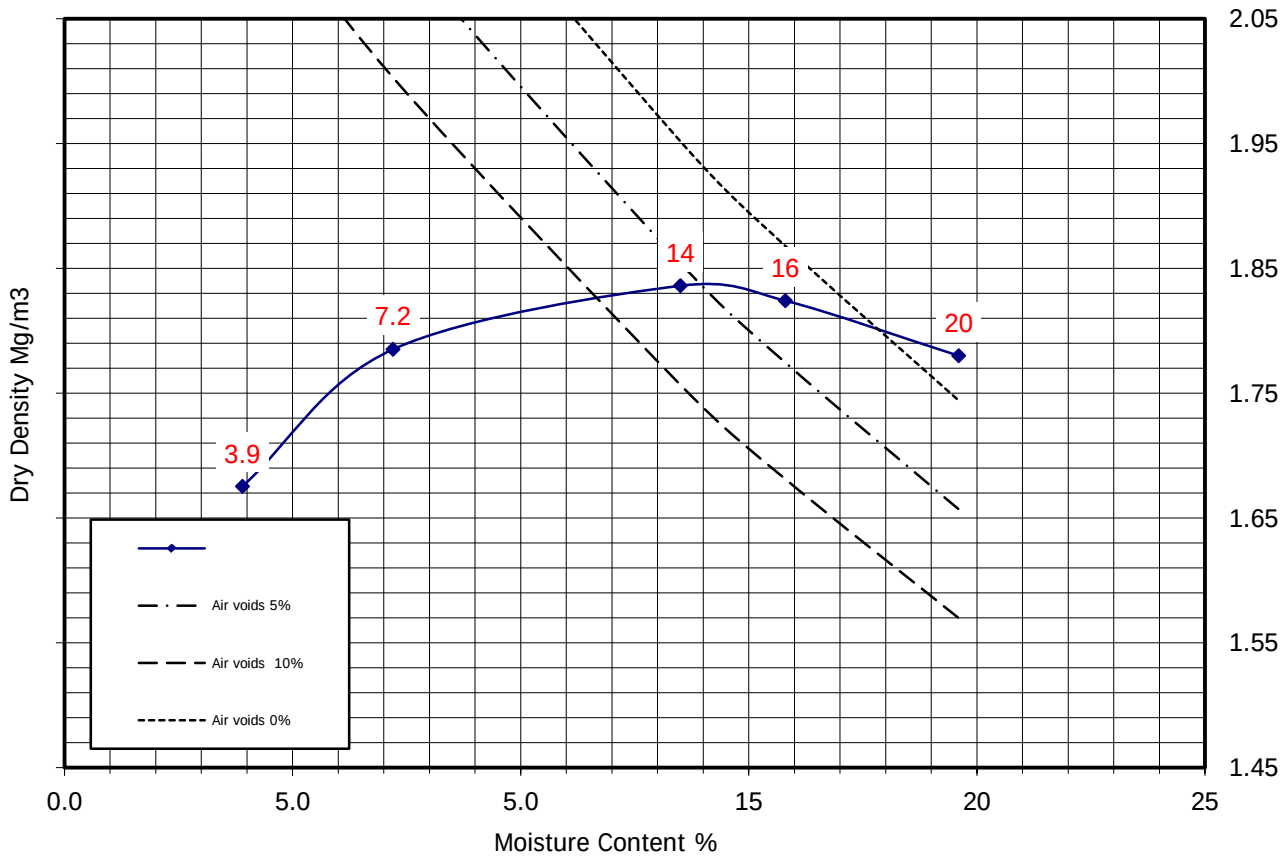
Contract Number: **25872-120215**

Hole Number:

Sample Number: **7**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.9	7.2	14	16	20
Bulk Density (Mg/m^3):	1.74	1.91	2.08	2.11	2.13
Dry Density (Mg/m^3):	1.68	1.79	1.84	1.82	1.78

Initial Moisture Content:	**16**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**37**
Maximum Dry Density (mg/m^3):	**1.84**	Material Retained on 20.0 mm Test Sieve (%):	**46**
Optimum Moisture Content (%):	**14**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: **25.2.15**

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Herbert Road**

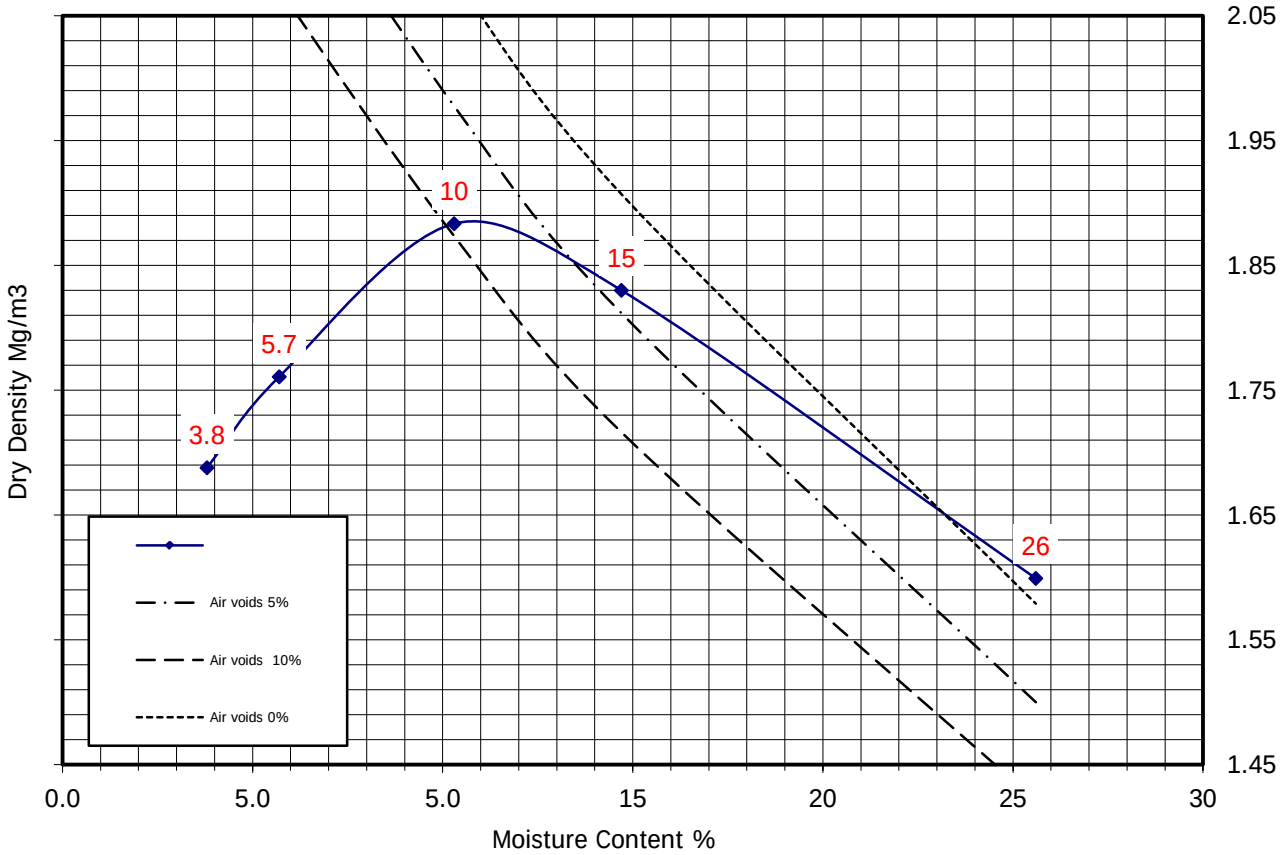
Contract Number: **25872-120215**

Hole Number:

Sample Number: **8**

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	3.8	5.7	10	15	26
Bulk Density (Mg/m^3):	1.75	1.86	2.08	2.10	2.01
Dry Density (Mg/m^3):	1.69	1.76	1.88	1.83	1.60

Initial Moisture Content:	**26**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**15**
Maximum Dry Density (mg/m^3):	**1.88**	Material Retained on 20.0 mm Test Sieve (%):	**32**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 25.2.15

UKAS TESTING
2788

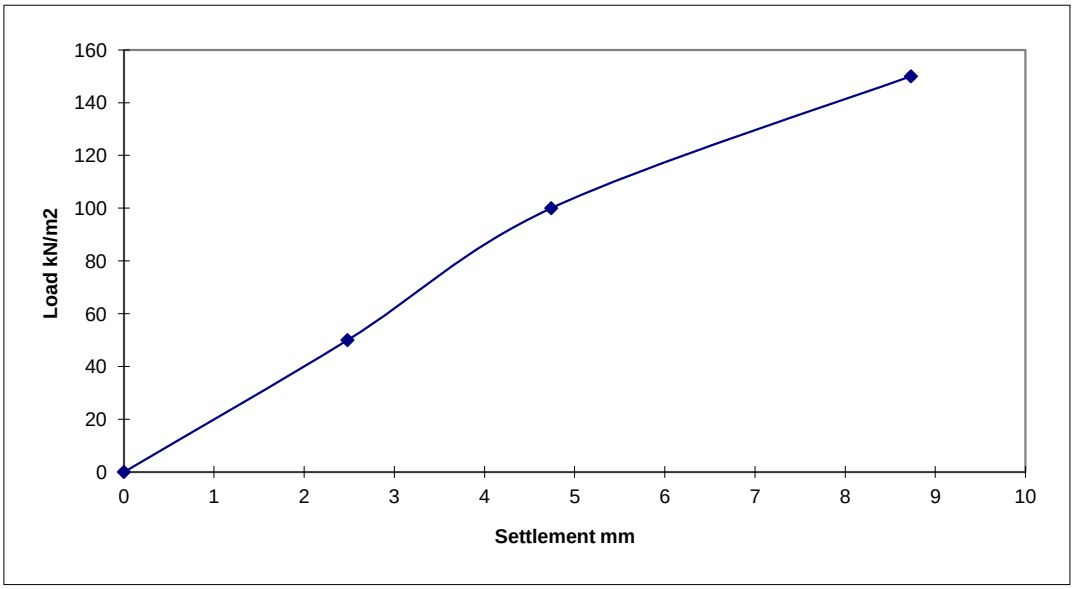
ANNEX K
Geotechnical Test Results Certificates

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 1	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.48	50	50
4.74	100	100
8.73	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

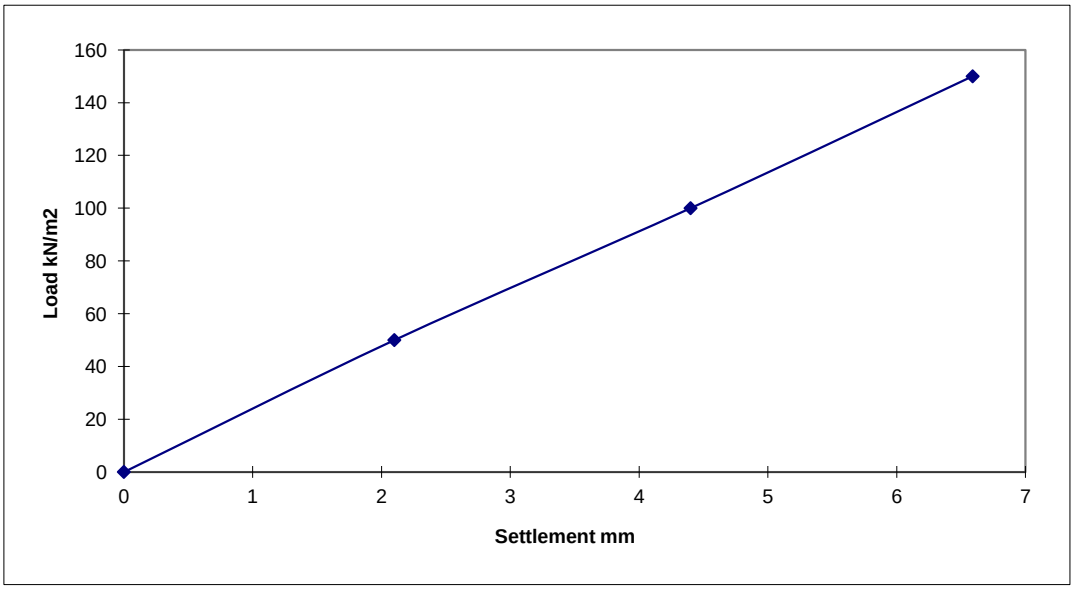
CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 3	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.10	50	50
4.40	100	100
6.59	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

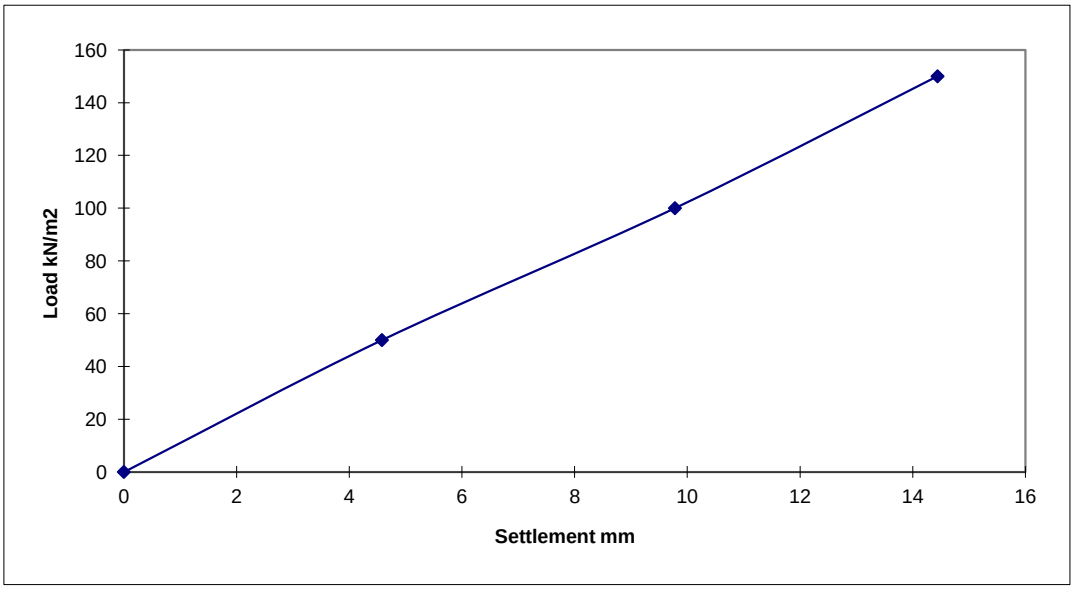
CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 5	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
4.58	50	50
9.78	100	100
14.44	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

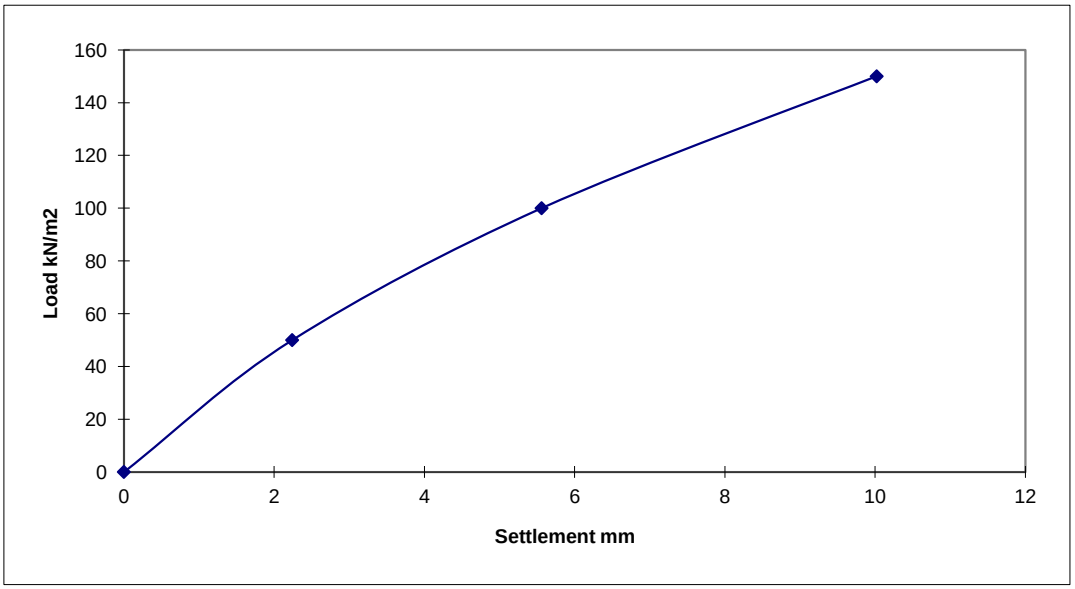
CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 6	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.24	50	50
5.56	100	100
10.02	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

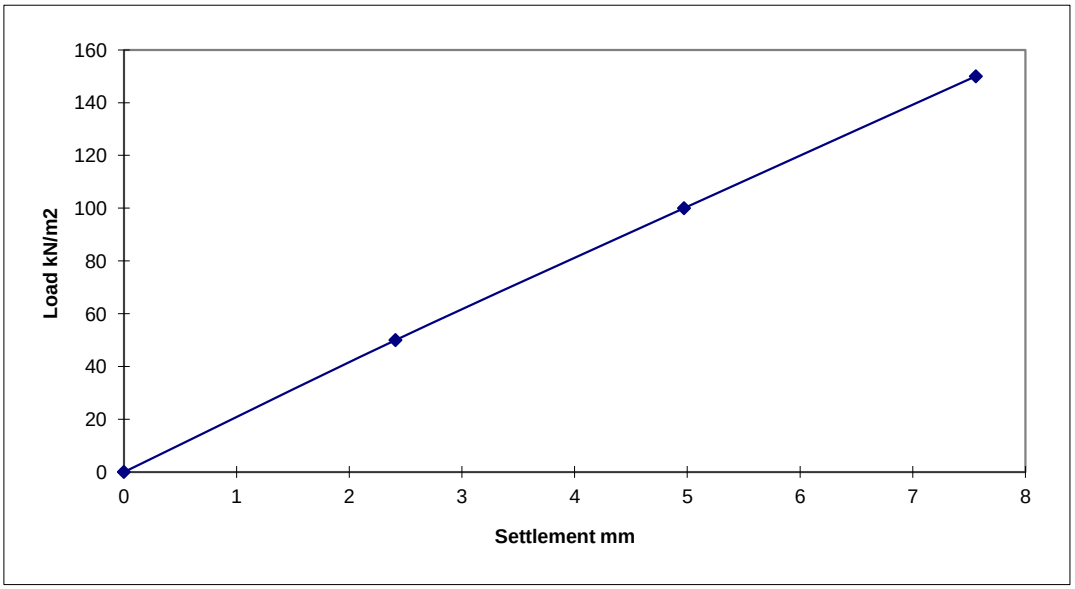
CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: Test 7	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.41	50	50
4.97	100	100
7.56	150	150



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Herbert Road, Newport	Date: 24.07.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7260	g
4.Weight of soil from excavation	(C3)	6494	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4840	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.08	Mg/m^3
9. Moisture content of soil:	(C8)	7.89	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.93	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 1

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6830	g
4.Weight of soil from excavation	(C3)	6471	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5270	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	1.90	Mg/m^3
9. Moisture content of soil:	(C8)	6.52	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.79	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 2

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	5900	g
4.Weight of soil from excavation	(C3)	7997	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	6200	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.00	Mg/m^3
9. Moisture content of soil:	(C8)	9.75	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.82	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 3

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6752	g
4.Weight of soil from excavation	(C3)	6597	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5348	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	1.91	Mg/m^3
9. Moisture content of soil:	(C8)	5.78	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.81	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 4

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7509	g
4.Weight of soil from excavation	(C3)	6111	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4591	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.06	Mg/m^3
9. Moisture content of soil:	(C8)	8.40	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.90	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 5

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING
IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7685	g
4.Weight of soil from excavation	(C3)	6140	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4415	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.16	Mg/m^3
9. Moisture content of soil:	(C8)	8.90	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.98	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 6

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 24.07.15 OPERATIVE: DMc

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7617	g
4.Weight of soil from excavation	(C3)	5890	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4483	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.04	Mg/m^3
9. Moisture content of soil:	(C8)	6.06	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.92	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 7

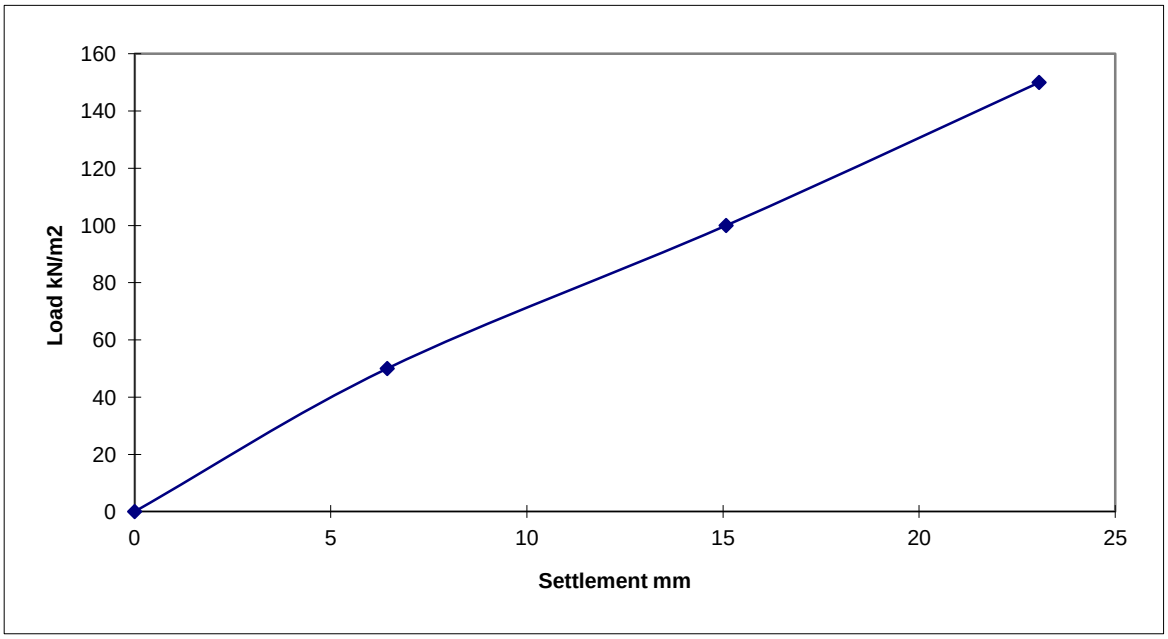
In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 1	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
6.44	50	12
15.08	100	24
23.06	150	36



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

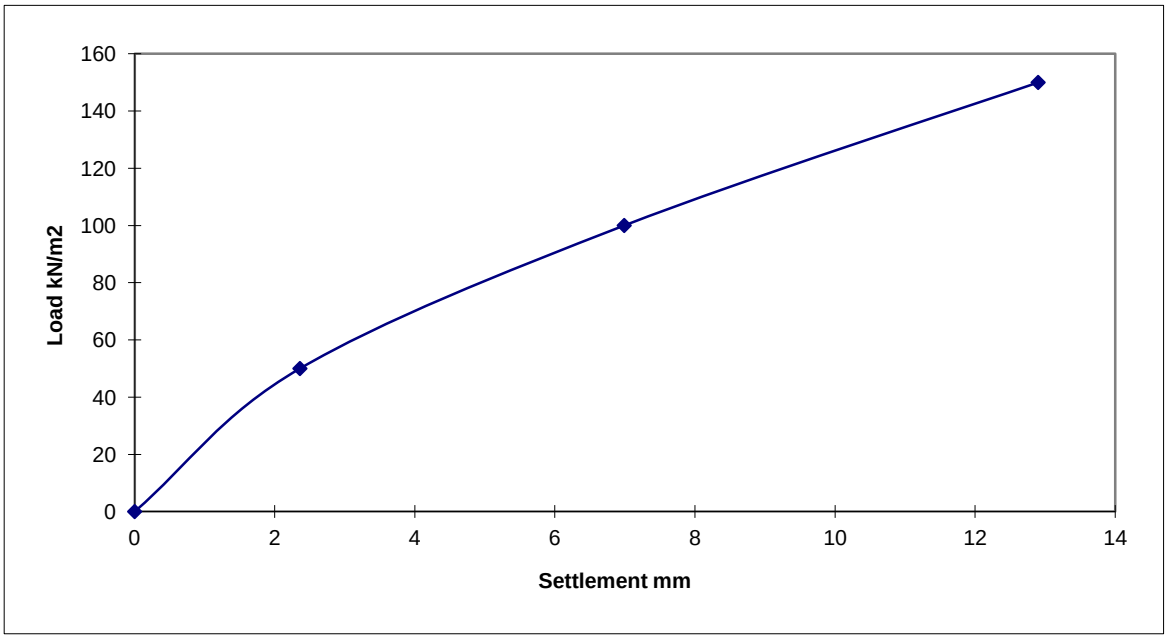
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 2	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.36	50	5
6.99	100	11
12.90	150	19



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 3	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.90	50	3
3.77	100	8
5.12	150	13



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

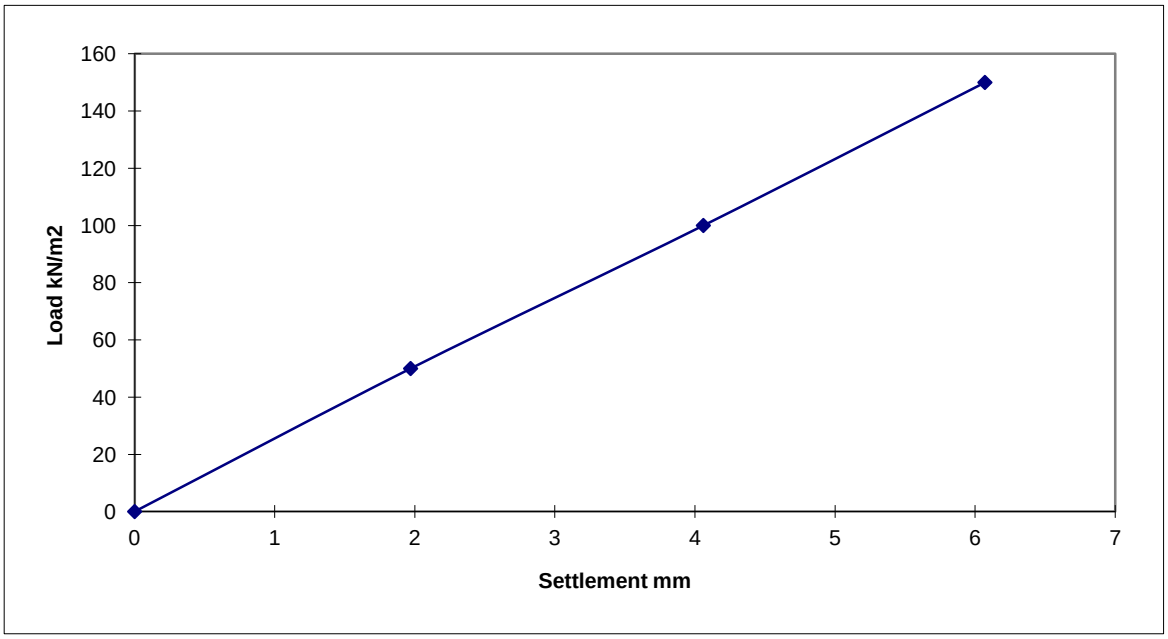
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 4	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.97	50	4
4.06	100	9
6.07	150	15



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

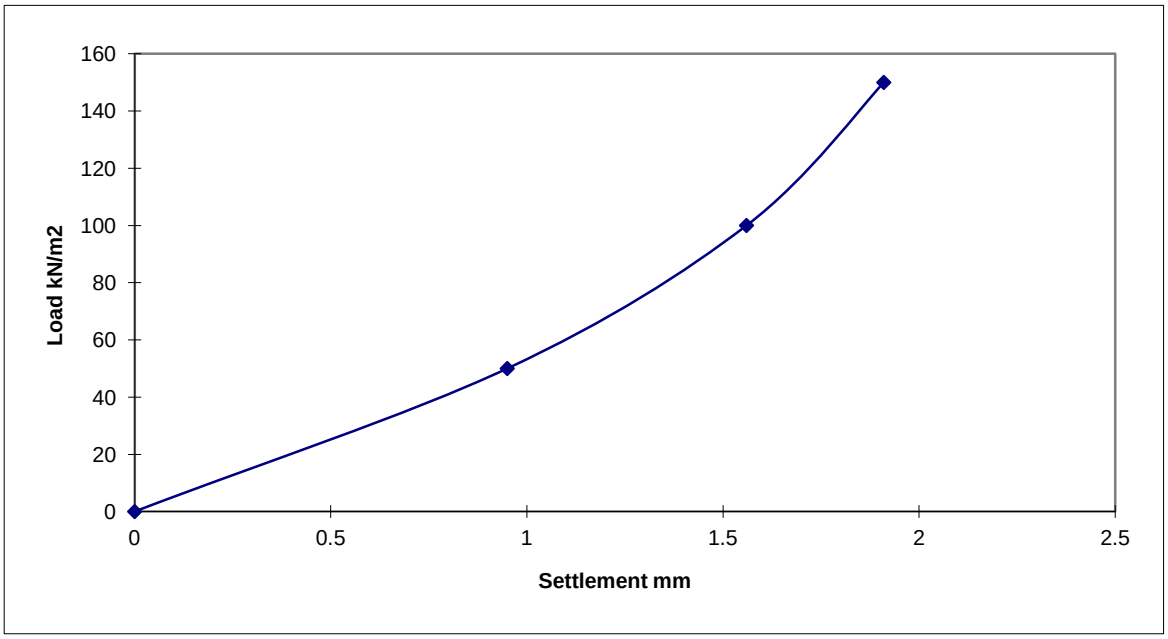
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 5	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
0.95	50	3
1.56	100	6
1.91	150	9



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

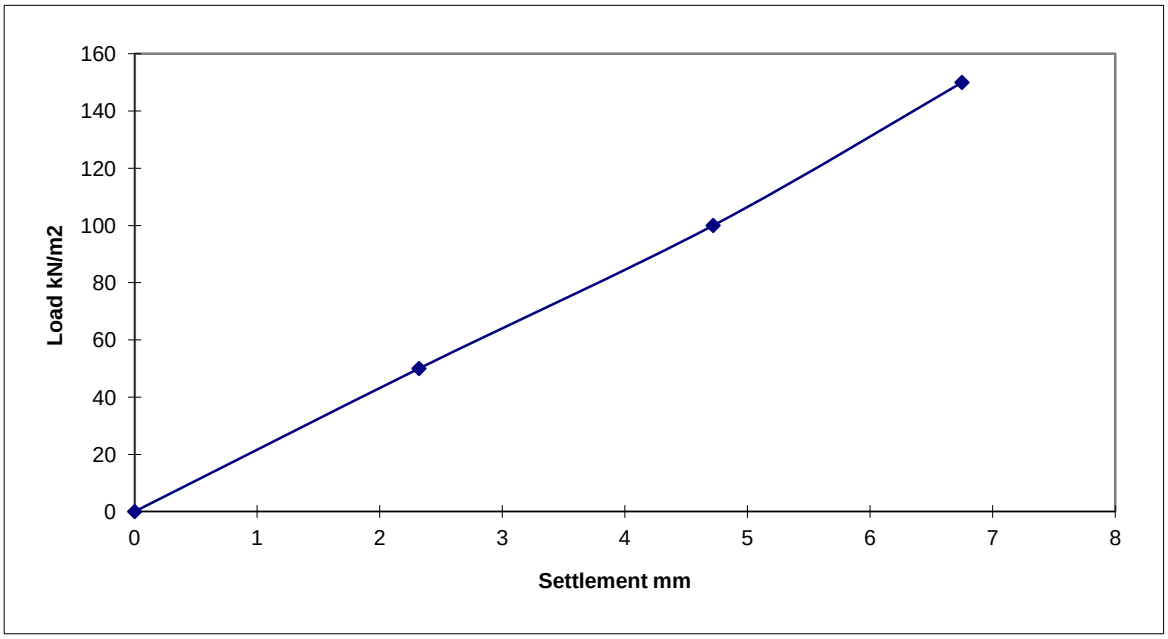
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 6	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.32	50	4
4.72	100	8
6.75	150	12



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

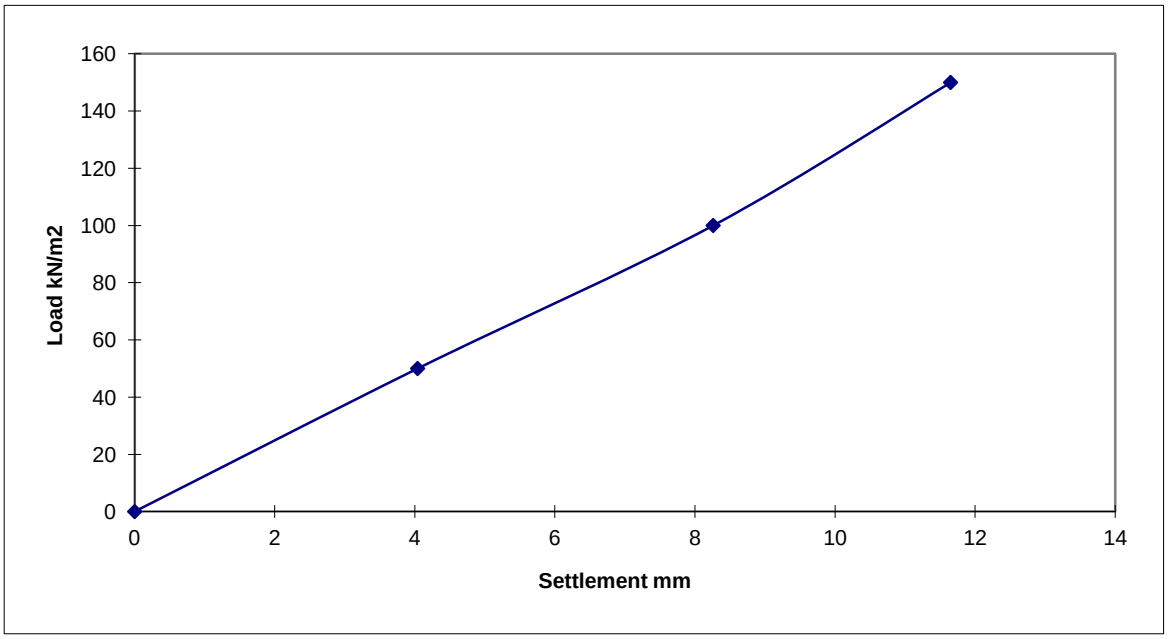
CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 7	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
4.04	50	4
8.26	100	9
11.65	150	15



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Herbert Road	Date: 11.09.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown clayey gravel	TEST DEPTH: GL DATE: 14.09.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6420	g
4.Weight of soil from excavation	(C3)	7600	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5680	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.07	Mg/m^3
9. Moisture content of soil:	(C8)	15.97	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.79	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 1

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown clayey gravel	TEST DEPTH: GL DATE: 14.09.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	7580	g
4.Weight of soil from excavation	(C3)	6350	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	4520	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.18	Mg/m^3
9. Moisture content of soil:	(C8)	8.58	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	2.01	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 2

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown clayey gravel	TEST DEPTH: GL DATE: 14.09.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6250	g
4.Weight of soil from excavation	(C3)	7950	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5850	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.11	Mg/m^3
9. Moisture content of soil:	(C8)	8.23	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.95	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 3

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 05.08.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6900	g
4.Weight of soil from excavation	(C3)	7650	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5200	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.28	Mg/m^3
9. Moisture content of soil:	(C8)	18.26	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.93	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 2

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 05.08.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	5650	g
4.Weight of soil from excavation	(C3)	9550	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	6450	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.29	Mg/m^3
9. Moisture content of soil:	(C8)	16.17	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.98	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 3

In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

IN-SITU DENSITY FIELD SHEET

SOIL DESCRIPTION: Brown gravelly clay.	TEST DEPTH: GL DATE: 05.08.15 OPERATIVE: JP

1.Fill Pouring cylinder with known amount of sand.	(C1)	15000	g
2.Pour sand into excavation.			
3.Sand retained in pouring cylinder	(C2)	6750	g
4.Weight of soil from excavation	(C3)	7890	g
5.from calibration sheet, weight of sand required to fill pouring cylinder cone.	(C4)	2900	g
6.Sand required to fill excavation (C1-C2-C4)	(C5)	5350	g
7.From calibration sheet, dry density of sand	(C6)	1.55	Mg/m^3
8. Bulk density of soil. ((C3/C5))xC6)	(C7)	2.29	Mg/m^3
9. Moisture content of soil:	(C8)	18.40	%
10.Dry density of soil ((100xC7)/(100+C8))	(C9)	1.93	Mg/m^3

REMARKS:

CONTRACT: Herbert Road, Newport.

CLIENT: Terra Firma	TEST REFERENCE: SR 4

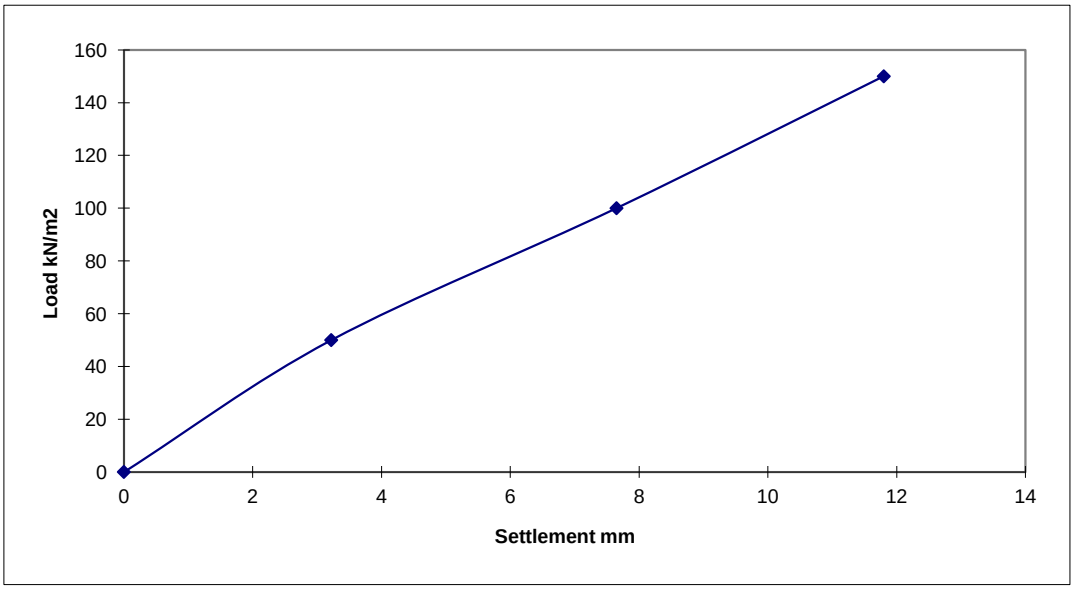
In situ density by sand replacement. BS1377 Part 9

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 1	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.22	50	5
7.65	100	10
11.80	150	21



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

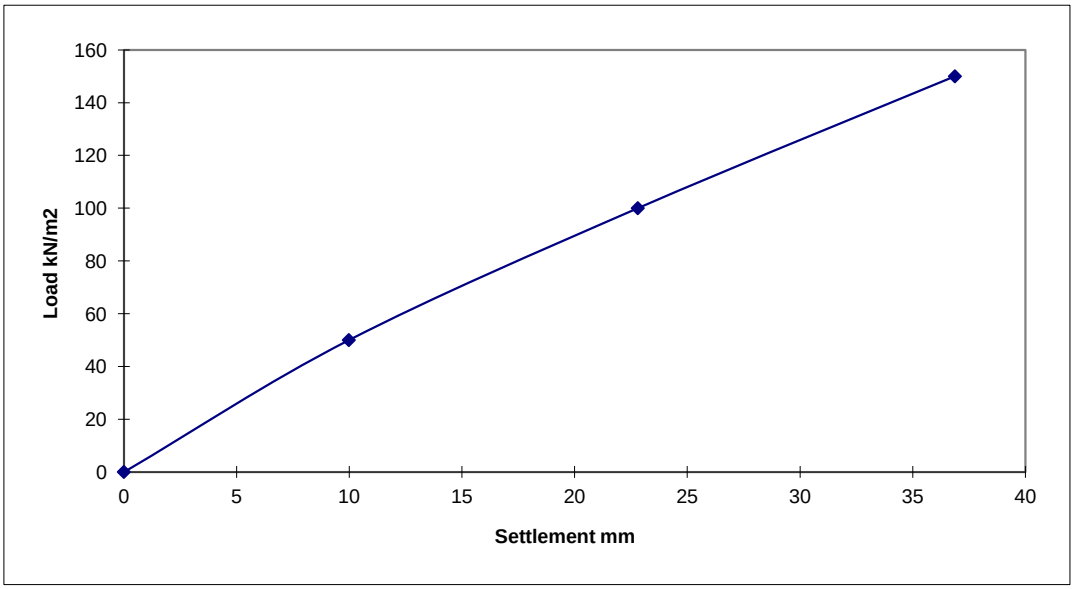
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 2	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
9.98	50	10
22.80	100	15
36.87	150	18



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

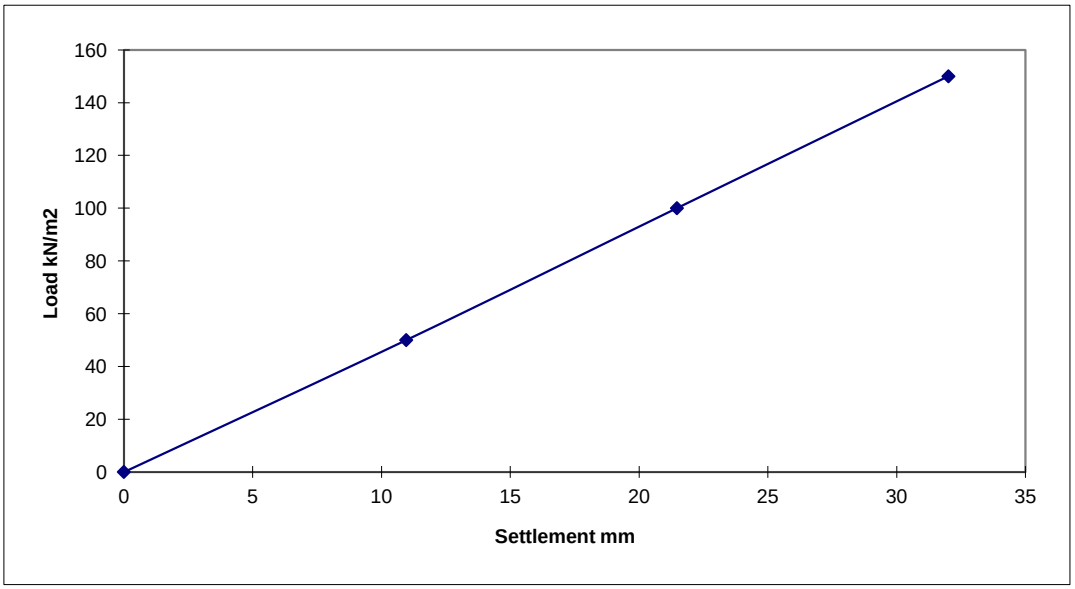
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 3	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
10.96	50	10
21.47	100	15
32.01	150	20



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

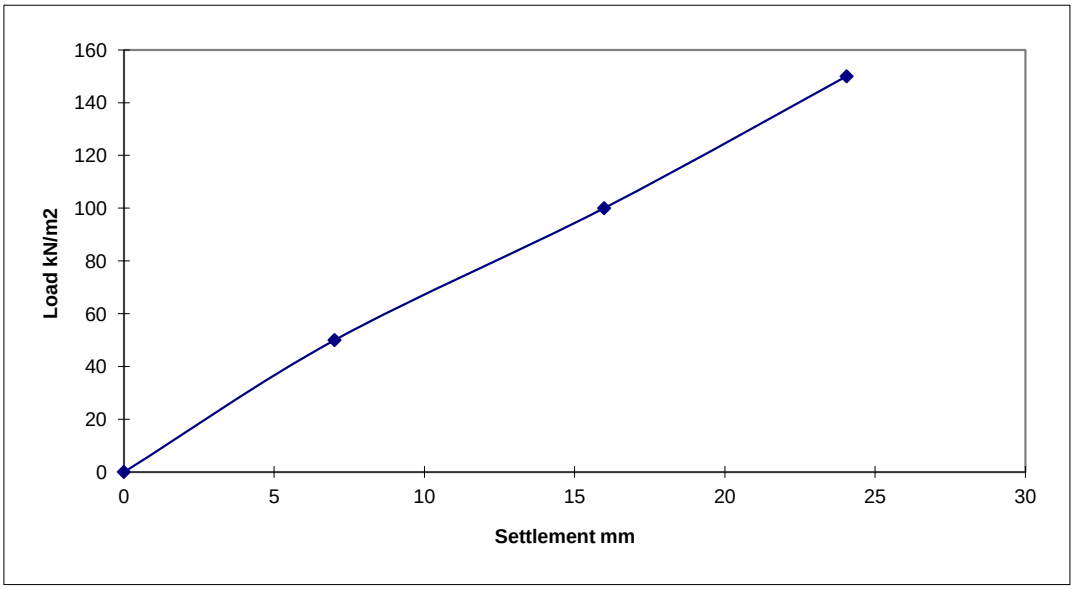
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 4	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
7.01	50	10
15.98	100	20
24.05	150	30



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

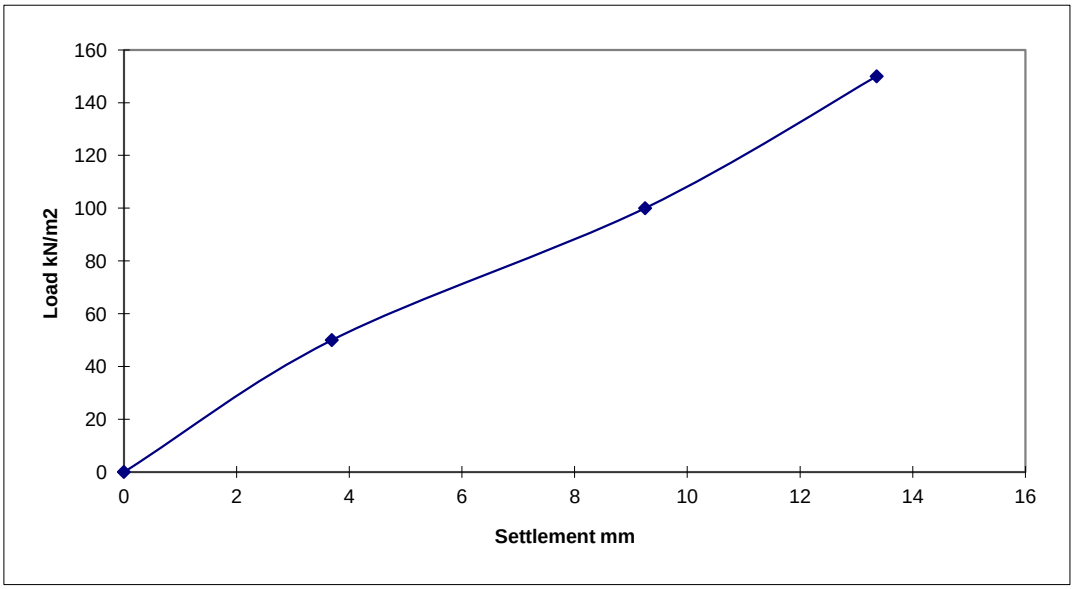
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Test 5	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.69	50	5
9.25	100	15
13.36	150	25



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

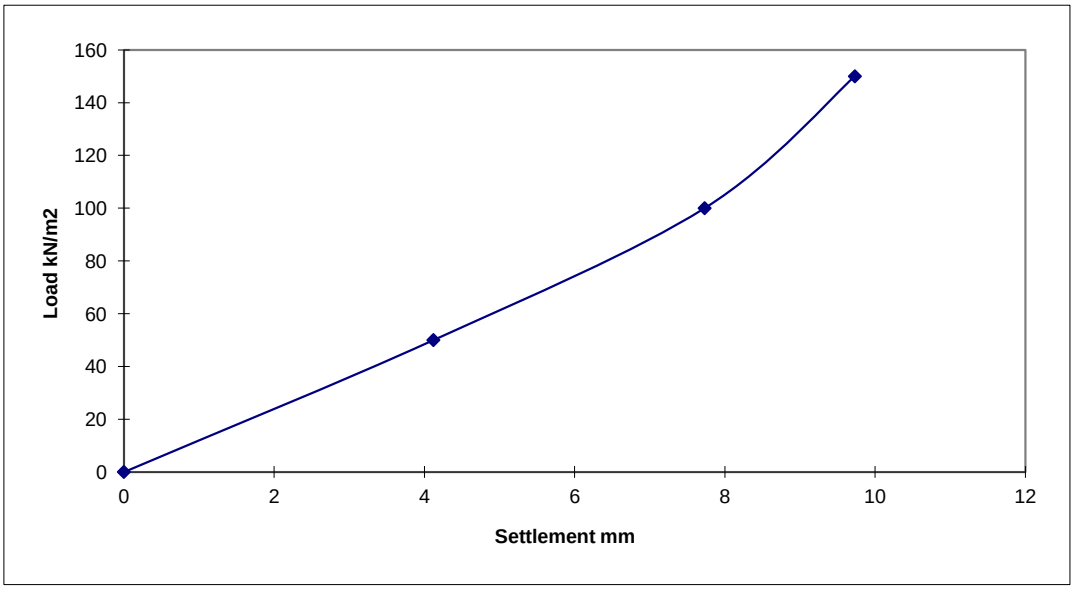
CONTRACT:	Date: 05.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 8	Surface	600mm	Fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
4.12	50	5
7.73	100	13
9.73	150	17



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied for ten minutes.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTHERN GROUND TESTING

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

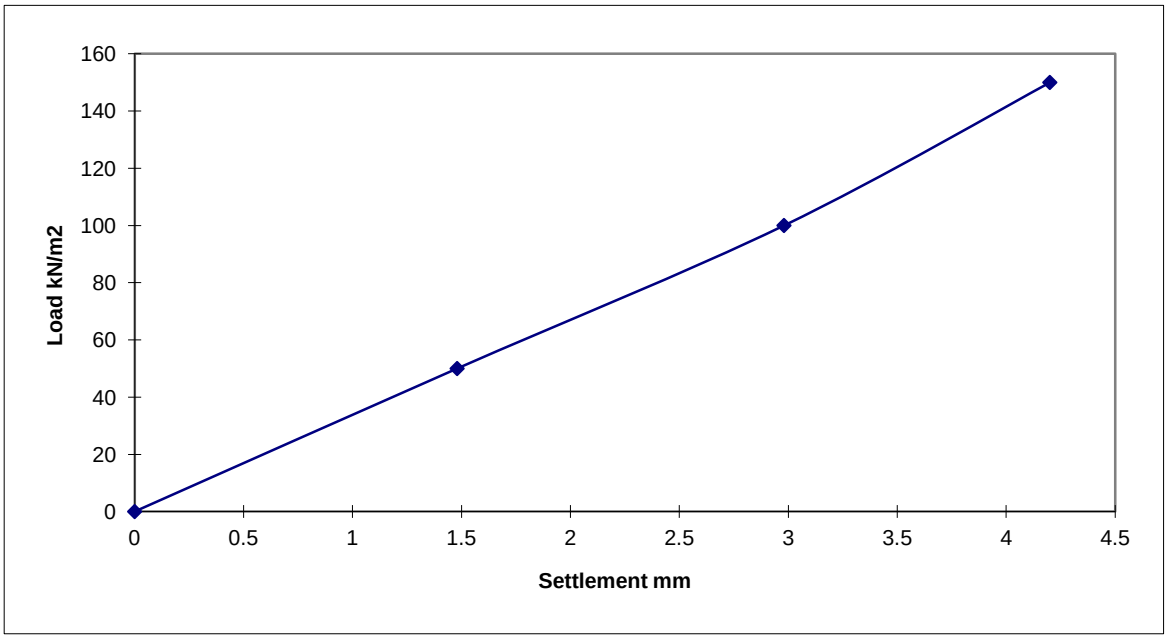
CONTRACT:	Date: 18.08.15
Herbert Road, Newport	Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 1	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.48	50	3
2.98	100	6
4.20	150	13



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

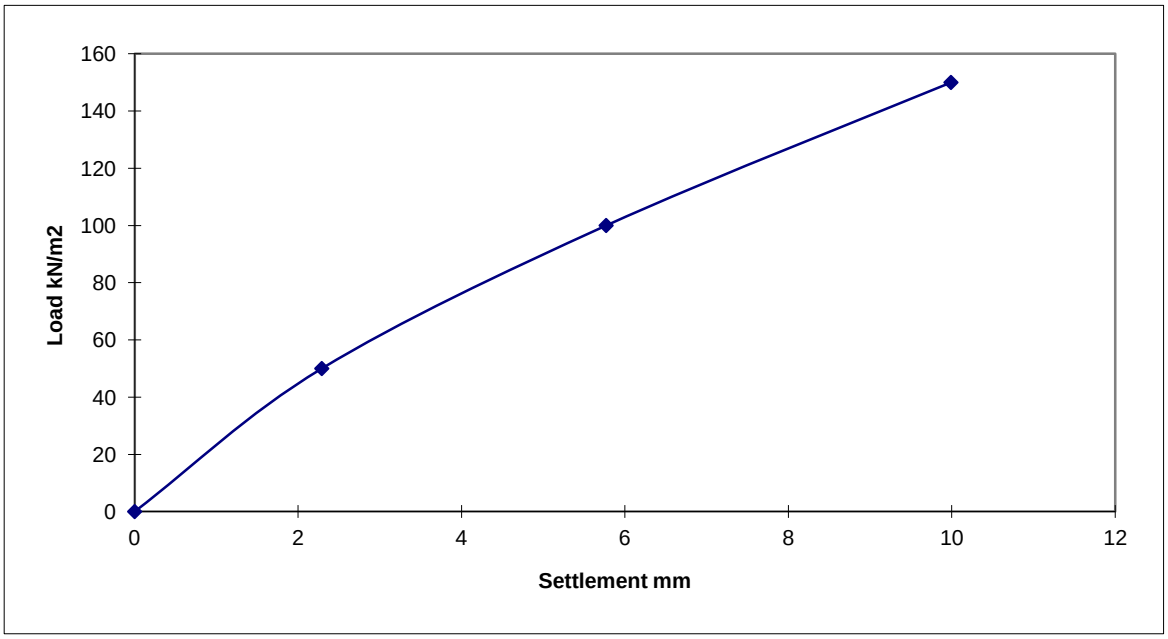
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 2	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.29	50	6
5.77	100	12
9.99	150	20



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

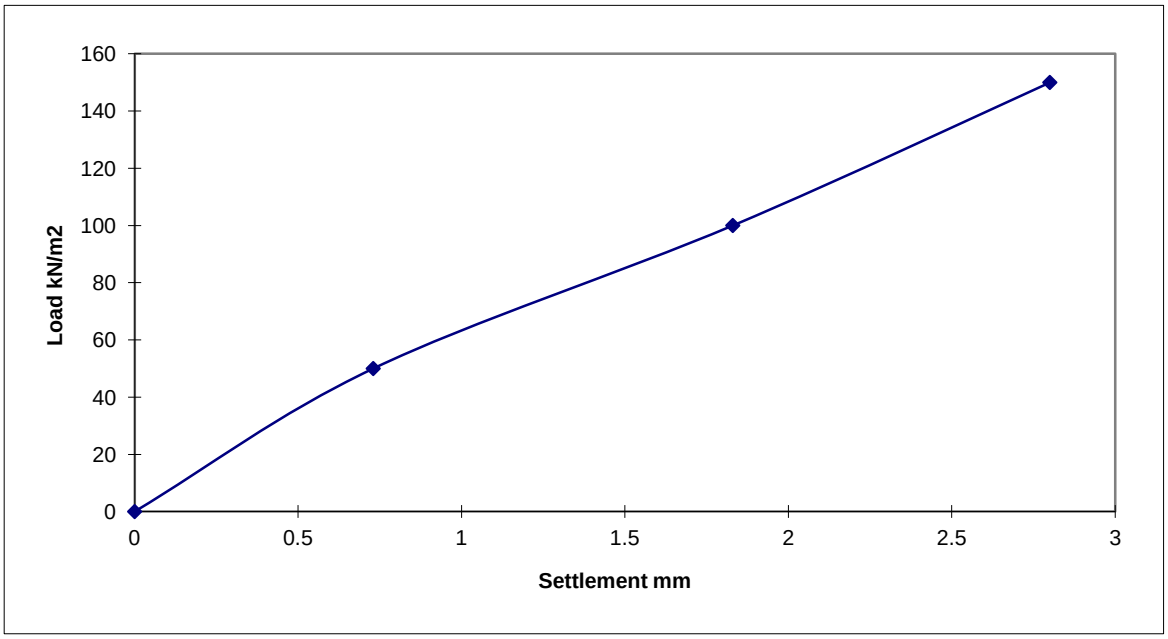
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 3	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
0.73	50	3
1.83	100	6
2.80	150	13



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

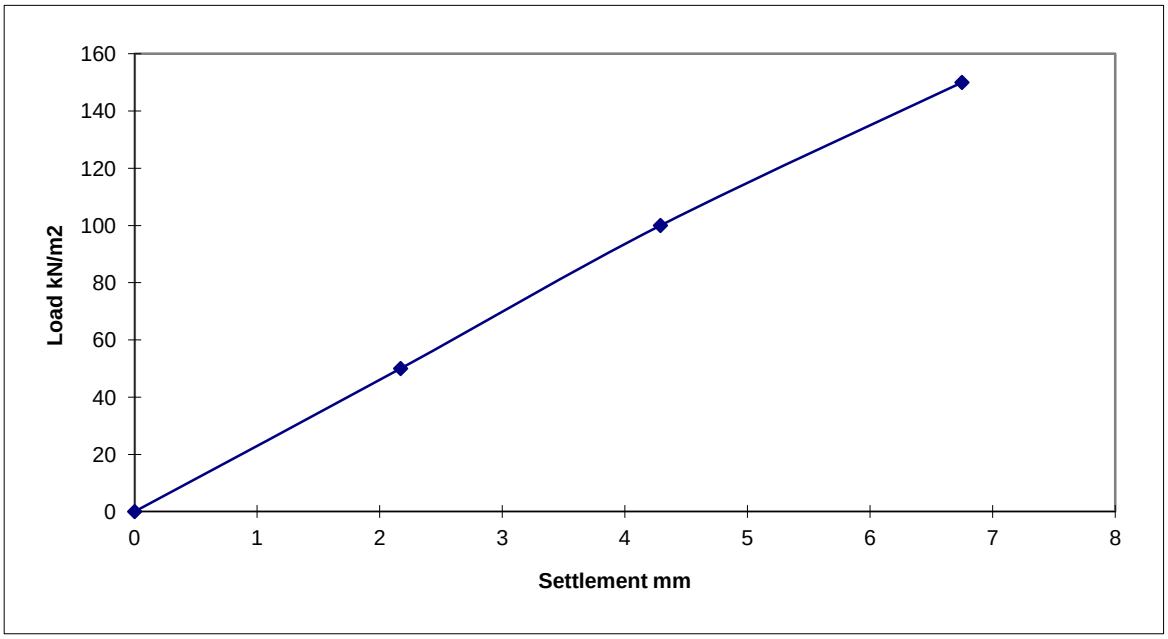
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 4	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.17	50	5
4.29	100	10
6.75	150	17



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

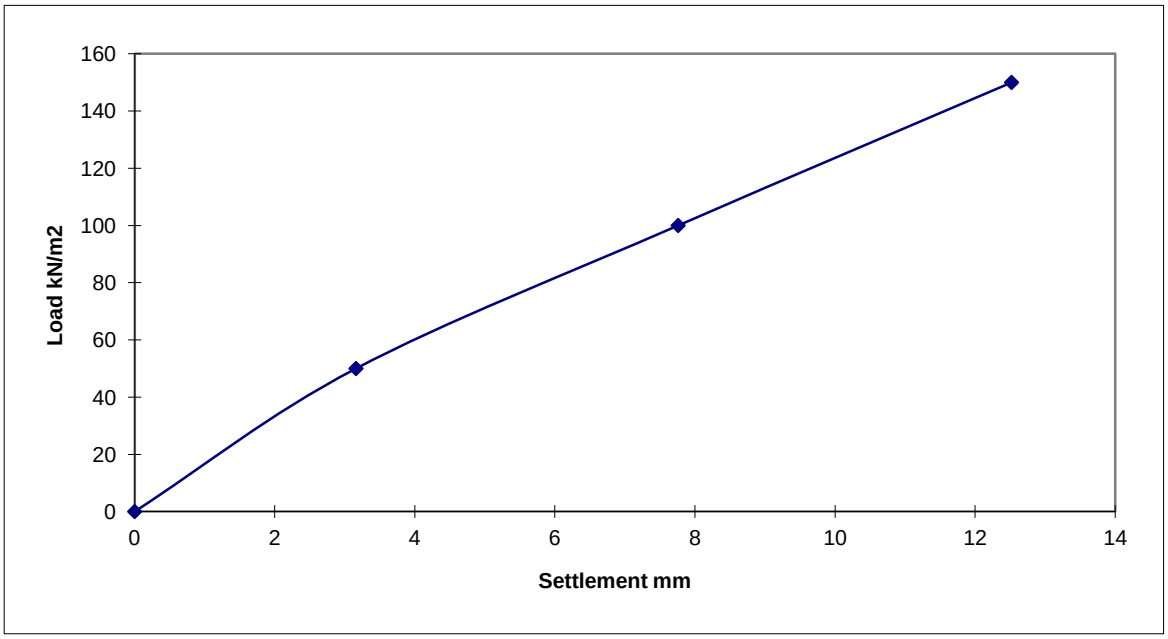
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 5	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.16	50	5
7.76	100	12
12.52	150	21



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

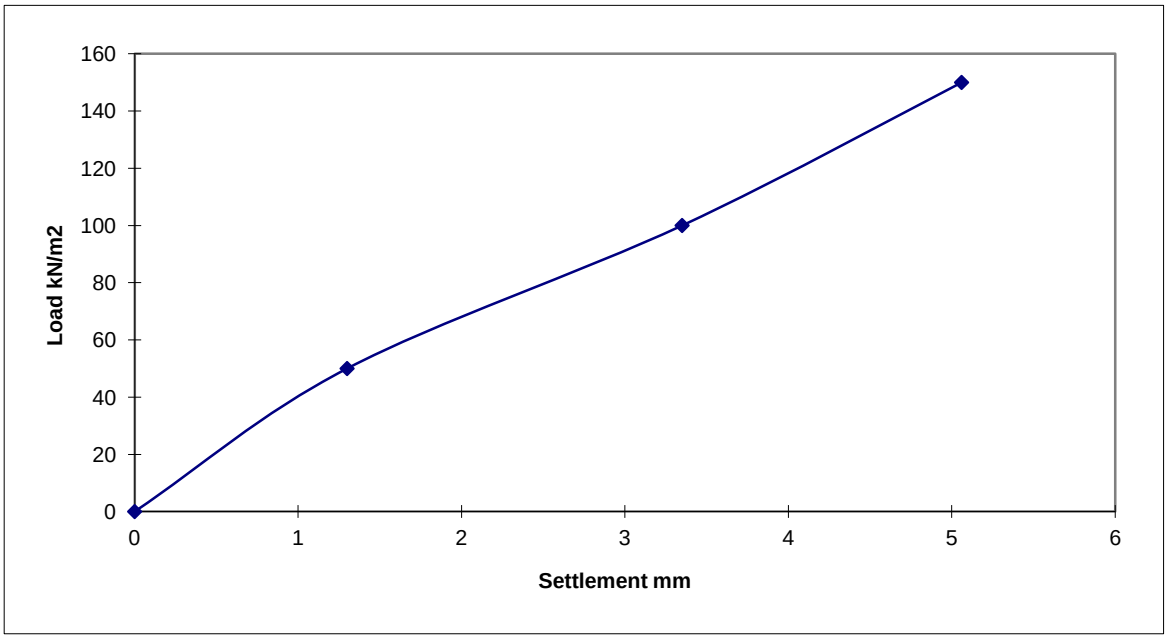
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 6	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.30	50	4
3.35	100	11
5.06	150	15



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

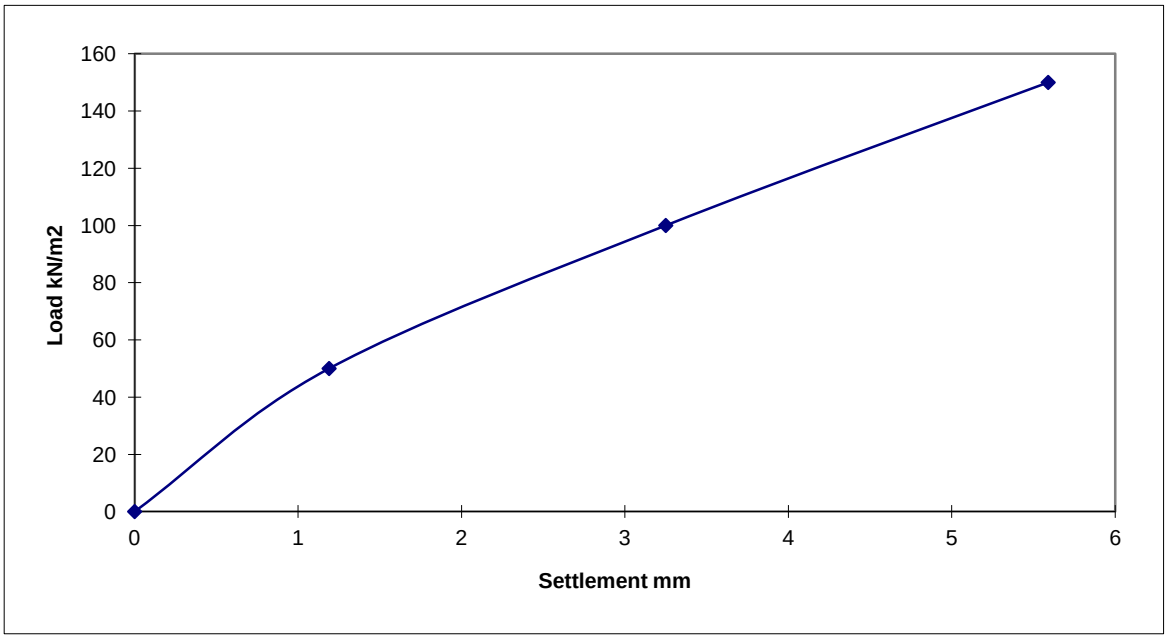
CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

SOUTHERN GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference:	Test Depth:	Plate Diameter:	Soil Description:
Plate 7	Surface	600mm	Engineered fill

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.19	50	4
3.25	100	9
5.59	150	20



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Each load increment applied until plate settlement less than 0.01mm per minute.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Herbert Road	Date: 18.08.15 Sheet 1 of 1

ANNEX L
Groundwater Monitoring Letter 25

Our Ref: RH/10411/Let25

Your Ref:

Contact: Ruth Howells

Terra Firma (Wales) Ltd.
Consulting Geotechnical & Geo-Environmental Engineers
Site Investigation Contractors

5 Deryn Court, Wharfedale Road,
Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 Fax: 029 2073 5433
Email: info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

30th August 2016

Natural Resources Wales

Via Email

For the attn. of Mr Matthew Llewhellin

Dear Matthew

GROUNDWATER MONITORING: HERBERT ROAD, NEWPORT

In our Remediation Strategy Report No.12032/RS, dated August 2015, it was proposed that further assessment of the groundwater beneath the site and the reen water be completed. The purpose of this was to increase confidence that no risks are presented the aquatic from filling of the site. It was specified that one round of water sampling be completed prior to fill works, and two upon completion of the Riversee Limited fill works, or in the event of delay, the second and third monitoring rounds should be completed no later than five and six months following commencement of the earthworks.

The fill works were delay in 2015 and are to re-commence shortly. The three groundwater sampling and testing rounds were completed as necessary.

Detailed in the enclosed groundwater test results summary table are the exceedences found in the groundwater results from testing completed in 2013 (BH1 – BH6), 2014 (BH1 – BH6) and from the additional three rounds (newly installed replacement wells, named BH1a – BH6a). The reen was also sampled and tested in the recent monitoring rounds.

All results have been compared to current threshold levels, rather than those used in previous assessment. Water Framework Directive thresholds are referred to where available, and in their absence drinking water directive thresholds are quoted. As per previous reporting petroleum hydrocarbon fractions have been assessed using a target concentration of 10ug/l (0.01mg/l) as a threshold in the absence of available guidelines. Some substances have also been highlighted where present above the laboratory detection limit (LoD), but where no guideline is available.

It should be noted that due to activity on site the well in BH4 was accidentally damaged. Also, the water sampling pump became jammed in BH1. These boreholes could therefore not be sampled in the monitoring rounds 5 months and 6 months after earthworks commencement.

In general, substances previously identified in exceedence at some stage in 2013, 2014 and 2015 tend to also be present in the two more recent 2016 samples. Also, only changes in Water Framework Directive guidance now means copper and zinc are highlighted as potential contaminants.

No correlation between the earthworks and water quality can be identified, and despite an incomplete dataset (due to the damaged/inaccessible wells) the table does not indicate that the fill works on site have had an adverse impact upon the underlying groundwater or reen.

In addition, it should be reiterated that all imported fill has adhered to thresholds levels quoted in our Remediation Strategy, with the exception of some minor exceedences already brought to your attention and subsequently confirmed acceptable.

Earthworks are due to re-commence in the early September 2016. Prior to this the Remediation Strategy Report needs to be revised to cover these remaining fill works.

Based on the above I do not see any merit in continuing water sampling and testing during the remainder of the earthworks.

Further fill will be screened as previously in accordance with our Remediation Strategy, to include leachate analysis to BS:EN:12457. Any unacceptable soils will be rejected and therefore no potential contaminative source to groundwater will be introduced to site.

I would be grateful if you could consider my suggestion for terminating groundwater monitoring at this stage and advise at your earliest opportunity whether you are in agreement or otherwise.

I trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact me.

Yours sincerely
for: Terra Firma (Wales) Ltd

R. Howells.

Mrs Ruth Howells

ANNEX M
NRW Email Response to Letter 25

From: Llewhellin, Matthew
Sent: Thursday, September 1, 2016 2:42 PM
To: ruth@terrafirmawales.co.uk
Subject: RE: herbert road

Hi Ruth,

I can confirm no significant concerns with the ending of groundwater monitoring (for the purposes of identifying impact via earthworks as outlined in your letter report ref:RH/10411/Let25 dated 30/08/16) . The proposal to continue testing imported fill as per the remediation strategy is considered adequate. However, would have to caveat this by suggesting that this may need to be revisited should any fundamental changes occur i.e. significant change in nature of earthworks, pollution incident, identification of any previously unknown contamination etc.

Kind Regards

Matt Llewhellin
Matt Llewhellin MSc BSc(Hons)
Arbenigwr Technegol/Technical Specialist (Contaminated Land)
Geowyddor/Geoscience
Cyfoeth Naturiol Cymru/Natural Resources Wales
Ffôn/Tel: 03000 654361

E-bost/E-mail:
matthew.llewhellin@cyfoethnaturiolcymru.gov.uk / matthew.llewhellin@naturalresourceswales.gov.uk
Ein diben yw sicrhau bod adnoddau naturiol Cymru yn cael eu cynnal, eu gwella a'u defnyddio yn gynaliadwy, yn awr ac yn y dyfodol.
Our purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future.