

COSMESTON

Phase 1 and Phase 2 Ground Investigation Report

February 2018



CONTACTS

CHRIS PRISTAVEC Senior Engineer

dd +44 (0) 292 092 6873 m +44 (0) 792 143 2320 e christopher.pristavec@arcadis.com Arcadis. Arcadis Cymru House

St. Mellon's Business Park Cardiff CF3 0EY

Arcadis Consulting (UK) Limited is a private limited company registered in England & Wales (registered number 02212959). Registered Office at Arcadis House, 34 York Way, London N1 9AB. UK. Part of the Arcadis Group of Companies along with other entities in the UK.

Cosmeston Farm

Phase 1 and Phase 2 Ground Investigation Report

AUTHORISED SIGNATURES

Author	Sian Carter
Checker	C Pristavec
Approver	J Venn
Report No	001-UA008386-UP32R-01
Date	February 2018

Version control

Date	Author	Changes
February 2018	Sian Carter	
-	Date February 2018	DateAuthorFebruary 2018Sian CarterVariationVariati

This report dated February 2018 has been prepared for Welsh Government (the "Client") in accordance with the terms and conditions of appointment dated September 2015 (the "Appointment") between the Client and **Arcadis Consulting (UK) Limited** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

CONTENTS

1	INTRODUCTION	1
1.1	Limitations	1
1.2	Proposed Development	1
1.3	Existing Information	1
2	SITE DETAILS	2
2.1	Site Location and Description	2
2.2	Geology	3
3	FIELDWORK	4
3.1	General	4
3.1.1	Phase 1	4
3.1.2	Phase 2	4
3.2	Exploratory Holes	5
3.2.1	Exploratory Hole Locations	5
3.2.2	Investigation Methodology	5
3.2.3	Dynamic Sampling	9
3.2.4	Trial Pitting/Trial Trenches	9
3.3	<i>In situ</i> Testing	9
3.3.1	General	9
3.3.2	Penetration Testing	10
3.4	Installations and Post-fieldwork Monitoring	11
3.4.1	Installations	11
3.4.2	Post-fieldwork Monitoring	12
4	LABORATORY TESTING	13
4.1	General	13
4.2	Geotechnical Laboratory Testing	13
4.2.1	Phase 1	13
4.2.2	Phase 2	13
4.3	Geo-Environmental Laboratory Testing	14
4.3.1	Phase 1	14
4.3.2	Phase 2	15

5	REFERENCES	1′	7
---	------------	----	---

IMAGES

Image 2-1: Site Location	. 2
Image 2-2: Geological Setting	. 3

TABLES

Table 3-1 Initial ground investigation scope – Phase 1 4
Table 3-2 Initial ground investigation scope – Phase 2
Table 3-3. Summary of completed exploratory holes – Phase 1
Table 3-4. Summary of completed exploratory holes – Phase 2
Table 3-5 SPT equipment – Phase 1 10
Table 3-6 SPT equipment – Phase 2 10
Table 3-7 Summary of trial pit soakage tests – Phase 1
Table 3-8 Summary of trial pit soakage tests – Phase 2
Table 3-9 Summary exploratory hole installations – Phase 1 11
Table 3-10 Summary exploratory hole installations – Phase 2 11
Table 4-1 Summary of geotechnical test data – Phase 1
Table 4-2 Summary of geotechnical test data – Phase 2
Table 4-3 Summary of geo-environmental test data – soil matrix 14
Table 4-4 Summary of geo-environmental test data – groundwater matrix
Table 4-5 Summary of geo-environmental testing data - leachate
Table 4-6 Summary of geo-environmental test data – soil matrix 15
Table 4-7 Summary of geo-environmental test data – groundwater matrix 15
Table 4-8 Summary of geo-environmental testing data - leachate 16

APPENDICES

APPENDIX A

DRAWINGS Drawing UA008386-AFS-DWG-G001: Exploratory Hole Location Plan

APPENDIX B STANDARD PROCEDURES

APPENDIX C EXPLORATORY HOLE LOGS

APPENDIX D CERTIFICATION OF FIELD APPARATUS

APPENDIX E MONITORING DATA

APPENDIX F GEOTECHNICAL LABORATORY TEST DATA

APPENDIX G

GEO-ENVIRONMENTAL LABORATORY TEST DATA

1 INTRODUCTION

Arcadis Consulting (UK) Limited (Arcadis) was instructed by Welsh Government, 'the Client', in September 2015 to undertake a ground investigation at Lower Cosmeston Farm. The purpose of the investigation was to confirm the below ground conditions and establish the soil's material properties to enable a suitable design for the development of residential housing, a school, and open space.

The scope of the ground investigation was determined by Arcadis Consulting (UK) Ltd and approved by the Client.

This ground investigation report provides a factual account of the fieldwork undertaken, the strata encountered, results of *in situ* testing and the subsequent geotechnical and geo-environmental laboratory testing undertaken on samples obtained.

1.1 Limitations

This report has been prepared for the Client in accordance with the terms and conditions of appointment. Arcadis cannot accept any responsibility for any use of or reliance on the contents of this report by any third party. The copyright of this document, including the electronic format and any AGS data, shall remain the property of Arcadis.

Arcadis do not accept liability for any use of the information presented in this report unless it is signed by the author, checker and approver and marked as final

It should be noted that ground conditions between exploratory holes may vary from those identified during this ground investigation; any design should take this into consideration. It should also be noted that groundwater levels may be subject to diurnal, tidal, seasonal, climatic variations and those recorded in this report are solely dependent on the time the ground investigation was carried out and the weather before and during the investigation.

1.2 Proposed Development

The proposed development comprises residential housing, a school, and open space.

1.3 Existing Information

The following information relating to the site and the ground conditions was made available to Arcadis prior to mobilisation to the site:

- a. Ground investigation Scope and Specification Phase 1 [1]; source Arcadis Consulting (UK) Ltd.
- b. Ground investigation Scope and Specification Phase 2 [2]; source Arcadis Consulting (UK) Ltd.
- c. Phase 1 and Phase 2 Geo Environmental and Geotechnical Assessment Report [3]; source Arcadis Consulting (UK) Ltd.

2 SITE DETAILS

2.1 Site Location and Description

The site is situated at Lower Cosmeston Farm, approximately 2.65 km south of the centre of Penarth, and 2.50 km east of Sully. It is on the South Wales coastline approximately 0.7 km west of the Severn Estuary. The approximate NGR (National Grid Reference) is ST 17985 68928. Image 2-1 below shows the site location.



Image 2-1: Site Location

The site is accessed from the B4267 Lavernock Road to the west of the site and comprises six large pastures in the northern area of the site and smaller paddocks to the south. The six paddocks comprise two winter paddocks in the north-western area of the site, two summer paddocks in the north-eastern area of the site and two fields used for arable crops in the extreme north-eastern area of the site.

The site is undulating and gradually slopes from east to west across the farm, with the most eastern crop field at a height of 30 mAOD, and the lower winter paddocks to the west at 14 mOAD [17]. The total site area measures approximately 0.65 km (east to west) by 0.7 km (north to south).

Access between the horse paddocks can be obtained by using an unpaved farm track from the farm courtyard and winter paddocks to the summer paddocks in the north-east and the smaller fields to the south. The crop fields can be accessed via an unpaved farm track immediately north of the site. The site is bound to the north by residential housing, to the east by the Severn Estuary, the south by farmland and the west by the B4267 Lavernock Road beyond which is Cosmeston Country Park. The park has a number of designated Sites of Special Scientific Interest in and around the lakes to protect a rare plant known as Starry Stonework [17].

A section of land within the upper summer paddock is recorded as an historic landfill site named 'Cosmeston No.1 – Old Tip', which received inert, industrial, commercial and household waste from 1977 to 1994 [16].

2.2 Geology

The published 1:50 000 scale British Geological Survey (BGS) map of the area incorporating the site, Sheet 263 Cardiff [1], and the BGS online GeoIndex [15] indicate the site is predominantly underlain by the solid geology of the St Mary's Well Bay Member of the Blue Lias Group. Superficial deposits are not recorded on the published mapping. The general distribution of the strata at the site is shown in Image 2-2.



The bedrock geology changes from west to east across the site. The majority of the western site area is noted by the BGS as St Mary's Well Bay Member, which consists of interbedded mudstones and limestones. The St Mary's Well Bay Member is a sedimentary bedrock formed approximately 197 to 204 million years ago in the Jurassic and Triassic Periods [17]. The bedrock nearer the coastline is recorded as the Penarth Group, which consists of grey to black mudstones with subordinate limestones and sandstones. This bedrock is recorded as predominantly marine in origin. The bedrock underlying the coastline is recorded as the Mercia Mudstone Group, consisting of dominantly red, less commonly green-grey, mudstones and subordinate siltstones [17]. Thin beds of gypsym/anhydrite are recorded to be widespread within the bedrock geology.

The south-western area is recorded as being underlain by mudstones of the Lavernock Shales. The Lavernock Shales Member is noted to have formed approximately 197 to 200 million years ago during the Jurassic Period [17].

No faults are recorded within the site boundary. An inferred fault is recorded approximately 600m to the south of the site orientated north-west to south-east and downthrown to the south. The St Mary's Well Bay Member dips 6° to the northwest, and 7° to the southwest in the centre of the site.

3 FIELDWORK

3.1 General

Ground investigation works were carried out in two phases; Phase 1 between 5th September 2016 and 8th September 2016, and Phase 2 between 6th December 2017 and 18th December 2017.

The ground investigation methods were undertaken in general accordance with the principles set out in BS EN 1997-2:2005 [8] and with the general practice described in BS5930:2015 [9]. The geo-environmental aspects of the ground investigation complied with the general requirements of BS 10175:2011 [10].

3.1.1 Phase 1

The scope of the ground investigation, including the location, scheduled depth and type of exploratory hole undertaken was determined by Arcadis Consulting (UK) Ltd and is summarised in Table 3-1.

Table 3-1 Initial ground investigation scope - Phase 1

Location ID	Hole Type	Scheduled Depth (m)	Requirements		
WS01 to WS07, inclusive	DS	3.00	Determine ground conditions and install ground gas and groundwater monitoring wells.		
TP01 to TP21, inclusive	TP	3.50	Determine ground conditions and provide infiltration rates of the underlying strata.		

Notes

TP = trial pitting, DS = dynamic sampling.

The investigation works were carried out under the supervision of a suitably experienced ground engineer who undertook the logging and reporting of the exploratory holes and *in situ* testing.

3.1.2 Phase 2

The scope of the ground investigation, including the location, scheduled depth and type of exploratory hole undertaken was determined by Arcadis Consulting (UK) Ltd and is summarised in Table 3-2.

Table 3-2 Initial ground investigation scope – Phase 2

Location ID	Hole Туре	Scheduled Depth (m)	Requirements
BH101 - 103	СР	10.00	Determine depth to bedrock in former quarry area
DP101 – 108	DP	10.00	Determine depth to bedrock in former quarry area
PLT101 - 102	PLT	1.20	Assess settlement of strata in former quarry area
TP101, 103, 112, 115	TP + SA	3.00	Undertake soakaway infiltration tests
TP102, 104 – 111, 113- 114, 116	TP	3.00	Determine ground conditions

WS101 - 106	WLS	3.00	Determine ground conditions and install ground gas and groundwater monitoring wells.
WS107 - 111	WLS	3.00	Determine depth of former landfill, determine ground conditions and install ground gas and groundwater monitoring wells.

Notes

CP = cable percussive, DP = dynamic probe, PLT = plate load test, SA = soakaway infiltration testing, TP = trial pit, WLS = dynamic (windowless) sampler

3.2 Exploratory Holes

3.2.1 Exploratory Hole Locations

The co-ordinates and elevations of the exploratory hole locations were obtained by the Arcadis supervising engineer using a Trimble VRS NOW GPRS system; allowing an accuracy of +/-50 mm.

Drawing UA008386-AFS-DWG-G001 presented in Appendix A displays the as-constructed exploratory hole locations while the co-ordinates and elevation of the ground surface at each exploratory hole location are given on the individual logs.

3.2.2 Investigation Methodology

The following methods and techniques were undertaken to construct the exploratory holes at the site. Details of the methods of investigation, associated standards adopted and a key to the notation and symbols used on the logs is presented in Appendix B; the exploratory hole records are presented in Appendix C.

3.2.2.1 Phase 1

The completed scope of Phase 1 investigation is summarised in Table 3-3 below.

Table 3-3. Summary of completed exploratory holes – Phase 1

Location ID	Hole Туре	Start Date	End Date	Final depth (m)	Termination Reason	Comment
WS01	DS	05 Sept 2016	05 Sept 2016	3.00	Target depth	Standpipe Piezometer installed
WS02- TP	HP	08 Sept 2016	08 Sept 2016	0.50	Engineer's instruction	
WS03	DS	05 Sept 2016	05 Sept 2016	3.00	Target depth achieved	Standpipe Piezometer installed
WS04	DS	05 Sept 2016	05 Sept 2016	1.30	Terminated due to refusal on bedrock	
WS05	DS	05 Sept 2016	05 Sept 2016	1.90	Terminated due to refusal on bedrock	
WS06	DS	05 Sept 2016	05 Sept 2016	1.10	Terminated due to refusal on bedrock	

WS07	DS	05 Sept 2016	05 Sept 2016	1.10	Terminated due to refusal on bedrock	
TP01	-	-	-	-	Removed from scope of works	Unable to access
TP02	TP	08 Sept 2016	08 Sept 2016	3.50	Target depth achieved	Soakaway infiltration test completed
TP03	TP	08 Sept 2016	08 Sept 2016	2.70	Unstable Pit	Unstable below 2.00 m
TP04	TP	08 Sept 2016	08 Sept 2016	2.80	Unstable Pit	Unstable below 0.50 m
TP05	TP	08 Sept 2016	08 Sept 2016	2.60	Unstable Pit	Unstable below 0.60 m
TP06	TP	08 Sept 2016	08 Sept 2016	2.90	Unstable Pit	Unstable below 1.00 m
TP07	TP	06 Sept 2016	06 Sept 2016	1.30	Terminated on bedrock	
TP08	TP	06 Sept 2016	06 Sept 2016	1.30	Terminated on bedrock	
TP09	TP	06 Sept 2016	06 Sept 2016	1.30	Terminated on bedrock	
TP10	TP	06 Sept 2016	06 Sept 2016	1.10	Terminated on bedrock	
TP11	TP	06 Sept 2016	06 Sept 2016	0.90	Terminated on bedrock	
TP12	TP	06 Sept 2016	06 Sept 2016	0.70	Terminated on bedrock	
TP13	TP	07 Sept 2016	07 Sept 2016	1.20	Terminated on bedrock	
TP14	TP	07 Sept 2016	07 Sept 2016	1.50	Terminated on bedrock	
TP15	TP	07 Sept 2016	07 Sept 2016	1.50	Terminated on bedrock	
TP16	TP	07 Sept 2016	07 Sept 2016	1.40	Terminated on bedrock	
TP17	TP	07 Sept 2016	07 Sept 2016	2.20	Terminated on bedrock	
TP18	TP	06 Sept 2016	06 Sept 2016	0.90	Terminated on bedrock	

TP19	TP	07 Sept 2016	07 Sept 2016	0.60	Terminated on bedrock	
TP20	TP	07 Sept 2016	07 Sept 2016	1.20	Terminated on bedrock	
TP21	TP	06 Sept 2016	06 Sept 2016	0.55	Terminated on bedrock	

Notes TP = trial pitting, DS = dynamic sampling HP= hand pit

3.2.2.2 Phase 2

The completed scope of Phase 1 investigation is summarised in Table 3-3 above.

Table 3-4. Summary of completed exploratory holes – Phase 2

Location ID	Hole Type	Start Date	End Date	Final depth (m)	Termination Reason	Comment
BH101	СР	-	-	-	-	Poor ground conditions preventing rig access
BH102	СР	-	-	_	-	Poor ground conditions preventing rig access
BH103	СР	-	-	-	-	Poor ground conditions preventing rig access
DP101	DP	06 Dec 2017	06 Dec 2017	5.60	Refusal	
DP102	DP	06 Dec 2017	06 Dec 2017	7.80	Refusal	
DP103	DP	06 Dec 2017	06 Dec 2017	7.80	Refusal	
DP104	DP	06 Dec 2017	06 Dec 2017	8.40	Refusal	
DP105	DP	06 Dec 2017	06 Dec 2017	8.20	Refusal	
DP106	DP	06 Dec 2017	06 Dec 2017	9.40	Refusal	
DP107	DP	06 Dec 2017	06 Dec 2017	10.00	Target Depth	
DP108	DP	06 Dec 2017	06 Dec 2017	10.00	Target Depth	
DP109	DP	11 Dec 2017	11 Dec 2017	12.50	Refusal	
DP110	DP	11 Dec 2017	11 Dec 2017	12.40	Refusal	
DP111	DP	11 Dec 2017	11 Dec 2017	10.70	Refusal	

DP112	DP	11 Dec 2017	11 Dec 2017	12.20	Refusal	
PLT101	PLT	11 Dec 2017	11 Dec 2017	1.20	Target depth	
PLT102	PLT	11 Dec 2017	11 Dec 2017	1.20	Target depth	
TP101	TP + SA	13 Dec 2017	13 Dec 2017	3.00	Target Depth	
TP102	TP	13 Dec 2017	13 Dec 2017	0.90	Refusal	
TP103	TP + SA	13 Dec 2017	13 Dec 2017	0.90	Refusal	
TP104	TP	13 Dec 2017	13 Dec 2017	3.00	Target Depth	
TP105	TP	13 Dec 2017	13 Dec 2017	3.00	Target Depth	
TP106	TP	13 Dec 2017	13 Dec 2017	0.50	Refusal	
TP107	TP	12 Dec 2017	12 Dec 2017	0.60	Refusal	
TP108	TP	15 Dec 2017	15 Dec 2017	0.80	Refusal	
TP109	TP	12 Dec 2017	12 Dec 2017	0.40	Refusal	
TP110	TP	12 Dec 2017	12 Dec 2017	3.00	Target Depth	
TP111	TP	12 Dec 2017	12 Dec 2017	3.00	Target Depth	
TP112	TP + SA	14 Dec 2017	14 Dec 2017	1.10	Refusal	
TP113	TP	14 Dec 2017	14 Dec 2017	0.50	Refusal	
TP114	TP	14 Dec 2017	14 Dec 2017	1.30	Refusal	
TP115	TP + SA	14 Dec 2017	14 Dec 2017	0.70	Refusal	
TP116	TP	08 Dec 2017	08 Dec 2017	1.00	Refusal	Undertaken as TP116-WS
WS101	WLS	11 Dec 2017	11 Dec 2017	2.45	Refusal	Standpipe Piezometer installed
WS102	WLS	08 Dec 2017	08 Dec 2017	0.40	Refusal	
WS103	WLS	08 Dec 2017	08 Dec 2017	0.50	Refusal	
WS104	WLS	08 Dec 2017	08 Dec 2017	1.45	Refusal	Standpipe Piezometer installed
WS105	WLS	08 Dec 2017	08 Dec 2017	0.70	Refusal	

WS106	WLS	08 Dec 2017	08 Dec 2017	0.40	Refusal	
WS107	WLS	07 Dec 2017	07 Dec 2017	0.65	Refusal	
WS108	WLS	07 Dec 2017	07 Dec 2017	0.80	Refusal	
WS109	WLS	07 Dec 2017	07 Dec 2017	1.20	Refusal	Standpipe Piezometer installed
WS110	WLS	07 Dec 2017	07 Dec 2017	3.00	Target Depth	Standpipe Piezometer installed
WS111	WLS	07 Dec 2017	07 Dec 2017	1.30	Refusal	Standpipe Piezometer installed
WS116 – TP	WLS	08 Dec 2017	08 Dec 2017	1.00	Refusal	Replaced TP116

Notes

CP = cable percussive, DP = dynamic probe, PLT = plate load test, SA = soakaway infiltration testing, TP = trial pit, WLS = dynamic (windowless) sampler

3.2.3 Dynamic Sampling

Dynamic sampling was completed using a track-mounted sampling rig capable of driving windowless sampling tubes using a mechanical hammer dropped repeatedly from a self-governed height/hydraulic hammer drive head.

Due to the method of investigation, the materials recovered within the sampler apparatus were generally disturbed and were assessed as complying with Class 3 to Class 5 of BS EN 22475-2. Sub-samples of the material recovered in the liners were taken to enable representative laboratory testing. Generally small disturbed samples were taken at each change in stratum and at 0.5 m intervals thereafter in clay soils; and small bulk samples were taken at 1 m intervals where the sand and gravel content of the soil was significant.

Standard penetration tests (SPT) were undertaken using the track mounted rig 1.0 m centres until the termination depth of the hole.

3.2.4 Trial Pitting/Trial Trenches

Trial pits were undertaken using tracked excavators. All pits were entirely logged from the surface at depths more than 1.20 m below ground level. Bladed buckets were used instead of toothed buckets to mitigate the risk of damage to buried services.

Samples of the material recovered in the trial pits were taken to enable representative laboratory testing. Generally small disturbed samples were taken at each change in stratum and at 0.5 m intervals thereafter in clay soils; and bulk samples were taken at 1 m intervals where the sand and gravel content of the soil was assessed as significant.

Photographic records of the trial pit elevation and arisings were taken and are presented in Appendix C with the associated trial pit log.

3.3 In situ Testing

3.3.1 General

Where *in situ* tests are standalone and are not directly associated with other exploratory holes, the tests results are presented as individual records and they are summarised within Table 3-3 as such; their as-

constructed locations are given on the test records and their positions are shown on drawing UA008386-AFS-EHP-0001.

3.3.2 Penetration Testing

3.3.2.1 Standard Penetration Tests

Standard penetration tests (SPT) were carried out as required in the investigation scope and in accordance with the methods given in the standard procedures presented within Appendix B. Generally tests were undertaken at regular intervals throughout the borehole to provide a profile of the soil's resistance with depth and a disturbed soil samples was recovered from the SPT split-spoon tool or a disturbed sample was taken over the range of the test interval.

The N-values as determined in the field are presented on the borehole logs as uncorrected values that do not take into account the energy losses or efficiency of the automatic trip hammer used to drive the test tool into the ground. The calibration certification for the test devices used in the investigation is presented in Appendix D and a summary of the SPT equipment used at each location for Phase 1 is presented in Table 3-5, and in Table 3-6 SPT equipment – Phase 2for Phase 2.

Table 3-5 SPT equipment – Phase 1

Location ID	SPT Hammer Reference No.	Energy Efficiency Ratio, Er %
WS01 - 05	219	81.01

Table 3-6 SPT equipment – Phase 2

Location ID	SPT Hammer Reference No.	Energy Efficiency Ratio, Er %
WS101 - 111	365	59.56

3.3.2.2 Soakaway Tests

The soil infiltration rate was determined by conducting a soakaway test broadly in accordance with the methodology described in BRE 365 [6]. The tests were conducted in trial pits dug to the anticipated soakaway depth. Summary information of the tests undertaken Phase 1 are presented Table 3-7, and Phase 2 in Table 3-8 Summary of trial pit soakage tests – Phase 2 while detailed test sheets are presented with the relevant trial pit log in Appendix C.

Table 3-7 Summary of trial pit soakage tests – Phase 1

Location ID	Depth of pit (m)	Soil Infiltration Rate <i>f</i> ms ⁻¹	Comment/limitations
TP02	3.50	3.07 - 10 ⁻³	
TP19	0.60	Unable to calculate	25% to 75% effect depth levels not achieved
TP21	0.55	Unable to calculate	25% to 75% effect depth levels not achieved

Location ID	Depth of pit (m)	Soil Infiltration Rate <i>f</i> ms ⁻¹	Comment/limitations
TP101	3.00	Unable to calculate	Increase in water level during test
TP103	0.90	Unable to calculate	25% to 75% effect depth levels not achieved
TP112	1.10	Unable to calculate	Increase in water level during test
TP115	0.70	Unable to calculate	25% to 75% effect depth levels not achieved

Table 3-8 Summary of trial pit soakage tests – Phase 2

3.4 Installations and Post-fieldwork Monitoring

3.4.1 Installations

Installations to enable long term monitoring of the site were constructed in exploratory holes selected by Arcadis Consulting (UK) Ltd. A summary of the Phase 1 and Phase 2 installation details is presented in Table 3.9 and 3.10 respectively; installation details are also provided on the relevant exploratory hole logs. Installations have flush covers and no marker posts due to land use, but can be located using co-ordinates (in Ordance Datum) presented in the hole logs.

Table 3-9 Summary exploratory hole installations - Phase 1

Location ID	Installation Type	Response Zone Top m bgl	Response Zone Base m bgl	Comment/limitations
WS01	SP50	0.50	2.10	Flush cover set in concrete
WS03	SP50	0.50	2.15	Flush cover set in concrete

Notes: SP50 = 50 mm ID standpipe

Table 3-10 Summary exploratory hole installations – Phase 2

Location ID	Installation Type	Response Zone Top m bgl	Response Zone Base m bgl	Comment/limitations
WS101	SP50	0.45	2.00	Flush cover set in concrete
WS104	SP50	0.50	1.45	Flush cover set in concrete
WS109	SP50	0.50	1.20	Flush cover set in concrete
WS110	SP50	1.00	3.00	Flush cover set in concrete
WS111	SP50	0.75	1.30	Flush cover set in concrete

Notes: SP50 = 50 mm ID standpipe

3.4.2 Post-fieldwork Monitoring

Phase 1 post-field work monitoring was undertaken on two separate visits on 16th and 23rd September 2016. Phase 2 post-field work monitoring was undertaken on three separate visits on 9th, 16th and 25th January 2018. Serviceable Phase 1 monitoring wells were also monitored during the Phase 2 monitoring visits.

The monitoring visits to the site were made to record land gas emissions and groundwater levels and the results of the groundwater monitoring are presented within Appendix E.

4 LABORATORY TESTING

4.1 General

Geotechnical and geo-environmental chemical testing was undertaken on selected samples obtained from the exploratory holes. The testing was scheduled by a geotechnical and/or geo-environmental engineer and the testing was undertaken by an Arcadis approved testing laboratory.

4.2 Geotechnical Laboratory Testing

4.2.1 Phase 1

The geotechnical tests detailed in Table 4-1 were carried out in accordance with either BS1377:1990: Parts 1 to 8 [11]; BS EN ISO 17892: Parts 1 to 12 [12]; BRE SD 1:2005 [14]; or other methods as listed in Table 4-1. The complete results of the geotechnical laboratory testing are presented in Appendix F.

Table 4-1 Summary of geotechnical test data – Phase 1

Test	Method	No of Determinations
Moisture content	BS1377 Pt2-3.2	7
4-point liquid and plastic limit	BS 1377 Pt2-4.3 & 5.3	7
Wet sieving	BS1377 Pt2-9.2	1
Sedimentation	BS1377 Pt2-9.4	2
pH, water soluble sulphate; total sulphate, nitrate, magnesium	BRE SD1	6
Density / MC relationship (2.5kg/4.5kg)	EN ISO 17892 Pt3	2

4.2.2 Phase 2

The geotechnical tests detailed in Table 4-2 Summary of geotechnical test data_were carried out in accordance with either BS1377:1990: Parts 1 to 8 [11]; BS EN ISO 17892: Parts 1 to 12 [12]; BRE SD 1:2005 [14]; or other methods as listed in Table 4-2. The complete results of the geotechnical laboratory testing are presented in Appendix F.

Table 4-2 Summary of geotechnical test data – Phase 2

Test	Method	No of Determinations
Moisture content	BS1377 Pt2-3.2	9
4-point liquid and plastic limit	BS 1377 Pt2-4.3 & 5.3	6
Density / MC Relationship (2.5kg/4.5kg)	EN ISO 17892 Pt3	3
pH, water soluble sulphate; total sulphate, nitrate, magnesium	BRE SD1	2

4.3 Geo-Environmental Laboratory Testing

4.3.1 Phase 1

Geo-environmental tests were undertaken on soil, groundwater and prepared leachate specimens obtained from the samples collected from the site. Testing was carried out for the contaminants detailed in

Table 4-3, Table 4-4 and Table 4-5. The results of the chemical laboratory testing are presented in Appendix G. Details of the test methodology is presented with the test results.

Table 4-3 Summary of geo-environmental test data - soil matrix

Test type	Method	No of Determinations
Metals (As, B, Cr, Cd, Cu, Pb, Hg, Ni, Se, Zn),, pH, Cyanide Free & Total	Induced Coupled Plasma Optical Emission Spectroscopy (ICP-OES)	
Asbestos Screen	Stereobinocular Microscope	
Moisture Content		
Speciated Polycyclic Aromatic Hydrocarbon	Gravimetric	34
compounds (PAH)	GC/MS	
рН	Potentiometric	
Sulphate – Water Soluble (2:1)	ICP-OES	
Phenol (total), Cresol, Chlorinated Phenols	Skalar CFA	
Total Petroleum Hydrocarbon 6 Banded (TPH6)	Gas Chromatography – Mass Spectrometry (GC-MS)	20
Pesticides Suite – Organochlorine. Organophosphorus	Gas Chromatography – Mass Spectrometry (GC-MS)	5
FOC (Fraction Organic Carbon)	Titrimetry and Calculation	12

Table 4-4 Summary of geo-environmental test data – groundwater matrix

Test type	Method	No of Determinations
Metals (As, B, Cr, Cd, Cu, Pb, Hg, Ni, Se, Zn),, pH, Cyanide Free & Total	Induced Coupled Plasma Optical Emission Spectroscopy (ICP-OES)	
Asbestos Screen	Stereobinocular Microscope	
Moisture Content	Gravimetric	
Speciated Polycyclic Aromatic Hydrocarbon compounds	GC/MS	8
(PAH)	Potentiometric	
рН	ICP-OES	
Sulphate – Water Soluble (2:1)	Skalar CEA	
Phenol (total), Cresol, Chlorinated Phenols		
Pesticide Screen	GC/MS	4

Table 4-5 Summary of geo-environmental testing data - leachate

Test type	No of Determinations
Leachate Prep (CEN 2:1)	8

4.3.2 Phase 2

Geo-environmental tests were undertaken on soil, groundwater and prepared leachate specimens obtained from the samples collected from the site. Testing was carried out for the contaminants detailed in Table 4-6 Summary of geo-environmental test data – soil matrix Table 4-7 Summary of geo-environmental test data – groundwater Table 4-8 Summary of geo-environmental testing data - leachate The results of the chemical laboratory testing are presented in Appendix G. Details of the test methodology are presented with the test results.

Table 4-6 Summary of geo-environmental test data – soil matrix

Test type	Method	No of Determinations		
Metals (As, B, Cr, Cd, Cu, Pb, Hg, Ni, Se, Zn), pH, Cyanide Free & Total	Induced Coupled Plasma Optical Emission Spectroscopy (ICP-OES)			
Asbestos Screen	Stereobinocular Microscope			
Moisture Content	Gravimetric			
Speciated Polycyclic Aromatic Hydrocarbon	GC/MS	28		
compounds (PAH)	Potentiometric			
pH	ICP-OES			
Sulphate – Water Soluble (2:1)	Skalar CFA			
Phenol (total), Cresol, Chlorinated Phenols				
Total Petroleum Hydrocarbon 6 Banded (TPH6)	Gas Chromatography – Mass Spectrometry (GC-MS)	14		
Total Petroleum Hydrocarbon Criteria Working Croup (TPH CWG)	Gas Chromatography – Flame Ionisation Detector (GC-FID)	5		
Total Organic Carbon	Titrimetry and Calculation	4		

Table 4-7 Summary of geo-environmental test data – groundwater matrix

Test type	Method	No of Determinations
Metals (As, B, Cr, Cd, Cu, Pb, Hg, Ni, Se, Zn), pH	ICP-OES, ICP-MS, Skalar CFA, Potentionmetric, HPLC, Discrete Analyse	6
Speciated PAH	GC/MS	

Cyanide Free & Total		
PAHs	Potentiometric	
Sulphate as SO4	ICP-OES	
Phenols – Speciated	HPLC	
Alkalinity (as CaCO3)	Titrimetric	
Ammoniacal Nitrogen	ISE	1
Chloride	Colometric	1
VOC	HS-GC/MS	2
SVOC	GC/MS	2
TPHCWG analysis	GC/MS	2

Table 4-8 Summary of geo-environmental testing data - leachate

Test type	No of Determinations
Leachate Prep (CEN 2:1)	4
Metals (Arsenic, Boron, Cadmium, Chromium (total), Chromium (VI) , Copper, Lead, Mercury, Nickel, Selenium, Zinc)	4
Cyanide (free)	4
Cyanide (total)	4
Speciated Polycyclic Aromatic Hydrocarbon compounds (PAH)	4
рН	4
Total Phenols	4
Water soluble sulphate	4

5 REFERENCES

General References

- Arcadis Consulting. 2016. Pre-construction information for Cosmeston Phase 1. Arcadis Consulting Report. August 2016
- 2. Arcadis Consulting. 2017. Pre-construction information for Cosmeston Phase 2. Arcadis Consulting Report. August 2017
- 3. Arcadis Consulting. 2018. Phase 1 and Phase 2 Geo Environmental and Geotechnical Assessment Report 002-UA008386-UP32R-01
- British Geological Survey. 1986. Cardiff. England and Wales Sheet 263. Solid. 1:50 000. BGS Keyworth, Nottingham.
- British Geological Survey. 1988. Cardiff. England and Wales Sheet 263. Drift. 1:50 000. BGS Keyworth, Nottingham.
- 6. Building Research Establishment. 2016. Soakaway Design. BRE Digest DG365. BRE, Watford.
- 7. BS EN 1997-1. 2004. Eurocode 7: Geotechnical Design. Part 1 General Rules. British Standards Institution, 2013 (revised text).
- 8. BS EN 1997-2. 2007. Eurocode 7: Geotechnical Design. Part 2 Ground Investigation and testing. British Standards Institution, 2010 (revised text).
- 9. BS 5930. 2015. Code of practice for ground investigations. British Standards Institution.
- 10.BS 10175. 2011. Investigation of potentially contaminated sites Code of practice. British Standards Institution.
- 11.BS 1377. 1990. Method of test for soils for civil engineering purposes. Published in 9 Parts. British Standards Institution,
- 12.BS EN ISO 17892-1: Geotechnical investigation and testing Laboratory testing of soil Determination of water content. British Standards Institution.
- 13.BS EN ISO 17892-2: Geotechnical investigation and testing Laboratory testing of soil Determination of bulk density. British Standards Institution.
- Building Research Establishment. 2005. Concrete in aggressive ground. BRE Special Digest 1. 3rd Edition. BRE, Watford.
- 15.British Geological Survey: http://www.bgs.ac.uk/data/mapViewers/home.html. Accessed Jan 2018.
- 16.Environment Agency: http://maps.environmentagency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e. Accessed Jan 2018.
- 17. British Geological Society; Geoindex Onshore http://mapapps2.bgs.ac.uk/geoindex/home.html Accessed Jan 2018.
- 18. Natural Resource Wales; https://naturalresources.wales/?lang=en Accessed Jan 2018
- 19.BGS The Coal Authority; http://mapapps2.bgs.ac.uk/coalauthority/home.html Accessed Jan 2018

APPENDIX A

DRAWINGS

Drawing UA008386-AFS-DWG-G001: Exploratory Hole Location Plan







APPENDIX B

STANDARD PROCEDURES

B0 General Principles

This ground investigation was undertaken in general accordance with the principles of BS EN 1997-1 [1] and BS EN 1997-2 [2] and the advice given in BS5930:2015 [7], which, provides complimentary guidance on the application of the primary standards. Where the requirements of the ground investigation specification differ from these primary standards, the investigation methodology was adapted as required and specific notes regarding methods and techniques employed were made in the appropriate report sections.

B1 Buried Services

Service clearance was undertaken in accordance with Arcadis' common operating practice COP SA1. This document details the methods and safe working practices used to undertake excavations safely. Prior to breaking ground, services plans were consulted and the area scanned using a Cable Avoidance Tool (CAT) with detected signals marked on the ground. For all investigation positions, other than for machine excavated trial pits, hand excavated inspection pits are completed to 1.20 m bgl prior to the use of drilling and boring plant.

B2 Sampling requirements

The selection of sample types and sampling techniques has been chosen to take account of the soil fabric, size and quality of sample required based on whether the soils mass properties or the intact material properties of the ground are to be determined in subsequent laboratory tests. BS EN ISO 22475-1 [4] describes three generic sample groups that are:

- a. Sampling by drilling. Generally a disturbed sample recovered from the drilling tool or digging equipment, typically meeting Class 3 to Class 5 requirements, with the recovered material being stored in bulk bags or sealed jar or tub containers.
- b. Sampling by sampler. Typically referred to as open tube or drive sampling in which a tube with a sharp cutting edge is driven into the ground either by static thrust or dynamically driven to give a relatively undisturbed sample of Class 1 or Class 2 but may result in a Class 3 sample.
- c. Block sampling. Cylindrical large diameter samples or cuboid hand-cut samples usually relatively undisturbed Class 1 and Class 2.

The open-tube sampling equipment used on the site was of a type and design that conformed to BS EN ISO 22475-1. For the purpose of this ground investigation block sampling was not required.

Generally samples were assessed on site and any unexpected deterioration in sample quality was reported to the ground engineer by the lead drilling technician.

Sufficient and representative samples were taken to allow the geo-mechanical properties of the ground to be adequately characterised and to enable the sequence of soil strata to be described by an engineering geologist or geotechnical engineer.

Where samples have been taken for chemical tests the drilling method attempted to adopt dry drilling over the sampling range that generally was achieved by the use of drill casing to separate and isolate the upper soil layers and exclude groundwater. Cross-contamination was further reduced by regular cleaning of sampling tools. Sample integrity was maintained by sealing samples immediately on collection and storing the samples in a temperature controlled cool box. Samples were despatched from the site at the end of the shift on which they were collected or as

required in the project specification. Details of best practice storage, preservation and decontamination measures undertaken are given below:

Task	Soil	Groundwater	Ground Gas		
Storage	Glass jars and vials supplied by the laboratory were used for the collection of soil samples to be analysed for volatile compounds. Plastic one-litre tubs were used to collect soil samples for metals analysis.	Glass vials supplied by the laboratory were used for the collection of samples to be analysed for volatile compounds. Samples to be analysed for lower volatility compounds were stored in laboratory prepared glass bottles.	1.4L Canisters supplied by the laboratory.		
Preservation	Filling of sample containers as headspace and low storage te potential for volatilisation and b hydrocarbon compounds prior	Not required.			
Decontamination	Disposable gloves were worn and changed between sample collection to prevent cross-contamination.	Groundwater samples were collected using dedicated disposable tubing / bailers, that were changed between monitoring well locations in order to prevent cross- contamination.	Disposable gloves were worn and changed between sample collection to prevent cross contamination.		
Transport	Samples stored in dedicated sample boxes provided by the laboratory. Sample details and analytical requests were recorded on the laboratory chain of custody form included with samples, prior to dispatching to laboratory for analysis. Samples were dispatched to the laboratory on the day of sampling.				

B3 Sample description

Sample description was undertaken by the Arcadis site geologist in accordance with BS 5930: 2015. The descriptions of the individual samples were used to identify the sequence of strata at the exploratory hole location and from which representative exploratory hole logs were drawn.

B4 In situ testing

In situ geotechnical tests were undertaken taking account of the investigation scope and requirement to attain the appropriate parameters required in the geotechnical design. The tests were undertaken in accordance with the requirements of the relevant parts of BS EN ISO 22476 [5, 6] and other methods as follows:

Dynamic probing

Dynamic probes were undertaken in general accordance with BS EN ISO 22476-2, BS EN 1997-2 and the national annex to BS EN 1997. The tests were generally made using the super-heavy DPSH-B configuration of the apparatus, however, it should be noted that the basis for selection of the type of dynamic probe should be a consideration of the driving energy in relation to the type of ground conditions anticipated at the site.

Where adequate correlation with borehole data is available an interpretation of the estimated soil type may be made, however, it should be noted that probing can give unreliable results in mixed soils.

Standard penetration testing

Standard penetration tests were carried out in accordance with BS EN ISO 22476-3, BS EN 1997-2 and the national Annex to BS EN 1997-2. The test records are presented on the borehole logs as blow counts for each increment with the N-value as the total number of blows of the four main test increments.

Where the N-value exceeds a total of 50 blows, the test reports the penetration in millimetres for the last test increment recorded, and the N value is indicated as greater than 50,

e.g. 4,5/12,14,18, 6 for 10 mm

indicates that the seating blows (4 and 5) were completed and that the test terminated in the 4th increment after penetrating 10 mm.

Where the seating blows exceeded 25 blows for less than 150 mm; the test was stopped and the rods remarked after which, the main drive was continued. The test is then reported as the number of blows in each seating drive for the recorded penetration with the results of the main drive given as above,

e.g. 14/11 for 45 mm/12,14,16, 8 for 10 mm.

In certain circumstances where groundwater in-flow may affect the test, particularly in fine sand or silt, low SPT blow counts may be recorded. Where the SPT blow count was very low, N values of 5 or less, the test was, at the discretion of the site engineer, continued for a further 300 mm, recording blows for each 75 mm increment. **This is not** a standard penetration test value, it does however give an indication of potential disturbance to the ground.

B5 Data transfer format

The data collated during the ground investigation has been organised and managed using the "AGS data format" that allows data transfer between different disciplines and organisations in accordance with BS 8574 [8].

B6 References

- 1. BS EN 1997-1. 2004. Eurocode 7: Geotechnical Design. Part 1 General Rules. British Standards Institution, 2013 (revised text).
- BS EN 1997-2. 2007. Eurocode 7: Geotechnical Design. Part 2 Ground Investigation and testing. British Standards Institution, 2010 (revised text).
- 3. BS EN ISO 22282-1:2012. Geotechnical investigation and testing Geohydraulic testing. Part 1: General Rules. British Standards Institution.
- 4. BS EN ISO 22475-1. Geotechnical investigation and testing Sampling methods and groundwater measurements Part 1 Technical principles for execution.
- 5. BS EN ISO 22476-2. Geotechnical investigation and testing Field testing Part 2: Dynamic Probing. British Standards Institution
- BS EN ISO 22476-3 2005. Geotechnical investigation and testing Field testing Part 3: Standard penetration test. British Standards Institution
- 7. BS 5930: 2015. Code of practice for ground investigation. British Standards Institution.
- 8. BS 8574. Code of practice for the management of geotechnical data for ground engineering projects.
- 9. BS 1377-9. 1990. Methods of test for soils for civil engineering purposes. Part 9: In-situ tests. British Standards Institution.

B7 Exploratory Hole Key



Key to Exploratory Hole Symbols and Abbreviations

U

UT

W

SAMPLE TYPES

В	Bulk disturbed sample
С	Core sample
CBR-D	Disturbed sample from CBR test area

- CBR-U Undisturbed sample from CBR test area
- D Small disturbed sample

IN-SITU TESTING

SPTs Standard Penetration Test (using a split spoon sampler)

- SPTc Standard Penetration Test (using a solid 60 degree cone)
- N Recorded SPT 'N' Value *
- -/- Blows/Penetration (mm) after seating blows totalling 150 mm
- MX Mexi Probe Test (records CBR as %)
- HV Hand Shear Vane Test (undrained shear strength quoted in kPa)

ES

EW

G

L

SPT

Environmental soil sample

SPT split spoon sample

Gas sample

Liner sample

Environmental water sample

- PP Pocket Penetrometer Test (kg/m³)
- () Denotes residual test value
- PID Photo Ionisation Detector (ppm) *
- Kf/Kr Permeability Test (f = falling head, r = rising head quoted in ms⁻¹)
- HPD High Pressure Dilatometer Test (pressure meter)
- PKR Packer / Lugeon Permeability Test
- CBR California Bearing Ratio Test

ROTARY CORE DETAILS

- TCR Total Core Recovery, %
- SCR Solid Core Recovery, %
- RQD Rock Quality Designation (% of intact core >100 mm)
- FI Fracture Spacing (average fracture spacing; in mm, over indicated length of core) * *
- NI Non-Intact Core
- AZCL Assumed Zone of Core Loss

GROUNDWATER



Groundwater strike

Standing water level after 20 minutes; 1st, 2nd etc (number denotes level order)





* Where a single value is quoted this is the uncorrected 'N' value for a full 300 mm test drive following a seating drive of 150mm. Where the full test drive penetration is not achieved the number of blows is quoted for the penetration below the test total of 300mm, e.g.: 50/75.

* * The minimum, average and maximum are shown e.g. 5/45/125

INSTALLATION & BACKFILL DETAILS

Undisturbed sample

Water sample

Undisturbed thin wall sample



STRATUM BOUNDARIES

------ Unit boundary

APPENDIX C

EXPLORATORY HOLE LOGS

ARCADIS Trial Pit Log

Project Cosmeston Phase 1

Welsh Government

SAMPLI	AMPLES TESTS		es	STRATA	STRATA			Install		
Depth	Type/ No.	Depth	Type/ No.	Results	Wate	Description	Legend	(Thickness)	Level	Backfill
0.00 0.00 - 0.40 0.00 - 0.40	ES B1 ES2	-				MADE GROUND: Grass over soft brown slightly sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of ceramic pot fragments, brick and mudstone.		(0.40)	-	
- - - - - - - 0.60 - 0.60 - - - - - -	ES B3 ES4	0.40	PID	<1ppm		MADE GROUND: Soft to firm yellowish grey slightly sandy slightly gravelly CLAY with low cobble and boulder content. Gravel is angular to subrounded fine to coarse of brick and mudstone. Cobbles and boulders are angular to subrounded of mudstone.		0.40	18.68	
- - - - - - - - - - - -		 	PID	<1ppm		Weak dark grey mudstone recovered as angular gravel and cobbles.		(1.80)	- - - - - - - - - - - - - - - - - - -	≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡
- - - - - - - - - - - - - - - - - - -	B5 ES6					Soft yellow slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of mudstone. (Weathered St Mary's Well Bay Member)		2.20	16.88	₩≅₩≅₩≅₩≅₩≅₩≅₩ ₩ ≈₩═₩═₩═₩═₩═₩═₩ ₩ <u>═</u> ₩ <u>═</u> ₩ <u>═</u> ₩ <u>═</u> ₩ <u></u>
- - - - - - - - - - - - - -		- - - - - - - - - - - - - - - - - - -						(1.30)	+ + + + + + + + + + + + + + +	≡॥≡॥≡॥≡॥≡॥≡ ॥≡॥≡॥≡॥≡॥≡ ॥≡॥≡॥≡॥≡॥≡॥
- - - - - - - - - - - - -		- - - - - - - - - - - - - - - - - - -	PID	<1ppm				3.50 ·	- 15.58	
								-	- 	
-		=						-	-	
PLAN DETAIL	S					Remarks				
3.2 Long Axis Orientation: Terminate Backfilled 35 Shoring / Support: None					ion: Terminated on Engineer's instruction - Target depth achie Backfilled with arisings and surface left raised to accomm 35 None	eved. nodate fut	ure settleme	nt.		

Project No. UA008386-01

Easting (OS mE 318164.82

Ground Level (mAOD)

19.08 Northing (OS mN) 169230.89

Scale 1:25

Sheet 1 of 1

Start Date 08/09/2016

End Date 08/09/2016



Stability: Stable

Groundwater (description): Not encountered

Contractor



Termination Depth:

3.50m
TP	03

Project Cosmest Client Welsh G	ton Pha overnm	se 1 Ient				Project I UA00 Easting 3181	No. 1 8386-01 (OS mE) 5 4.37	Ground Level (mAOD) 20.51 Northing (OS mN) 169170.19	Start 08/ End 08/	Date 09/2016 Date 09/2016	s 1: s S	25 25 heet 1	of 1
SAMP	LES		TEST	S	r s			STRATA					
Depth	Type/	Depth	Type/	Results	Wate Strike		Desc	ription		Legend	Depth (Thickness)	Level	Backfill
0.00 0.00 - 0.30 0.00 - 0.30	ES B1 ES2		110.			MADE GROUND: Grass of Gravel is angular to subro	over soft brown unded fine to c	slightly sandy slightly gravelly C oarse of brick and mudstone.	CLAY.		(0.30)		
- 0.30 - 1.00 - 0.30 - 1.00 - - - -	B3 ES4	- 0.30 - - - - - -	PID	<1ppm		MADE GROUND: Soft yel subrounded fine to coarse	llowish brown s of brick and m	lightly gravelly CLAY. Gravel is a udstone.	angular to		0.30	20.21	
- - - - - - - -		- - - - - - - - - -	PID	<1ppm							(0.90)		
1.20 - 2.70 1.20 - 2.70	B5 ES6					Greyish yellow clayey slig content. Gravel is angular boulders are angular of m	htly sandy GRA to subrounded udstone.	WEL with medium cobble and bo fine to coarse of mudstone. Cot	oulder obles and		1.20	19.31	≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡
		- - - - - - - - - - - - - - - - - - -									(1.50) -	- - - - - - - - - - - - - - - - - - -	₩═₩═₩═₩═₩═₩═₩═ ═₩═₩═₩═₩═₩═₩═ ₩
		2.70	PID	<1ppm			Pemarks				2.70	17.81	
	AILS	3.5			s Orientat	ion: 80	Remarks Terminated du Backfilled with	e to collapsing sides from 2.0 m arisings and surface left raised	i. to accomm	odate futu	ire settleme	nt.	
0.8				Shoring Stability	Support: Unstable	None							
				Groundw	vater (deso	cription): Not encountered					Term	nination 2.70r	Depth: N
Arcadi	s Cymru U	nless other	vise state	1:		Equipment Used		Contractor		Lo	gged By	Checke	ed By



Arcadis Consulting (UK) Ltd

Project Cosmesto Client Welsh Gor	on Pha vernm	ise 1 ient				Project N UA00 Easting 3182	No. 8386-01 (OS mE) 18.11	Ground Level (mAOD) 23.89 Northing (OS mN) 169149.80	Start Date 08/09/201 End Date 08/09/201	6 1 6 S	^{:ale} :25 heet 1	of 1
SAMPLE	ES		TEST	S	er			STRATA		Dopth		Install/
Depth	Type/	Depth	Type/	Results	Strik		Desc	ription	Legend	(Thickness)	Level	Backfill
0.00 0.00 - 0.30 0.00 - 0.30	ES B1 ES2	- - - -				MADE GROUND: Grass of and rootlets. Gravel is and mudstone.	over soft brown gular to subroui	sandy gravelly CLAY with frequen ided fine to coarse of brick and	t roots	× × (0.30)		
- 0.30 - 0.30 - 1.00 - 0.30 - 1.00 - - -	ES B3 ES4	- 0.30 - - - - -	PID	<1ppm		MADE GROUND: Grey sa subrounded fine to coarse	andy slightly cla of brick and m	iyey GRAVEL. Gravel is angular to udstone.		0.30	23.59	
- - - - - - - - - - - - - - - - - - -	85	- - - - - - - - - - -	PID	<1ppm						(0.90)	22.69	= = = = = = = = = = = = =
1.20 - 2.80 1.20 - 2.80	ES6	- - - - - - - - - - - -				Soft yellowish brown-grey Gravel is angular to subro boulders are angular to su	gravelly CLAY unded fine to c brounded of m	with low cobble and boulder conte oarse of mudstone. Cobbles and udstone.	ent			: = = = = = = = = = = = = =
- - - - - - - - - - - - - - - - -		- - - - - - - - - - - - - -								- (1.60) ·		: = = = = = = = = = = = = =
		- - - - - - - - - - - - - - - - - - -	PID	<1ppm						2.80	21.09	
											* * * * * * * * * * * * * *	
-		-									Į	
		-									ŧ	
	LS	3.8	I	Long Axi	s Orientat	ion: 80	Remarks Terminated at Backfilled with	2.80 m due to collapsing sides fro arisings and surface left raised to	m 0.50 m. accommodate fu	ture settleme	nt.	1
1.0				Shoring / Stability: Groundw	' Support: Unstable vater (dese	None cription): Not encountered				Terr	nination	Depth:
Arcadis (Cymru					Fauinment Used		Contractor		ogged By	∠.ŏUr	d Bv



Contractor r Arcadis Consulting (UK) Ltd

A	202	ADIS	ό T	rial Pit	Lo]		TI	P05	
Project Cosmesto Dient Nelsh Go	on Pha vernm	se 1 ent				Project No. Ground Level (mAOD) Sta UA008386-01 24.68 08 Easting (OS mE) Northing (OS mN) Enc 318148.51 169040.96 08	rt Date /09/2016 Date /09/2016	5 1: 5 S	^{ale} 25 heet 1	of 1
SAMPL	ES		TEST	S	ы В S	STRATA		Death		Inote
Depth	Type/ No.	Depth	Type/ No.	Results	Strik	Description	Legend	(Thickness)	Level	Back
0.00 0.00 - 0.30 0.00 - 0.30 0.60 - 2.10 0.60 - 2.10 0.60 - 2.10	No. ES B1 ES2 ES B3 ES4	2.10	PID PID	<1ppm		MADE GROUND: Grass over soft brown sandy gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of brick and mudstone . MADE GROUND: Black angular to rounded fine to coarse GRAVEL of clinker and ash. Soft to firm yellowish brown grey sandy gravelly CLAY with low cobble and boulder content. Gravel is angular to subrounded fine to coarse of mudstone. Cobbles and boulders are angular to subrounded of mudstone (Weathered St Mary's Well Bay Member). Soft yellow gravelly CLAY with medium cobble and boulder content. Gravel is angular to subrounded fine to coarse of mudstone (Weathered St Mary's Well Bay Member).		(0.30) 0.30 (0.10) 0.40 (1.70) (1.70)	24.38 24.28	W=W=W=W=W=W=W=W=W=W=W=W=W=W=W=W=W=W=W=
		- - - -						2.60	22.08	

PLAN DETAILS		Remarks	
4.1	Long Axis Orientation:	Terminated at 26 m due to collapsing sides. Pit began collap Backfilled with arisings and surface left raised to accommoda	psing from 0.6m onwards. ate future settlement.
0.9	90 Shoring / Support: None Stability: Unstable		
	Groundwater (description): Not encountered		Termination Depth:
			2.60m
Arcadis Cymru House Unless otherwise stated:	Equipment Used	Contractor	Logged By Checked By

Tracked 8 Tonne Excavator

Project Cosmesto Client Welsh Go	on Pha vernm	se 1 Ient				Project No. Ground Level (mAOD) Start Date UA008386-01 26.75 08/09/2016 Easting (OS mE) Northing (OS mN) End Date 318120.81 168957.70 08/09/2016					Scale 16 1:25 16 Sheet 1 or		
SAMPL	ES		TEST	S	es er			STRATA			Dauth		Install
Depth	Type/	Depth	Type/	Results	Strike		Desc	ription		Legend	(Thickness)	Level	Backfil
0.00 0.00 - 0.25 0.00 - 0.25	ES B1 ES2	- - -				MADE GROUND: Grass of frequent roots and rootlets and mudstone.	over soft brown s. Gravel is ang	locally yellow sandy gravelly Cl ular to subrounded fine to coars	LAY with se of brick		(0.25)		
- 0.25 - 1.00 - 0.25 - 1.00 	B3 ES4	- 0.25 	PID	<1ppm		MADE GROUND: Light to low cobble content. Grave mudstone. Cobbles are an	dark brown slių I is angular to s ngular to subro	ghtly sandy slightly gravelly CLA subrounded fine to coarse of brid unded of mudstone.	AY with ck and		0.25	26.50	= = = = = = = = = = = = =
- 1.00 - 1.00 - 1.90 	ES B5	- 1.00 - 1.00 	PID	<1ppm		MADE GROUND: Black lo clinker, ash and brick.	rose angular to	subrounded fine to coarse GRA	AVEL of		(0.90)	25.75	∈
- - 1.90 - 2.90 - - - - - - - - - - - - -	ES6	- - - - - - - - - - - - - - - - - - -	PID	<1ppm		MADE GROUND: Soft yel to coarse of brick, clinker,	low gravelly CL ash and mudst	.AY. Gravel is angular to subrou one.	nded fine		1.90 - (1.00)	24.85	
			PID	<1ppm							2.90	23.85	
												+ + + + + + + + + + + + + + + + + + +	
												- - - - - - - - - - - - - - - - - - -	
- PLAN DETAI	LS	-					Remarks			1			
1.0		4.0		Long Axis Shoring / Stability: Groundw	s Orientat ' Support: Unstable vater (dese	ion: 45 None cription): Not encountered	Terminated at Backfilled with	2.90 m due to collapsing sides arisings and surface left raised	from 1.00 n I to accomn	n. nodate futu	ire settleme	nt. nination I	Depth:



Arcadis Consulting (UK) Ltd

Contractor

Checked By Logged By sc IP

TP06

Project Cosmesto Client Welsh Gov	on Pha vernm	se 1 ent				Project N UA00 Easting 31808	No. 1 8386-01 (OS mE) 1 2.72	Ground Level (mAOD) 17.78 Northing (OS mN) 169130.11	Star 06/ End 06/	t Date 09/2016 Date 09/2016	5 1: 5 SI	ale 25 heet 1	of 1
SAMPLE	ES		TEST	S	es			STRATA					la stall
Depth	Type/	Depth	Type/	Results	Wate		Descr	iption		Legend	Depth (Thickness)	Level	Backfil
0.00 - 0.20 0.00 - 0.20	B1 ES2	-				MADE GROUND: Grass of frequent roots and rootlets mudstone.	over soft brown s. Gravel is angu	slightly sandy slightly gravelly C ular to subrounded fine to coars	LAY with e of		(0.20)		
-		-				Firm yellowish brown sligh content. Gravel is angular angular to subangular of n	ntly sandy slight to subrounded nudstone (Weat	ly gravelly CLAY with low cobble fine to coarse of mudstone. Col thered St Mary's Well Bay Mem	e obles are ber).		0.20	17.58	
- - -		- - - 0.50 -	PID	<1ppm		Weak to medium strong g	rey MUDSTON	E recovered as gravel with low of	cobble		0.50	- 17.28	
- 0.70 - 1.30 - 0.70 - 1.30 -	B3 ES4	-				subangular (St Mary's We Firm light brownish grey C	II Bay Member). CLAY (St Mary's	Well Bay Member).			0.70	17.08	
- - - -		- - 									(0.60) -	• • • •	
-		- 1.30	PID	<1ppm							1.30	16.48	
- - - -		- 1.30 - - -				∖_Weak to medium strong №	IUDSTONE (St	Mary's Well Bay Member).			1.50	10.40	
-		-									-		
-		-									-		
											-	-	
- -		-											
- - - -		-									-	-	
- - - -		-											
- 		- -									: 	- - -	
-		-											
- - - -		-									-		
-		-											
- - - -		-									-	- - -	
- - - -		-									-		
- - -		-									-	• • •	
- - - -		-									-	- - -	
- - -		-										• • •	
- PLAN DETAII	LS						Remarks						
		2.8		Long Axi	s Orientat	ion:	Terminated on Backfilled with	bedrock. arisings and surface left raised	to accomm	iodate futu	re settlemer	nt.	
0.9				Shoring	Support:	None							
Stability: Stable Groundwater (d						cription): Not encountered					Term	ination I	Depth:



Contractor

Checked By Logged By sc IP

Projec Cos Client Wel	oject Osmeston Phase 1 ient /elsh Government					Project No. Ground Level (mAOD) Start uA008386-01 13.98 06/ Easting (OS mE) Northing (OS mN) End Government 318000.87 169130.66 06/						s∝ 1: 5 Sl	^{Scale} 1:25 Sheet 1 of ⁴	
	SAMPLE	ES		TEST	S	er es			STRATA					
D	epth	Type/	Depth	Type/	Results	Wate		Desc	ription		Legend	Depth (Thickness)	Level	Install/ Backfil
- (- -	0.00	ES	-	INO.			MADE GROUND: Grass of frequent roots and rootlets mudstone.	ver soft brown . Gravel is ang	slightly sandy slightly gravelly (ular to subrounded fine to coars	CLAY with se of		(0.30)		
- - - -			- 0.30 - -	PID	<1ppm		Firm yellowish brown sligh content. Gravel is angular angular of mudstone (Wea	tly sandy slight to subrounded athered St Mary	ly gravelly CLAY with low cobbl fine to coarse of mudstone. Co 's Well Bay Member).	e bbles are		0.30 (0.30)	13.68	
- (0.70	ES	- - - - - -				Weak to medium strong gr cobbles and boulders, with <u>mudstone (St Mary's Well</u> Firm light brownish grey C	rey MUDSTON n some gravel o Bay Member). LAY (St Mary's	E recovered as angular to subr f angular to subrounded fine to Well Bay Member).	rounded coarse /		0.60 (0.10) 0.70	13.38 13.28	
- - -			-									(0.60) -	- - - -	
- - - -			- 1.30 - - -	PID	<1ppm		✓ Medium strong bedrock of	MUDSTONE (St Mary's Well Bay Member).	/		1.30	12.68	
- - - -			-											
- - - -			-									-		
-			-									- - - -		
- - - -			-									-	- - -	
-			-										- - - -	
			-									-		
- - -			-										- - - -	
-														
- - - -			-									- - -		
- - - -			-									- - - -		
- - -			-									-		
-			-											
-			-									-	-	
		_S	2.9		Long Axi	s Orientat	ion: 100	Remarks Terminated on Backfilled with	bedrock. arisings and surface left raised	to accomm	iodate futu	re settleme	nt.	
0.9					Shoring Stability:	/ Support: Stable	None					T -	inoti '	Donth
	Ground				Groundwater (description): Not encountere							lerm	1.30n	Depin:



Contractor

Checked By Logged By sc IP



Project Cosmeston Phase 1 ^{Dient} Nelsh Government						Project No. Ground Level (mAOD) Start Date UA008386-01 14.52 06/09/201 Easting (OS mE) Northing (OS mN) End Date 317993.69 169073.00 06/09/201			2016 Sheet 1 of 1				
					1								
SAMPL	ES Turno/		TEST	'S I	ater ikes	STRATA		Depth	Level	Install/			
Depth	No.	Depth	No.	Results	Str 🕅	Description	Legend	(Thickness)		Backfill			
0.00 0.00 - 0.30 0.00 - 0.30	ES B1 ES2					MADE GROUND: Grass over soft brown slightly sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded of mudstone.		(0.30)					
-		0.30	PID	<1ppm		Firm yellowish brown slightly sandy slightly gravelly CLAY with low cobble		0.30	14.22				
-						content. Gravel is angular to subrounded fine to coarse of mudstone. Cobbles are angular to subrounded of mudstone.		(0.20)	14.02				
-						Weak to medium strong grey MUDSTONE recovered as gravel, cobbles and boulders. Gravel is angular to subrounded fine to coarse. Cobbles and boulders		(0.20)	14.02				
- 0.70 - 1.30	В3					are angular to subangular (Weathered St Mary's Well Bay Member).	_	0.70	13.82	∭₩			
- 0.70 - 1.30	ES4					subrounded fine to coarse of mudstone. Cobbles and boulders are angular to							
						subrounded of mudstone (weathered St Mary's well Bay Member).	[≡≡≡ ⊯≡≡			
-								(0.60) -	-				
-													
-										≝≡≡			
-		1.30	PID	<1ppm		Medium strong grey MUDSTONE (St Mary's Well Bay Member).	_	1.30	13.22				
		<u> </u>							-				
PLAN DETAILS						Remarks							
⊢—		3.0		Long Axis	s Orienta	ion: Terminated on bedrock. Backfilled with arisings and surface left raised to accom	imodate futu	re settlemer	nt.				

PLAN	DETAILS		Remarks	
	3.0	Long Axis Orientation:	Terminated on bedrock. Backfilled with arisings and surface left raised to accommodate future se	ettlement.
T		25 Sharing / Support: Name		
		Shoring / Support. None		
0.9		Stability: Stable		
		Groundwater (description): Not encountered		Termination Depth:
				1.30m
	Arcadis Cymru House Unless otherwise stated:	Equipment Used	Contractor	By Checked By

Equipment Used Tracked 8 Tonne Excavator

Arcadis Consulting (UK) Ltd



Project Cosmesto Client Welsh Go	original states of the second					Project No. Ground Level (mAOD) UA008386-01 15.24 Easting (OS mE) Northing (OS mN) 318002.87 168997.87				t Date /09/2016 Date /09/2016	6 ^{Scale} 1:25 6 Sheet 1 of 1		
SAMPL	ES		TEST	S	es			STRATA			Danth		Install
Depth	Type/	Depth	Type/	Results	Wate Strike		Desc	ription		Legend	Depth (Thickness)	Level	Backfil
0.00 0.00 - 0.30 0.00 - 0.30	ES B1 ES2	- - - -	110.			MADE GROUND: Grass of frequent roots and rootlets mudstone.	over soft brown s. Gravel is ang	slightly sandy slightly gravelly (ular to subrounded fine to coar	CLAY with se of		(0.30)		
-		- 0.30	PID	<1ppm		Firm yellowish brown sligh	ntly sandy sligh	tly gravelly CLAY with low cobb	le bbles are	Ē	0.30	14.94	
-		-				angular to subrounded of	mudstone.	powered as cobbles and boulder	o with		0.50	- 14.74	
-		-				some gravel. Gravel is an	gular to subrou	inded fine to coarse. Cobbles and boulder	nd The short		(0.25)	•	
0.75 - 1.10	В3	-				Stiff grey CLAY (Weathers	ad St Mary's W	ell Bay Member)			0.75	14.49	
- 0.75 - 1.10 -	ES4	-						on Bay Monibory.		F	(0.05)		
-		-								F	(0.35) _	-	
-		- 1.10	PID	<1ppm		Medium strong grey MUD	STONE (St Ma	ry's Well Bay Member).			1.10	14.14	₩ ≣₩
	LS	3.5			is Orientat	ion:	Remarks Terminated or Backfilled with	n bedrock.	I to accomm	nodate futu	re settlemer		
						15	Backnied with	i ansings and surface left raised	i io accomn	iouate tutu	ie settiemer	п.	
1.2				Shoring Stability:	/ Support: Stable	None					Torm	ination	Denth:
				Groundy	vater (des	cripuon): Not encountered					lerm	1.10n	Depui.



Contractor

Logged By Checked By sc IP



Project Cosmeston Phase 1 Client Welsh Government						Project I UA00 Easting 3180	No. 18386-01 (OS mE) 30.07	Ground Level (mAOD) 19.10 Northing (OS mN) 168947.07	Star 06/ End 06/	t Date /09/2016 Date /09/2016	5 1: 5 S∣	ale 25 neet 1	of 1
SAMPL	ES		TEST	S	۲ų		S	STRATA					
Depth	Type/	Depth	Type/	Results	Wate		Descrip	otion		Legend	Depth (Thickness)	Level	Install/ Backfil
0.00 0.00 - 0.25 0.00 - 0.25	ES B1 ES2	- - -	NU.			MADE GROUND: Grass of frequent roots and rootlets mudstone.	over soft brown s s. Gravel is angul	ightly sandy slightly gravelly CLA ar to subrounded fine to coarse of	AY with of		(0.25)		
- - - 0.35 - 0.90	B3	- - 0.25 -	PID	<1ppm		Grey GRAVEL with mediu subrounded fine to coarse	m cobble and bo of mudstone. Co	ulder content. Gravel is angular to bbles and boulders are angular	to to		0.25 (0.10) 0.35	18.85 18.75	
- - - - - - -	E34	-				Firm to stiff yellowish grey content. Gravel is angular boulders are angular of m	r slightly gravelly to subrounded fi udstone (Weathe	CLAY with low cobble and bould ne to coarse of mudstone. Cobb red St Mary's Well Bay Member	er les and).		(0.55)	- - - -	
- - -		- - 0.90 	PID	<1ppm		∖ Medium strong grey MUD	STONE (St Mary	's Well Bay Member).			0.90	18.20	
- - - -		-									· · ·		
- - - -		-									-	- - -	
-		-										• • •	
- - - -		-									- - -	- - - -	
- - - -		-										-	
-		-									-	-	
-		-											
- - 		- - - -									- - -	- -	
- - - -		-											
- - - -		-									-	- - - -	
- - - -		-										• • •	
- - - -		-									-	-	
-		-										-	
- - -		-									-	- - -	
- - - -		-									- - - -		
		-									-	-	
	LS	2.9	·	Long Axi	s Oriental	ion: 160	Remarks Terminated on b Backfilled with a	edrock. risings and surface left raised to	accomm	nodate futu	ire settleme	nt.	
0.8				Shoring Stability:	/ Support: Stable	None							
				Groundy	/ater (des	cription): Not encountered					Term	ination I 0.90n	Depth:



Contractor



Project Cosmeston Pha Client Welsh Governr	ase 1 nent			Project No. UA008386-01 Easting (OS mE) 317974.28	Ground Level (mAOD) 15.43 Northing (OS mN) 168964.18	Start Date 06/09/2016 End Date 06/09/2016	3 1: 3 S	^{ale} 25 heet 1	of 1
SAMPLES	SAMPLES TESTS				STRATA		Denth		Install/
Depth Type/	Depth Type/	Results	Strik	Des	cription	Legend	(Thickness)	Level	Backfill

Depth	Type/ No.	Depth	No.	Results	Stri		Description	Legend	(Thickness)	20101	Backfill
0.00	ES B1	_				MADE GROUND: Grass c	ver soft brown slightly sandy slightly gravelly CLAY with				
0.00 - 0.30	ES2	-				roots and rootlets. Gravel	is angular to subrounded fine to coarse of mudstone .	\otimes	(0.30)		
-		-									≣Щ≡
-		- 0.30		<1ppm		Soft yellowish brown slight	tly sandy slightly gravelly CLAY. Gravel is angular to	EE	0.30	15.12	
-		_				subrounded line to coarse	or mudstone.	L	(0.20)	11.00	
-	D 2	-				Grey GRAVEL with mediu	m cobble and boulder content. Gravel is angular to		(0.10)	14.92	
- 0.60 - 0.70	ES4	- 0.70		<1.0.0m		subrounded of mudstone.		[(0.10)	14.02	
		0.70		< ippin		Firm yellowish brown sligh is angular to subrounded f	tly sandy gravelly CLAY with low cobble content. Gravel ine to coarse of mudstone. Cobbles are angular to	/	0.70	14.72	
[subrounded of mudstone	Weathered St Mary's Well Bay Member).				
-		-				Medium strong grey MUD	STONE (St Mary's Well Bay Member).				
		-									
		-									
		-									
-		-									
		-							-	-	
-		-									
-		-									
-		-									
-		-									
-		_							-	-	
		_									
		-							-		
		-									
-		-									
-		-							-	-	
-		-									
-		-									
-		-									
		-								_	
		-									
		-									
		-									
-		-									
-		-							-	-	
-		-									
-		-									
E		_							-		
		-									
-		-							-	-	
-		-									
-		-									
-		-							:		
		-									
<u> </u>		_							-		
		_									
-		-									
		-							:		
⊨		-							-	-	
PLAN DETAII	L		I			<u> </u>	Remarks	I			
		3.6		Long Axis	Orientati	ion:	Terminated on bedrock.				
						30	Backtilled with arisings and surface left raised to accomm	nodate futi	ure settlemei	nt.	
						00					
				Shoring /	Support:	None					
0.9				Stability:	Stable				_		
				Groundwa	ater (desc	cription): Not encountered			Term	ination [Depth:
										0.70m	ו ו
Arcadie (Cymru									Charl	d Dy
Heuro	, II	nlace other	vico etator			Equipment Used	Contractor	LO	uued BV	CHECKE	υDV



Arcadis Consulting (UK) Ltd

Project Cosmeston Phase 1 Client Welsh Government				Project N UA00 Easting 31798	No. 1 8386-01 (OS mE) 8 1.97	Ground Level (mAOD) 17.51 Northing (OS mN) 168922.50	Sta 07 Enc 07	rt Date 7 /09/2016 1 Date 7 /09/2016	s∝ 1: 5 S	25 25 heet 1	of 1			
S	AMPLE	S		TEST	S	er			STRATA			Donth		Inctall/
De	pth	Type/ No.	Depth	Type/ No.	Results	Wati Strik		Desc	ription		Legend	(Thickness)	Level	Backfil
0.0 - 0.00 - - 0.00 -	0.30 0.30 0.30	ES B1 ES2	-				MADE GROUND: Grass of frequent roots and rootlets and mudstone.	over soft brown s. Gravel is ang	slightly sandy slightly gravelly ular to subrounded fine to coa	CLAY with se of brick		(0.30)		
-			0.30	PID	<1ppm		Firm yellowish brown sligh	ntly gravelly CL	AY. Gravel is angular to subrou	nded fine		0.30	17.21	
- - - - 0.60 -	1.20	B3 ES4	- - - -				Grey weak to medium stro cobble and boulder conter mudstone. Cobbles and b	ong MUDSTON nt. Gravel is an	E recovered as GRAVEL with gular to subrounded fine to coa	medium arse of St Many's	·	(0.20) 0.50 (0.10) 0.60	- 17.01 16.91	
-	1.20	204	- 0.70 - - -	PID	<1ppm		Well Bay Member). Firm yellowish grey slight Gravel is angular to subro boulders are angular to su	y gravelly CLA unded fine to c ibrounded of m	/ with low cobble and boulder oarse of mudstone. Cobbles a udstone (Weathered St Mary's	content. nd Well Bay		(0.60)	-	
-			-				Member).					=		
-			-				∖ Grey medium strong MUD	STONE (St Ma	ry's Well Bay Member).			1.20	16.31	≡≡≡ ₩≡₩
0.9	DETAILS	3	3.7		Long Axi	Support:	ion: 110 None	Remarks Terminated or Backfilled with	bedrock. arisings and surface left raise	d to accomr	nodate futu	re settleme	nt.	
					Groundv	vater (des	cription): Not encountered					Term	nination	Depth:



Arcadis Consulting (UK) Ltd

Contractor

Checked By Logged By sc IP

Project Cosmesto Client Welsh Go	t meston Phase 1 sh Government					Project I UA00 Easting 3179	No. 1 8386-01 (OS mE) 7 4.72	Ground Level (mAOD) 18.55 Northing (OS mN) 168855.46	Star 07/ End 07/	Date 09/2016 Date 09/2016	5 1: 5 SI	ale 25 heet 1	of 1
SAMPL	ES		TEST	S	r s			STRATA					
Depth	Type/	Depth	Type/	Results	Wate		Desc	ription		Legend	Depth (Thickness)	Level	Backfi
0.00 0.00 - 0.30 0.00 - 0.30	ES B1 ES2	- - - -				MADE GROUND: Grass of frequent roots and rootlets mudstone.	over soft brown s. Gravel is ang	slightly sandy slightly gravelly CL ular to subrounded fine to coarse	AY with of		(0.30)		
- 0.30 - 1.50 - 0.30 - 1.50 - - - - - - - - - - - - - - -	B3 ES4	0.30	PID	<1ppm		Firm yellowish grey slightl boulder content. Gravel is Cobbles and boulders are Mary's Well Bay Member)	y sandy slightly angular to sub angular to sub	gravelly CLAY with medium cobi ounded fine to coarse of mudsto anguar of mudstone (Weathered	ble and ne. St		0.30	18.25	
- 		- - - - - - - - - - - - - - - - - - -	PID	<100m							1 50	- 17.05	
		- - - - - - - - - - - -				Villedium strong grey MOD	<u>STONE (St Ma</u>	ys weil bay member).	/			· · · · · ·	
		-									-	- - - - - - - - - - - -	
		- - - - - - - - - - - - - -										- - - - - - - - -	
											-	- - - - - - - - - - -	
		-					Domortic						
ALO Long Axis Orientation 1.0 4.0 1.0 Shoring / Support: No Stability: Stable					s Orientat Support: Stable	ion: 45 None	remarks Terminated on Backfilled with	bedrock. arisings and surface left raised t	o accomm	odate futu	ire settlemei	nt.	
	Groundw					cription): Not encountered					Term	ination I 1.50n	Depth: N



Equipment Used Tracked 8 Tonne Excavator

Arcadis Consulting (UK) Ltd

Contractor

Checked By Logged By sc IP

Project Cosmesto Client Welsh Gov	Toject Cosmeston Phase 1 lient Velsh Government					Project No. Ground Level (mAOD) Sta UA008386-01 20.08 07 Easting (OS mE) Northing (OS mN) Env 318020.78 168873.46 07	rt Date 7 /09/2016 1 Date 7 /09/2016	6 1: 6 SI	ale 25 heet 1	of 1
SAMPLE	ES		TEST	S	L٥	STRATA				
Depth	Type/ No.	Depth	Type/ No.	Results	Watel Strike	Description	Legend	Depth (Thickness)	Level	Install/ Backfill
0.00 0.00 - 0.20 0.00 - 0.20	ES B1 ES2	0.00	PID	<1ppm		MADE GROUND: Grass over soft brown slightly sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of brick and mudstone		(0.20)		
- 0.20 - 1.20 - 0.20 - 1.20 - - - - - - - - - -	B3 ES4	- 0.20 	PID	<1ppm		Firm yellowish grey-brown gravelly CLAY with medium cobble and boulder content. Gravel is angular to subrounded fine to coarse of mudstone. Cobbles and boulders are angular to subrounded of mudstone.		0.20	19.88	= = = = = = =
- - - - - - - - - - - - - -		- - - - - - - - - - - - - - - - - - -	PID	<1ppm				(1.30)	· - - - - - - - - -	≡
						Medium strong grey MUDSTONE (St Mary's Well Bay Member).		1.50	18.58	
-		- - - - -						-	-	

PLAN	N DETAILS							Remarks				
0.9	0.9				Long Axis Shoring / Stability: S	Orientation: 35 Support: Nor Stable	ne Possible perched	Terminated on bedrock. Backfilled with arisings and surface left raised to accomm	odate futi	ure settleme	nt.	Denthi
					Groundwa	ater (descript	ion): groundwater on bedrock			Iern	1.50n	n n



Equipment Used Tracked 8 Tonne Excavator

Arcadis Consulting (UK) Ltd

Contractor



Project Cosmesto Client Welsh Go	ect psmeston Phase 1 nt elsh Government					Project N UA00 Easting (31792	lo. 8386-01 (OS mE) 24.55	Ground Level (mAOD) 17.35 Northing (OS mN) 168824.20	Start Date 07/09/20 End Date 07/09/20)16)16	Sca 1:2 Sh	^{ile} 25 neet 1	of 1
SAMPL	ES		TEST	S	ب ی		:	STRATA					
Depth	Type/	Depth	Type/	Results	Wate		Descri	ption	Lege	nd ^{(Thi}	Depth ickness)	Level	Install Backfi
0.00 0.00 - 0.30 0.00 - 0.30 	ES B1 ES2	-				MADE GROUND: Grass of frequent roots and rootlets mudstone (TOPSOIL).	over soft brown s a. Gravel is angu	lightly sandy slightly gravelly CLA lar to subrounded fine to coarse c	Y with f	× (0.30)		
- 0.30 - 0.90 - 0.30 - 0.90 - - -	B3 ES4	- 0.30 	PID	<1ppm		Firm brown mottled yellow boulder content. Gravel is Cobbles and boulders are Mary's Well Bay Member).	ish orange sligh angular to subro angular to subro	tly gravelly CLAY with low cobble bunded fine to coarse of mudstone bunded of mudstone (Weathered	and e St		0.30	17.05	
-	DE	-		~1.000						- (0.60)	16 45	
- 0.90 - 1.40 - 0.90 - 1.40 - - - -	ES6	- 0.90 - - - -	PID	<1ppm		Firm grey slightly sandy sl content. Gravel is angular boulders are angular to su Mary's Well Bay Member).	ightly gravelly C to subrounded f brounded fine to	LAY with medium cobble and bou ine to coarse of mudstone. Cobbl o coarse of mudstone (Weathered	der es and St		0.50)	16.45	
-		- - - - 1.40 - -	PID	<1ppm		\ Medium strong grey MUD	STONE (St Mar	y's Well Bay Member).			1.40	15.95	
- - - - -		-									+		
- - - - -												-	
- - - -		-											
- - - - -		-											
- - - - -		-									+	-	
-		-											
- - - -		-											
- - - - -													
- - - - -		-											
-													
-											+	-	
	LS	4.0		Long Axi	s Orientat	ion:	Remarks Terminated on Backfilled with	bedrock. arisings and surface left raised to	accommodate	future s	ettlemen	t.	
1.1	1.1 Shoring / Support			Support:	None								
	Groundwa					cription): Not encountered					Termi	ination I 1 40n	Depth:



Contractor



Project Cosmesto Client Welsh Go	h Government					Project N UA00 Easting (31785	No. 8386-01 (OS mE) 95.01	Ground Level (mAOD) 18.80 Northing (OS mN) 168779.37	Star 07 End 07	t Date /09/2016 Date /09/2016	s∝ 1: 5 S	^{ale} 25 heet 1	of 1
SAMPL	ES		TEST	S	<u>ب</u> ې			STRATA					
Depth	Type/	Depth	Type/	Results	Wate Strike		Desc	ription		Legend	Depth (Thickness)	Level	Install/ Backfill
0.00 0.00 - 0.30 0.00 - 0.30	No. ES B1 ES2	- - - -	No.			MADE GROUND: Grass of frequent roots and rootlets mudstone.	over soft brown s. Gravel is ang	slightly sandy slightly gravelly CL gular to subrounded fine to coarse	AY with of		(0.30)	-	
0.30 - 1.60 0.30 - 1.60	B3 ES4	- 0.30 - - - - - - -	PID	<1ppm		Firm yellowish brown sligh to coarse of mudstone (W	ntly gravelly CL eathered St Ma	AY. Gravel is angular to subrounde ary's Well Bay Member).	ed fine		0.30	18.50	= = = = = = = = = = = = =
-		- - - - - - - - - - - - - - - - - - -	PID	<1ppm							(1.30)	- - - - - - - - - - - - - - - - - - -	: = = = = = = =
1.60 - 2.20 1.60 - 2.20	B5 ES6	- - - - - - - - -				Firm grey mottled orange Gravel is angular to subro boulders are angular to su Mary's Well Bay Member)	gravelly CLAY unded fine to c ibrounded of m	with low cobble and boulder conte coarse of mudstone. Cobbles and udstone and limestone (Weathere	nt. d St		1.60 (0.60)	17.20	======================================
 PLAN DETAI		4.0	PID	<1ppm	s Orientat	Medium strong grey MUD	STONE (St Ma	ry's Well Bay Member).			2.20	16.60	
1.0	4.0 Long Axis Orie Long Axis Orie Shoring / Supp Stability: Stabil Groundwater (r					125 None pription): Not encountered	Backfilled with	n arisings and surface left raised to	accomn	nodate futu	re settleme	nt. nination	Depth:



Equipment Used Tracked 8 Tonne Excavator

Arcadis Consulting (UK) Ltd

Contractor

Checked By Logged By sc IP

TP17

Start Date 07/09/2016

Project Cosmeston Phase 1 Client Welsh Government						Project N UA00 Easting (31786	lo. 8386-01 (OS mE) 59.45	Ground Level (mAOD) 15.47 Northing (OS mN) 168873.67	Star 06/ End 06/	Date 09/2016 Date 09/2016	5 1: 5 S	ale 25 heet 1	of 1
SAMF	PLES		TEST	s	L۵		S	STRATA					
Depth	Type/	Depth	Type/	Results	Wate Strike		Descri	otion		Legend	Depth (Thickness)	Level	Install/ Backfil
0.00 0.00 - 0.30 0.00 - 0.30	ES B1 ES2	- - - -				MADE GROUND: Grass of frequent roots and rootlets mudstone.	over soft brown s s. Gravel is angul	lightly sandy slightly gravelly Cl lar to subangular fine to coarse	LAY with of		(0.30)		
- 0.30 - 0.90 - 0.30 - 0.90 - - - - -	B3 ES4	- 0.30 	PID	<1ppm		Firm to stiff yellowish brow and boulder content. Grav Cobbles and boulders are Well Bay Member).	n slightly sandy el is angular to s angular to rounc	slightly gravelly CLAY with low ubrounded fine to coarse of mu led of mudstone (Weathered S	cobble udstone. t Mary's		0.30	15.17	
			PID	<1ppm		Medium strong grey MUD	STONE (St Mary	's Well Bay Member).			0.90		
		-					Remarks						
	<u>AILS</u>	4.4		Long Axi Shoring / Stability: Groundw	s Orientati / Support: Stable /ater (desc	on: 110 None Possible perched ription): groundwater on	remarks Terminated on b Backfilled with a	bedrock. arisings and surface left raised	to accomm	iodate futu	ire settleme	nt. nination I	Depth:
						bedrock						0 90n	n



Arcadis Consulting (UK) Ltd

Contractor

Logged By Checked By sc IP



g				TP19	
	Project No. UA008386-01	Ground Level (mAOD) 14.54	Start Date 07/09/2016	Scale 1:25	
	Easting (OS mE) 317814.16	Northing (OS mN) 168898.90	End Date 07/09/2016	Sheet 1 of 1	

Project Cosmeste Client Welsh Go	elsh Government					Project N UA00 Easting 3178	No. 8386-01 (OS mE) 14.16	Ground Level (mAOD) 14.54 Northing (OS mN) 168898.90	Start Date 07/09/2010 End Date 07/09/2010	5 1: 5 S	:25 heet 1	of 1
SAMPL	ES		TEST	S	- S			STRATA				
Depth	Type/	Depth	Type/	Results	Wate		Desc	ription	Legend	Depth (Thickness)	Level	Install/ Backfill
0.00 0.00 - 0.30 0.00 - 0.30	ES B1 ES2	-	110.			MADE GROUND: Grass of frequent roots and rootlets mudstone.	over soft brown s. Gravel is ang	slightly sandy slightly gravelly CLAY ular to subrounded fine to coarse of	with	(0.30)	+ + + +	
- - 0.30 - 0.60 - 0.30 - 0.60 -	B3 ES4	- 0.30 	PID	<1ppm		Soft yellowish brown sligh is angular to subrounded to subrounded of mudstone	tly sandy grave fine to coarse o (Weathered St	lly CLAY with low cobble content. Gr f mudstone. Cobbles are angular to Mary's Well Bay Member).	avel	0.30	14.24	
	ILS	3.6	PID	<1ppm	s Oriental	ion:	Remarks Terminated on Backfilled with	bedrock.	ccommodate fut	0.60	nt.	
						40		anonigo ana sunaco icit iaiseu lu di				
1.0				Shoring Stability:	/ Support: Stable	None						
				Groundv	vater (des	cription): Not encountered				Tern	nination 0.60r	Depth: N
Arcadis	Cymru	nless other	vise stater			Equipment Used		Contractor	Lc	gged By	Checke	ed By



Arcadis Consulting (UK) Ltd

Project Cosmesto Client Welsh Gor	Project Cosmeston Phase 1 Jient Velsh Government SAMPLES TESTS					Project I UA00 Easting 31782	No. 1 8386-01 (OS mE) 2 6.92	Ground Level (mAOD) 16.35 Northing (OS mN) 168843.35	Start Date 07/09/2 End Date 07/09/2	016 016	Sca 1:2 Sh	ile 25 neet 1	of 1
SAMPLE	ES		TEST	S	r s		:	STRATA					
Depth	Type/	Depth	Type/	Results	Wate		Descri	ption	Leg	end (T	Depth hickness)	Level	Backfil
0.00 0.00 - 0.30 0.00 - 0.30	ES B1 ES2	- - - -				MADE GROUND: Soft bro roots and rootlets. Gravel	own slightly sand is angular to sub	ly slightly gravelly CLAY with freque prounded fine to coarse of mudston	ent e.		(0.30)		
- 0.30 - 1.20 - 0.30 - 1.20 - - - - -	B3 ES4	- 0.30 - - - - -	PID	<1ppm		SLight brownish grey sligh content. Gravel is angular boulders are angular to su	ntly sandy gravel to subrounded f ibrounded fine to	lly CLAY with low cobble and bould fine to coarse of mudstone. Cobble o coarse of mudstone.	er s and		0.30	16.05	
- - - - -		- - - - -									(0.90)	-	
- - - - -		- - - 1.20 -	PID	<1ppm		\ Medium strong grey MUD	STONE (St Mary	y's Well Bay Member).			1.20	15.15	
- - - - -		- - - -											
- - - - - -		- - - - -										-	
-		- - - - -											
- - - - -		-									+		
- - - - -		- 										-	
- - - - - -		- - - - -											
- - - - -		- - - - -										-	
- - - - -		-											
- - - - -		- - - - -											
	\$	- - - 					Remarka				-	-	
		4.2		Long Axis	s Orientat	ion: 50	Terminated on Backfilled with	bedrock. arisings and surface left raised to a	ccommodate	future	settlemen	t.	
0.9				Shoring / Stability: Groundw	Support: Stable ater (deso	None cription): Not encountered					Termi	ination I 1.20n	Depth:



Arcadis Consulting (UK) Ltd

Contractor

Checked By Logged By sc IP

			_			J				
Project Cosmesto Client Welsh Go	on Pha overnm	se 1 ent				Project No. Ground Level (mAOD) Sta UA008386-01 13.88 06 Easting (OS mE) Northing (OS mN) End 317839.66 168916.94 06	ort Date 5/09/2016 d Date 5/09/2016	5 1: 5 S	^{ale} 25 heet 1	of 1
SAMPL	.ES		TEST	S	es es	STRATA				la stall
Depth	Type/ No.	Depth	Type/ No.	Results	Wate	Description	Legend	Depth (Thickness)	Level	Backfil
0.00 0.00 - 0.30 0.00 - 0.30	ES B1 ES2	-				MADE GROUND: Grass over soft brown slightly sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of mudstone.		(0.30)		
0.30 - 0.55 0.30 - 0.55	B3 ES4	- 0.30 -	PID	<1ppm		Firm to stiff yellowish brown slightly sandy slightly gravelly CLAY with low cobble and boulder content. Gravel is angular to subrounded fine to coarse of mudstone. Cobbles and boulders are angular to rounded of mudstone (Weathered St Mary's		0.30 (0.25)	13.58	
		- 0.55 - - -	PID	<1ppm		Well Bay Member). Medium strong grey MUDSTONE (St Mary's Well Bay Member).	1	0.55	13.33	ш <u>ё</u> п
_		- - - -						-		
		-								
		-								
-		-								

.9		Stability: S	stable	NUNG				
	4.5	 Long Axis	Orientati	on: 130 None	Terminated on bedrock. Backfilled with arisings and surface left raised to ac	commodate futu	ire settlement.	
AN DETAIL	.S	Long Ard	Origination		Remarks			
	-							
	-							
	-						1	
	-							
	-							
	-						+	
	-						‡	
	-							
	-							
	-						‡	
	-							
	-							
	-						l ‡	
	-						ļ	
	-						l I	
	-							
	-							
	-						‡	
	-							
	-							
	-							
	-						‡	
	-							
	-						↓ [↓]	
	-						‡	
	-							
	-							
	-							
	-						+	
	Г						• †	

WS01

Project Cosmes Client Welsh (ston P Gover	hase 1 nment				P L 8 3	roject No. JA008386 asting (OS mf 18216.8 8	6-01 ^{≞)} 3	Ground L 22.89 Northing 16917	evel (mAOI (OS mN) '6.47))	Start Date 05/09/ End Date 05/09/	2016 2016	Scale 1:5 She	0 eet 1	of 1
SAM	PLES		Т	ESTS	er es				STRAT	A						
Depth	Typ No	e/ Depth	Type/ No.	Results	Wate			D	escription				Legend	Depth (Thickness)	Level	Install/ Backfill
- 0.20 - 0.20 - 0.5 - 0.20 - 0.5 - 0.50 -	0 B1 0 ES D7	2 0.50 0.50	SPT(S) PID	N=31 (7,8/11,12,3,5) <1ppm	0	MADE GROUND roots and rootlets Soft grey slightly to coarse of mud Grey weak MUD (Weathered St M	: Grass ove s. Gravel is : sandy sligh stone. STONE reco ary's Well E	er soft bro subangula tly gravell overed as Bay Memb	wn sandy s ar to subrou y CLAY. Gr angular to er).	lightly gra unded fine ravel is an rounded f	velly CLAY with to coarse of m gular to subrou ine to coarse g	n frequent udstone. nded fine ravel.		(0.20) 0.20 (0.30) 0.50	22.69 - 22.39	
0.95	D	0.95	SPT(S)	N=6 (2,2/2,1,1,2)	0									-	- - -	
- 1.30 - 1.5 - 1.30 - 1.5 - 1.30 - 1.5 -	0 B3 0 ES	4 1.50	PID	<1ppm										(1.50)	- - -	
- 2.00 2.20 - 2.5 2.20 - 2.5	D9 0 B5 0 ES	2.00 5 2.30	SPT(S) HV(1)	N=6 (1,1/1,1,2,2) 3(3)kPa	0	Soft yellowish bro to subrounded fir (Weathered St M	own gravelly ne to coarse ary's Well B	/ CLAY wi of mudst Bay Memb	th medium one. Cobbl er).	cobble co les are sub	ntent. Gravel is bangular of muc	s angular dstone.		2.00 -	- 20.89	
		2.50	PID	<1ppm		Firm brownish gr angular to subrou mudstone (Weat	ey slightly s unded fine to hered St Ma	andy grav o coarse o ary's Well	velly CLAY of mudston Bay Memb	with low co e. Cobbles er).	obble content. s are subangula	Gravel is ar of		2.50 - (0.50)	- 20.39	
From 0.00 1.40	DRILLING	E TECHNIQI Techr Inspect Dynamic	UE ique Sample	Date/Time	WATEF Strike At	R OBSERVATIONS Time Elapsed Rise To	• Casing	Sealed	H0 Hole Dia.	OLE/CASI Depth	NG DIAMETER Casing Dia.	R Depth	Top 0.00 0.10 0.50	BACKFI Base 1		fill id nite iel
Remarks Terminated	d on Eng	jineer's instr	uction - Ta	arget depth achieved						<u> </u>			2.10	3.00	Bento	epth:
нс	L House	liniese	otherwise	stated		Equipment Used			Contrac	tor			Log	ned By	3.00 Checke	m ed By



Arcadis Consulting (UK) Ltd

WS02-TP

Project Cosme	eston I	Phase	1						Proj UA Eas	ect No. 00838 ting (OS m	6-01	Ground I 25.98 Northing	Level (mAOI	D)	Start Da 08/09 End Dat	te /2016 e	Scale 1:5	0	
Welsh	Gover	nmen	nt						31	8208.3	3	16907	73.08		08/09	/2016	Sh	eet 1 o	of 1
SAM	/IPLES			TI	ESTS		ter Kes					STRA	TA			-1	Depth		Install/
Dept	n Ty	o. D	epth	Type/ No.	F	Results	Stri				D	Description				Legend	(Thickness)	Lever	Backfill
0.00 - 0.	10 ES	61 0 62	0.10	PID	<1ppm			MADE GF	ROUND: sional gra	Grass ov avels, and	er soft to f I frequent	irm dark br roots and r	own to gre	y slightly sar ravel is subar	ndy CLAY		(0.20)	25.78	
-		0	0.40	PID	<1ppm			subround	ed fine to	coarse o	f mudston	IE.	modium oo		Cravelie	∕⊑- <u>-</u> -	(0.30)	20.70	
-								subangula	ar to subr	ounded fi	ine to coal	rse of mud	stone. Cob	bles are sub	angular of		0.50	25.48	
-								\ <u>mudstone</u>	e (Weathe	ered St Ma	ary's Well	Bay Memb	ber).			/		ŧ	
_																	-	ŀ	
-																		ļ	
-																		+	
-																		ŧ	
_																	-	L	
-																		ļ	
-																		ł	
-																		ŧ	
																		Į	
-																	-	ł	
-																		ł	
																		ŧ	
																		Į	
-																	-	ł	
-																		ł	
-																		Į	
_																		Į	
-																		ł	
-																	-	ł	
E																		ŧ	
E																		Ŧ	
-																		ł	
-																	-	+	
																		ŧ	
-																		ļ	
-																		ł	
-																		ţ	
_																	-	Ī	
[I	
-																		ł	
-																		ţ	
-																	-	ŧ	
[Į	
-																		ł	
-																		ŧ	
-																		L	
-																		ļ	
-																		ţ	
-																		ţ	
-																		ŧ	
<u> </u>							_										-	<u> </u>	
	DRILLIN	G TECI	HNIQU	E			WATER	ROBSERVA	TIONS			Н	OLE/CASI	NG DIAMET	ER	- I	BACKF	LL	1
From 0.00	To 0.50		Technic nspectic	que on Pit		Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole DIa.	Depth	Casing Dia.	Depth	Тор 0.00	Base 0.50	Back Arisin	rfill
Remarks		I																	
Terminat	ed on En	igineer's	s instru	ction foll	owing ES	S sample col	lection												
																			
																	Termi	nation De	epth:
												and Di-	0.50	I []					
HCL House St Mallons Unless otherwise stated: Equipment Us									Jsed			Contrac	cior			Log	деа Ву	Cnecke	ed By

Project Cosme Client Welsh	eston P Goverr	hase 1 nment					Proj UA Eas 31	ect No. \00838 ting (OS m 8133.3 '	6-01 ^{⊑)} I	Ground I 26.15 Northing 16899	Level (mAOI (OS mN))0.04))	Start Dat 05/09 End Date 05/09	, 2016 2016	sc. 1: SI	ale 50 neet 1	of 1	
SAN	/ IPLES		T	ESTS	er es					STRAT	ΓA				Denth		Instal	=
Deptl	n Typ No	e/ Depth	Type/ No.	Results	Mat Strik				[Description				Legend	(Thicknes	s) Level	Backf	ill
0.00 0.20 - 1. 0.20 - 1.	20 B2 20 ES	0.20	PID	<1ppm		MADE GF frequent r mudstone	ROUND: (roots and e.	Grass ove rootlets.	er soft bro Gravel is	own slightly angular to s	sandy slig subrounde	htly gravelly C d fine to coars	CLAY with se of		(0.20) 0.20	25.95		
-						cobble co Cobbles a	ntent. Gra are suban	avel is an gular of n	gular to s nudstone	ultrounded (REWORK)	fine to coa KED NATU	arse of mudsto IRAL).	niow one.		(1.00)			1,
1.20	D3	1.20 1.20	SPT(S) PID	N=6 (1,2/2,1,2,1) <1ppm		MADE GF with low c mudstone	ROUND: S obble cor	Soft to firr ntent. Gra	n yellowis vel is sub angular o	sh brown sli bangular to f mudstone	ightly sand subrounde (REWORI	ly slightly grav ed fine to coar KED NATURA	velly CLAY se of L).		1.20 (0.30) 1.50	24.95		· · · ·
1.65 - 1.	80 ES4	1.80	PID	<1ppm		MADE GF angular to	ROUND: (subroun	Grey wea ded grave	k MUDST el. Cobble	FONE with I es are angu	ow cobble lar to suba	content. Reco ingular (REW	overed as /ORKED		(0.40)	ļ		•
— 2.00	D5	2.00	SPT(S)	N=7 (1,2/2,2,1,2)		MATURAL MADE GF	_) ROUND: \$	Soft to firr	n yellowis	sh brown sli	ightly sand	ly gravelly CL	AY with low		1.90 (0.25) 2.15	24.25		, ,
2.30 2.30 - 2.	40 ES	5 2.40	PID	<1ppm		Cobble co Cobbles a MADE GF	are angula ROUND: I	ar of mud Black ang	stone (RE ular to su	EWORKED	NATURAL	.). rse GRAVEL o	of clinker	h	(0.15) 2.30	23.85		
-						\and ash. Firm to sti subround	iff greyish ed of mud	brown C Istone (W	LAY with eathered	low cobble St Mary's \	content. C Well Bay M	obbles are ar lember).	ngular to	/ 	(0.70)	Ī		///
- 3.00	D7	3.00	SPT(S)	N=14 (5,7/7,3,2,2)						,	,	,		<u> </u>	3.00	- 23.15	////	/
		3 TECHNIQ	JE		WATE	R OBSERVA			Societ	H	OLE/CASI Doub		R		BACK			
From	То	Techn	ique	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dia.	Depth	Casing Dia.	Depth	Тор	Base	Baci	fill	_
0.00	3.00	Dynamic	Sample											0.00 0.10 0.50 2.15	0.10 0.50 2.15 3.00	Conc Bento Grav Bento	rete nite vel nite	

Remarks

Terminated on Engineer's instruction - Target depth achieved. Backfilled with arisings and surface left raised to accommodate future settlement.



Equipment Used

Contractor

Termination Depth: 3.00m

Project Cosmesto	on Ph	ase 1				Project No. UA008386-	01	Ground Lev 27.99	vel (mAOD)	Start Da 05/09	^{te} /2016	Scale 1:5	0	
Welsh Go	vernn	nent				Easting (OS mE) 318098.59		Northing (O 168877	OS mN) .00	End Dat 05/09	,2016	She	et 1 o	of 1
SAMPLI	ES		Т	ESTS	ter kes			STRATA			_	Depth		Install/
Depth	Type/ No.	Depth	Type/ No.	Results	Wat Strik		D	escription			Legend	(Thickness)	Level	Backfill
0.00	ES B1					MADE GROUND: Grass over angular to subrounded fine to	slightly coarse	sandy slightly of brick, ash a	/ gravelly CLAY. and clinker.	Gravel is		(0.20) 0.20	27.79	
- 0.50 - 0.90 - 0.50 - 0.90	D3	0.50	SPT(S)	N=14 (5.7/7.3.2.2)		MADE GROUND: Black angul cobble and boulder content. G	ar to su ravel is	orounded fine of ash and cl	e to coarse GRA inker. Cobbles a	VEL with low and boulders are		(0.30) 0.50 -	- 27.49	
-		0.50	PID	<1ppm		\angular to subrounded of brick Grey weak to medium strong N	and co MUDST	ncrete. DNE (St Mar	y's Well Bay Mei	mber).				
- 0.90 - 1.30	D4	0.95	SPT(S)	N>50 (3,6/12,13,20,5 for								(0.80)	-	
- -				1301111								1.30	26.69	
-												-	-	
-														
- 												-	-	
-														
-												-	-	
-														
-												-	-	
-														
-												-		
-														
-													- - -	
-														
-														
-													-	
-														
-												-	-	
- -														
-												-	-	
-														
-												-	-	
-														
-												-	-	
-														
-												-	-	
-														
												-	-	
-														
-												-		
-														
-														
-														
-														
-												-	-	
DRI		ECHNIQ	JE		WATEF	OBSERVATIONS		HOL	E/CASING DIA	METER		BACKFI	LL	
From T	ō	Techn	ique ion Pit	Date/Time S	Strike At	Time Elapsed Rise To Casing	Sealed	Hole DIa.	Depth Casing	Dia. Depth	Top 0.00	Base	Back Bento	:fill nite
0.00 0.	50	mapeor									0.00		Donto	
Remarks														
Terminated o Backfilled wit	n Engin h arising	eer's instr gs and sur	uction on face left i	bedrock. raised to accommodate	future s	ettlement.								
												Termin	ation De	epth:
													1.30	m
HCL Ho St Mello Busines	use ons ss Park	Unless o	therwise	stated:		Equipment Used		Contractor			Log	ged By	Checke	d By
AGS Cardiff CF3 0E	Y	Thicknes	.,, Braine ss (m), Le	evel (mOD).	,	Archway Dart		Arca	ais Consultin	g (UK) Ltd		SC	I	P

Project Cosme Client Welsh	ston P Goverr	ernment					Pro UA Eas 31	ject No. \00838 sting (OS m 8046.9	6-01 ^{1E)}	Ground I 16.34 Northing 16906	Level (mAOI (OS mN) 54.57))	Start Da 05/09 End Da 05/09	ate)/2016 te)/2016	Sci 1: SI	^{ale} 50 neet 1 (of 1
SAM	IPLES		Т	ESTS	- S					STRA	TA						Install
Depth	Тур	e/ Depth	Type/	Results	Wate Strike				[Description				Legend	Depth (Thicknes	s) Level	Backfil
0.10	10 ES		NO.			MADE G	ROUND: roots and	Grass ov rootlets.	er soft bro Gravel is	own slightly angular to s	sandy slig subrounde	htly gravelly d fine to coar	CLAY with se of		(0.20) 0.20	16.14	
- 0.10-0.4		0.40	PID	<1ppm		\mudstone	e. m vellowi	sh brown	slightly s	andv slightl	v gravelly	CLAY Gravel	is angular		(0.20)	15.94	
- 0.50 - 0.6 - 0.50 - 0.6	50 B4 50 ES3	0.60	PID	<1ppm		to subrou	nded fine	to coars	e of muds	tone.		- recovered			0.50	15.84	
- 0.60 - 0.9 -	90 D5					to suban	jular cobl	bles and b	boulders (Weathered	St Mary's	Well Bay Me	mber).		(0.30)	15 //	
-		0.95	SPT(S)	N=50 (3,6/12,13,20,5)	0	Soft yello	wish brov ed fine to	vn slightly coarse c	y sandy sl of mudstor	ightly grave ne (Weathe	elly CLAY. (red St Mai	Gravel is ang⊧ v's Well Bav	ular to Member).	//	0.30	+ 10.44	
-						Medium s	strong ligh	nt grey M	UDSTON	E (St Mary's	s Well Bay	Member).	,]		ł	
-																ļ	
-																ļ	
-																ţ	
-																Ť	
-																ţ	
-																ļ	
-																ţ	
-																ţ	
-																Ť	
-																ŧ	
-																ŧ	
-																Ŧ	
-																Ŧ	
-																Ŧ	
-																ł	
_																Ŧ	
_																ł	
																Ŧ	
_																Ŧ	
_																ł	
_																ł	
-																ł	
-																1	
-																Ŧ	
-																ł	
_																ł	
-																ł	
-																1	
-																ł	
-																ł	
-																ţ	
-																ţ	
-																1	
-																ţ	
-																ţ	
-																Ť	
-																ŧ	
_																÷	
-																ł	
-																ł	
-																Ŧ	
-																ł	
_																+	
[JE		WATE	ROBSERVA	TIONS			н	OLE/CASI	NG DIAMETI	ER		BACK	FILL	
From	То	Techr	ique	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dla.	Depth	Casing Dia.	Depth	Тор	Base	Back	cfill
0.00	0.60	Inspect	ion Pit											0.00	0.90	Arisir	ngs

Remarks

Terminated on Engineer's instruction on bedrock. Backfilled with arisings and surface left raised to accommodate future settlement.



Equipment Used

Contractor

Termination Depth: 0.90m

WS06

Project Cosme Client Welsh	eston Gove	Phas rnme	se 1 ent					Proj UA Eas 31	ject No. \00838 ting (OS m 7965.7	6-01 ⊫) 6	Ground L 14.04 Northing 16899	_evel (mAOI (OS mN)]0.84	D)	Start Dat 05/09 End Date 05/09	, 2016 2016	Scale 1:5 She) 0 eet 1 (of 1
SAN	IPLES			Т	ESTS	۲ų					STRAT	ΓA						
Depth	π LLO Ty N	rpe/ lo.	Depth	Type/ No.	Results	Water Strike				C	Description				Legend	Depth (Thickness)	Level	Install/ Backfill
0.00 0.00 - 0. 0.00 - 0. - 0.40	20 E 20 E 20 E	S 32 S1 S	0.20	PID	<1ppm		MADE GRO frequent ro mudstone.	OUND: ots and	Grass over rootlets.	er soft bro Gravel is a	wn slightly angular to s	sandy slig	htly gravelly Cl d fine to coarse	LAY with		(0.20) 0.20 (0.40)	13.84	
- 0.40 - 0. - 0.40 - 0. - 0.60 - 0.	60 E 60 E 90 E	84 S3 D5	0.60 0.60	SPT(S) PID	N>50 (5,4/5,9,10,26 for 40mm) <1ppm	0	rootlets. Gr Weak to m Member)	avel is a edium s	angular to trong ligh	subround t grey to g	ded fine to o grey weak N	coarse of I MUDSTON	nudstone. IE (St Mary's W	/ell Bay		0.60	13.44	
- 0.90 - 1.	10 E	06														(0.00)		
							Medium str	ong gre	y MUDS	TONE.						1.10		
F																		
<u> </u>	_					<u> </u>											<u> </u>	
				JE	· · · · · · · · · · · · · · · · · · ·	WATEF	ROBSERVAT	IONS	-		H	OLE/CASI	NG DIAMETER	۲	·	BACKF	LL	
From 0.00 0.60	To 0.60 1.10		Techni Inspectio Dynamic \$	ique on Pit Sample	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole DIa.	Depth	Casing Dia.	Depth	Тор 0.00	Base 1.10	Back	fill Igs
Remarks Terminate Backfilled	ed on Er I with ar	nginee isings	er's instru and surf	uction on face left r	bedrock. aised to accommodate	e future s	settlement.		1	1			<u> </u>	I	I	I		
																Termir	ation De	epth: M



Arcadis Consulting (UK) Ltd

Contractor

Project Cosme ^{Client} Welsh	ston Pl Govern	nase 1 ment					Proj UA Eas 31	ect No. 00838 ting (OS m 7881.8	6-01 ^{E)} D	Ground L 16.77 Northing 16883	.evel (mAOI (OS mN) 3 2.61))	Start Da 05/09 End Dat 05/09	e /2016 /2016	Sca 1:5 Sh	e i0 eet 1	of 1
SAM	IPLES		T	ESTS	es					STRAT	A				Denth		Install
Depth	Туре	e/ Depth	Type/	Results	Strike				C	escription				Legend	(Thickness	Level	Backfi
0.00 0.00 - 0.2 0.00 - 0.2 0.20	ES 20 B1 20 ES2 ES		110.			MADE GF frequent r mudstone	ROUND: (oots and	Grass ove rootlets. (er soft bro Gravel is a	wn slightly angular to s	sandy slig subrounde	htly gravelly C d fine to coars	CLAY with se of	/	(0.20) 0.20 (0.30)	16.57	
- 0.20 - 0.5 0.20 - 0.5 0.50 - 0.8	50 B3 50 ES4 30 D5	0.50 0.50	SPT(S) PID	N=16 (5,11/6,3,3,4) <1ppm		Gravel is subangula Weak to r	angular to ar to subr nedium s	o subrour ounded o trong gre	ided fine t f mudstor y MUDST	o coarse of ie. ONE (St Ma	mudstone	e. Cobbles are Bay Member).	;		0.50 (0.60)	- 16.27	
- 1.00 - 1.1	10 D6	0.95	SPT(S)	N>50 (4,5/20,30,0 for Omm)											1.10		
		TECHNIQU	JE		WATER	R OBSERVA	TIONS			н	OLE/CASI	NG DIAMETE	R		BACKF		<u> </u>
From	To	Techn	ique	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole DIa.	Depth	Casing Dia.	Depth	Тор	Base	Back	cfill
0.00	0.50	Inspecti	ion Pit											0.00	1.10	Arisir	ngs

Remarks

Terminated on engineer's instruction on bedrock. Backfilled with arisings and surface left raised to accommodate future settlement.



Arcadis Consulting (UK) Ltd

Contractor

Checked By Logged By sc IP

Termination Depth: 1.10m

9/	ARCADIS	Su Lo	per a	Heav	/y Dy	ynan	nic F	Prob	9					DP101
Project Cosme Client Welsh	eston Phase 2 Goverment	,	5				Project No UA008 Easting (C 318224). 386-02 ^()S mE) 1.34	Grou 21. Nort 169	und Level (m .00 hing (OS mN 9273.75	n OD) N)		Start Date 06/12/2017 End Date 06/12/2017	^{Scale} 1:50 Sheet 1 of 1
Depth	Readings (blows/100mm)		5	10 4	L	Diagram (N	100 Value	es)	25	10	16	Torque (Nm)	Re	emarks
-			Ĭ											
-														
-														
- 1	_											_		
-	332													
-	2222													
2	2 2 4											15		
-	322													
-														
3	1 1 3											- 20		
-	3 2 3													
-	1 2 3													
- 4	333											- 20		
	4 3 2													
-	23 4 3													
-	3 4 4											45		
- 5	3 2 3											- 15		
	3 3 4													
-	50													
6												-		
-														
-														
- 7														
-														
-														
8												_		
-														
- 9														
-														
-														
-														
								Dame -				-		
Test Type	E PROBE DE TAILS							Hand e	uks excavated	inspection	pit from 0	.00 m to 1.	20 m bgl. Refusal at	5.70 m bgl.
Hammer	Mass (kg): 63.5 Drop (mm): 750													
Cone Dia	meter (mm): 50.0													
Rod Dian	neter (mm): 35.0													—
Anvii Dar	nper Type: None													Termination Depth: 5.80m
		wiso state	d'		Equir	ment Used			Co	ntractor				By Checked By



Logged By Checked By
GSTL CPr

9/	RCADIS	Su Lo	per a	Heav	y D	ynar	nic l	Prob	e					DP102
Project Cosme Client Welsh	eston Phase 2 Goverment		3				Project N UA00 Easting (31814	lo. 8386-02 (OS mE) 14.80	Grd 19 Not 16	ound Level (i).23 rthing (OS m 5 9212.48	m OD) N)		Start Date 06/12/2017 End Date 06/12/2017	^{Scale} 1:50 Sheet 1 of 1
Depth	Readings (blows/100mm)				[Diagram (I	N 100 Valu	ies)				Torque (Nm)	F	Remarks
<u> </u>	(5	10 *	15 2	20	25	30	35	40	45			
-														
-														
- 1												-		
-	1													
	1 1 1													
2	1 1 1											10		
-	1													
-	0 2 3													
3	4 4 2											- 15		
	3 3 1													
-	2 1 2 2													
- 4	2 2 1											15		
	1 2 2													
-	2 2 2													
	1											10		
-	222													
	2 3 2													
-	3 4 3											20		
-	2 2 3 3													
-	4 5 4													
	3 4 4											- 20		
	3 4 4											20		
-	6 4													
	5 50													
- 8														
-														
-														
- 9 -												-		
-														
- 10 -								<u> </u>						
DYNAM Test Type	IC PROBE DÉTAILS							Rema	arks excavated	l inspectior	n pit from 0	.00 m to 1.	20 m bgl. Refusal a	at 7.80 m bgl. Location is
Hammer	Mass (kg): 63.5 Drop (mm): 750							pianne	u, unable	to survey	as not mar	ĸea.		
Cone Dia	meter (mm): 50.0													
Rod Diam	neter (mm): 35.0 nper Type [:] None													Termination Depthy
														7.90m
An St St Ca	unless other Mellons Business rk wdiff r3 0EY Unless other Depth (m), D Thickness (r	wise state iameter (n n), Level (i	ed: nm), Time mOD).	e (hhmm),	Equip Cor	oment Used	Dart		Co A	ontractor Ircadis C	onsultin	g (UK) Lto	Logg	ed By Checked By FL CPr

9/	RCADIS	Su Lo	per a	Heav	/y D	ynar	nic I	Probe	9					C	P103
Project Cosme Client Welsh	ston Phase 2 Goverment		5				Project N UA00 Easting (31822	lo. 8386-02 OS mE) 25.07	Grou 24 Nort 16	und Level (m .18 thing (OS mN 9146.39	n OD) N)		Start Date 06/12/2017 End Date 06/12/2017		^{Scale} 1:50 Sheet 1 of 1
Depth	Readings					Diagram (I	N 100 Valu	ies)				Torque		Rema	rks
-			5	10	15	20	25	30 3	35	40 4	45	(NIII)			
- - -															
-															
- 1												_			
-	1														
- - -	2														
2	1											- 10			
-	1 1 2														
-	2 3 2														
- 3	2 2 2 2											15			
-	2 1 2														
-	3 4 3														
	0 0 1											15			
- 4	2 0 0											15			
	1 2 3														
-	3 2 1														
- 5	1 2 14											- 20			
-	4														
-	3 5 6														
6	4 6 6											- 25			
-	4 4 3														
-	4 4 3														
- 7	553											30			
-	4 3 3														
-	3 4 4														
- 8	50											-			
-															
-															
- 9															
-															
-															
								Boma	rke						
Test Type	: DPSH-B							Hand e	excavated	inspection	pit from 0	.00 m to 1. ked	20 m bgl. Refusal	at 7.80) m bgl. Location is
Hammer Hammer	Mass (kg): 63.5 Drop (mm): 750							plaine	_,						
Cone Dia	meter (mm): 50.0														
Rod Diam	neter (mm): 35.0 nper Type: None													T	ermination Depth:
	· · ·														7.90m
AGS CF	rk Mellons Business rk rdiff 30EY Thickness (n	wise state iameter (n	ed: nm), Tim mOD)	e (hhmm),	Equi Co	ipment Usec mpetitor	Dart		Co Ai	ntractor cadis Co	onsulting	ı (UK) Lte	Log d. GS	ged By	Checked By CPr

Cardiff	Park	Arcadis Cymru Hou St Mellons Busines
	Cardiff	GS Park Cardiff

94	RCADIS	Su Lo	per a	Неа	vy	Dyn	ami	сP	robe	9					DP1	04
Project Cosme Client Welsh	ston Phase 2 Goverment		5				Pro U Ea 31	oject No. A0083 asting (OS 18141	86-02 mE) .53	Grou 21. Nort 169	und Level (r . 19 hing (OS m 9128.34	n OD) N)		Start Date 06/12/2017 End Date 06/12/2017	^{Scale} 1:50 Sheet	: 1 of 1
Depth	Readings					Diagra	am (N 100	0 Values	;)				Torque		Remarks	
	(blows/100mm)	Ę	5	10	15	20	25	30) 3	5 4	40	45	(Nm)		rtomanto	
-																
- 1	10												-			
-	12 6 2															
E	2 2 2															
- 2	2 2 1				_								5			
F	1 2 3															
	3 2 1															
Ē	1 2 2												10			
- 3	15												-			
Ē	4 3 4															
	3 2 3															
- 4	3 3 2				_								15			
E	2 2 3															
F	2 3 3															
	3 3 4												20			
- 5	2 4 3															
	223															
	222															
6	3 2				_								15			
	2 2 2 2															
-	1 2 3															
-	4 5 5												25			
	4 4 3															
	3 4 5															
Ę	6 6 5															
8	5 4 5				_								25			
	7 50															
-																
-																
-																
- 10													-			
DYNAM									Rema	rks	iner "	nit fra C	00 1 - 1		ot 9 40 ! . ! .	
Hammer	:: DPSH-B Mass (kg): 63.5								planne	d, unable	to survey	as not mar	.00 m to 1. ked.	∠∪ m ɒgi. Ketusal	at 8.40 m bgl.	Location is
Hammer	Drop (mm): 750															
Cone Dia	meter (mm): 50.0															
Anvil Dan	nper Type: None														Terminatio	n Depth:
															8.	40m
	cadis Cymru House Mellons Business rk rdiff 30EY Unless other Depth (m), Di Thickness (m	wise state ameter (n). Level (i	ed: nm), Tin mOD).	ne (hhmm	ı),	Equipment Compet	Used titor Dar	rt –		Co Ar	ntractor	onsulting	I (UK) Lto	Log	ged By Chi TL CF	ecked By Pr

94	RCADIS	Su Lo	per a	Heav	vy D	yna	mic	Prob	e					DP105
Project Cosme Client Welsh	ston Phase 2 Goverment		3				Project N UA00 Easting 31820	No. 1 8386-02 (OS mE))5.32	Grc 26 Nor 16	ound Level (m 5.07 rthing (OS m 59070.91	n OD) N)		Start Date 06/12/2017 End Date 06/12/2017	^{Scale} 1:50 Sheet 1 of 1
Depth	Readings					Diagram ((N 100 Valı	ues)				Torque	F	Remarks
	(blows/100mm)		5	10	15	20	25	30	35	40 4	45	(Nm)		
-														
-														
-														
- 1 -												-		
-	2 1 1													
-	1 2													
	1											0		
_	0											Ŭ		
-	0 1 1													
-	1 2 2													
- 3	2											10		
-	2 1 2													
-	1 5 7													
-	5555											20		
- 4	3330													
-	2 3 2													
-	2 3 3													
- 5	2 2						_					15		
	34													
-	4 4 4													
-	2 2 3													
6	3 4 4					_	_					20		
-	2													
-	22													
-	2 3 2											15		
-	332													
-	380													
-	9 5 3													
- 8	4 4 5											20		
-	4 50													
-														
-														
- 9												-		
-														
-														
-														
								Bomo	vrko					
Test Type	: DPSH-B							Hand	excavated	l inspection	pit from 0	.00 m to 1.	20 m bgl. Refusal a	t 8.20 m bgl. Location is
Hammer	Mass (kg): 63.5							planne	d, unable	to survey a	is not mar	ked.		
Hammer I	Drop (mm): 750													
Rod Diam	neter (mm): 35.0													
Anvil Dam	nper Type: None													Termination Depth:
														8.30m
Arc St I AGS Ca CF	adis Cymru House Mellons Business rk 13 0EY Unless othe Depth (m), D Thickness (r	rwise state liameter (r n), Level (ed: nm), Time mOD).	e (hhmm),	Equ CC	uipment Use ompetito	^{ed} r Dart		Co A	ontractor Ircadis Co	onsulting	g (UK) Lto	Logg d. GS1	ed By Checked By

255 UU	erwi	5
th (m),	Diar	n
kness	(m),	L

90	RCADIS	Sup Log	oer He	avy l	Dyna	mic	Probe)				DP106
Project Cosme Client Welsh	ston Phase 2 Goverment	3				Project N UA00 Easting 31812	No. 1 8386-02 (OS mE) 2 8.28	Grou 22. Nort 16	und Level (m OD . 45 hing (OS mN) 9052.46))	Start Date 06/12/2017 End Date 06/12/2017	^{Scale} 1:50 Sheet 1 of 1
Depth	Readings (blows/100mm)				Diagram	(N 100 Val	ues)			Torque (Nm)		Remarks
	0	5	10	15	20	25	30 35	5 4	40 45			
-	0											
-	0											
- - 1 -	0									0		
-	0 0											
-	0 0 1											
- 2	1									5		
-	1 1 2											
-	2											
-	3 2 2											
- 3	532									20		
-	222											
-	222											
4	2									10		
-	222											
-	342											
	222									15		
-	6 2 3]									
-	5 6 4											
-	4											
- 6	336		1							20		
-	3 4 5]									
-	5 4 6											
7	6 5 4									25		
-	4 5 4											
-	9 17 9											
	9 6 6											
-	6 9 7									20		
-	12 7 11											
-	5 7 7									30		
9	7 9 13											
-	9 9 13											
-												
- 10												
DYNAMI	C PROBE DETAILS						Remar	ks				
Test Type	: DPSH-B						Hand ex planned	cavated , unable t	inspection pit to survey as n	from 0.00 m to 1. ot marked.	20 m bgl. Refusal	at 9.40 m bgl. Location is
Hammer I	Drop (mm): 750											
Cone Dia	meter (mm): 50.0											
Rod Diam	eter (mm): 35.0 nper Type: None											Termination Depth:
												9.50m
Arc St Day Car	adis Cymru House Mellons Business * Depth (m), D Thickness (r	wise stated iameter (mn	: n), Time (hhn OD).	nm), (Equipment Use Competito	^{ed} r Dart		Co Ar	ntractor cadis Cons	ulting (UK) Lt	Logg d. GS	ged By Checked By TL CPr

9 A	RCAD	IS L	Sup _oo	oer	Heav	vy D	yna	mic	Pro	be						DP1	07
Project Cosme Client Welsh	ston Phase 2 Goverment			,				Projec UA0 Eastin 3181	t No. 08386 g (OS mE 175.32	- 02	Grou 26. North 169	ind Level (m 64 hing (OS mN 9023.03	1 OD) 1)		Start Date 06/12/2017 End Date 06/12/2017	^{Scale} 1:50 Sheet	t 1 of 1
Depth	Readings	m)					Diagram	(N 100 Va	alues)					Torque		Remarks	
-	0		5		10	15	20	25	30	35	4	10 4	15				
-	0 0 0																
-	0																
-	0																
- 1	0													0			
-	22																
-	1																
-	1																
2	1 2								_					10			
-	2																
-	1 2																
-	2																
3	1 2							_	_					10			
-	223																
-	3																
-	4 4 6																
4	6 10			1				-	_					35			
-	8 14 11																
-	3																
-	3																
- 5	3													10			
-	3																
-	3 2 2																
-	5 10																
- 6	8 8 4							_						30			
	4 3																
-	347																
-	7 5																
- 7	8													30			
-	4 4 6																
-	56																
-	6 5 5																
-	6 6													25			
-	6																
-	5 6																
-	6 6																
-	4 4 4													20			
- 9	4													20			
-	5 6 10			1													
-	10 9																
-	5 5 4													20			
- 10 -	-													-			
DYNAM		AILS							R	emark	s						
Iest Type	: DPSH-B Mass (kg): 63.5								H Di	and exc gl). Loca	avated i ition is p	inspection planned, ur	pit from (hable to s	0.00 m to 1. urvey as no	∠∪ m bgl. Target d ot marked.	eptn reached	(10.00 m
Hammer	Drop (mm): 750																
Cone Dia	meter (mm): 50.0																
Rod Diam	neter (mm): 35.0																
Anvil Dam	nper Type: None															Terminatio	on Depth:
																10	.00m
	tadis Cymru House Unles	s otherwise	stated	1: m) Time	(hhmm)	Equ	ipment Use	ed			Cor	ntractor	_		Log	ged By Ch	ecked By
AGS	^{rdiff} ^{3 OEY} Thick	ness (m), Le	evel (m	iOD).	<i>,</i> (),	Co	mpetito	r Dart			Ar	cadis Co	onsultin	g (UK) Lte	a. GS	IL C	Pr

9/	RCADIS	Su Lo	per a	Heav	y Dy	ynan	nic P	robe	Ð					DP108
Project Cosme Client Welsh	eston Phase 2 Goverment		9				Project No UA008 Easting (O 318121	386-02 ^{S mE)} I.51	Grou 26. Norti 168	und Level (m .13 hing (OS mh 8979.20	n OD) N)		Start Date 06/12/2017 End Date 06/12/2017	^{Scale} 1:50 Sheet 1 of 1
Depth	Readings (blows/100mm)		-			Diagram (N	I 100 Value	s)	-		-	Torque (Nm)	F	Remarks
-	0		5	10 1	5 2	20 :	25 3	i0 3	35 4	40 2	15			
Ē	Ŏ													
-	0													
	0													
- 1 -	0											0		
-	1													
	1													
- 2	1	_										10		
	1													
-	1 1 1													
- 3												10		
E	22													
-	2													
-														
4	1 3											25		
-	23													
-	24													
-	222													
5	22											20		
-	232													
-	2													
-	1 2													
- 6	3 3 4											25		
	23													
-	333													
-	34													
- 7	4											- 30		
ŀ	3													
E	34													
-	5 6 7													
-	55											20		
- °	3 2 2											20		
-	53													
	4 5													
-	6 7											0.5		
- 9	75											- 35		
-	653		ļ											
-	54													
Ę	8 13													
- 10 -	10											-		
DYNAM	IC PROBE DETAILS						-	Rema	rks					
Test Type	e: DPSH-B							Hand e	excavated	inspection planned, ur	pit from 0. nable to su	00 m to 1. Irvey as no	20 m bgl. Target de ot marked.	pth reached (10.00 m
Hammer	Drop (mm): 750													
Cone Dia	meter (mm): 50.0													
Rod Diam	neter (mm): 35.0													
Anvil Dan	nper Type: None													Termination Depth:
														10.00m
Ar	cadis Cymru House Unless other	wise state	əd:		Equip	ment Used			Со	ntractor			Logg	ed By Checked By

9/	ARCADIS	Su Lo	per g	Heav	y D	ynar	nic P	Probe	9					DP109
Project Cosme Client Welsh	eston Phase 2 Goverment						Project No UA008 Easting (C 318143). 386-02)S mE) 3.99	Grou 26. Norti 169	und Level (m .35 hing (OS mN 9000.05	1 OD) N)		Start Date 11/12/2017 End Date 11/12/2017	^{Scale} 1:50 Sheet 1 of 2
Depth	Readings (blows/100mm)				[Diagram (N	N 100 Value	es)				Torque (Nm)	F	Remarks
-	. ,	5) 1		15 2	20	25 3	su 3	5 4	10 4	15			
-														
− 1 -														
-	2 2 1													
-	2													
- 2	2											- 20		
E	32													
Ę														
-	222											20		
-	233											20		
Ē	32													
-	333													
- 4	3											25		
-	3													
E	3													
	33													
5	2 3 3											25		
E	4													
	7 8 8													
E	4 3													
6	3											25		
E	4 5													
-	7 9 7													
	4													
- 7	3 8 4											- 30		
	56													
-	6 4 3													
	8 11													
- 8	8											30		
	57													
-	8 8 7													
	12 22 15													
- 9	20 7											35		
Ę	12 8 7													
	11 12													
-	9 15 22													
- 10	25 22											45		
DYNAM	I IC PROBE DETAILS							Rema	rks				1	
Test Type	: DPSH-B							Locatio	n is plann	ed, unable	to survey	as not ma	rked.	
Hammer	Mass (kg): 63.5													
	ועסיט (mm): 750 meter (mm): 50.0													
Rod Dian	neter (mm): 35.0													
Anvil Dar	nper Type: None													Termination Depth:
														12.50m
		wiso stato	d.		Equir	oment Used			Cor	ntractor			Logg	ed By Checked By



Logged By Checked By
GSTL CPr

٩A	RCADIS	Sup Loc	ber H a	Heav	y Dy	/nan	nic F	Probe	Ð					DP109
Project Cosme Client Welsh	ston Phase 2 Goverment						Project No UA008 Easting (C 318143). 386-02 ^(S mE) 3.99	Grou 26 Nort 16	und Level (m .35 hing (OS mh 9000.05	1 OD) 1)		Start Date 11/12/2017 End Date 11/12/2017	^{Scale} 1:50 Sheet 2 of 2
Depth	Readings				D	iagram (N	100 Value	es)				Torque	F	Remarks
	11 16	5	11	0 15	5 2	0 2	25 3	30 3	5 4	40 4	15	(1111)		
-	10 10 11 10													
- - - 11	11 12 12											- 45		
	21 23 22 24													
-	26 18													
- 12	-													
-														
-														
- 13	-											_		
-														
-														
- 14	-													
-														
	-													
-														
- 16	-											-		
-														
-														
- 17	-													
-														
-														
- 18	-											_		
-														
- 19 -	-													
-														
- - - 20	-											_		
								Rema	rks					
Test Type	: DPSH-B							Locatio	n is plann	ed, unable	to survey	as not ma	rked.	
Hammer I Hammer I	wass (kg): 63.5 Drop (mm): 750													
Cone Dia	meter (mm): 50.0 neter (mm): 35.0													
Anvil Dam	nper Type: None													Termination Depth:
	adis Cymru House Unless otherv	vise stated	d:		Equip	ment Used			Co	ntractor			Logge	12.50m
AGS	Mellons Business rk rdiff 3 0EY Thickness (m	ameter (mi), Level (m	m), Time 10D).	(hhmm),	Con	petitor	Dart		Ar	cadis Co	onsulting	(UK) Lt	d. GST	L CPr
Super Heavy Dynamic Probe DF Log Project No. Ground Level (m OD) Start Date Sca Project Cosmeston Phase 2 UA0083386-02 26.35 Start Date Sca Linet UA0083386-02 Easting (OS mE) Northing (OS mN) Start Date Sca														DP110
--	--	--	--------------------------	---------	--	---------------------------------	---------------------------	---	-------------	------------	--	--	-------	--------------------
Project Cosme Client Welsh	ston Phase 2 Goverment				Project No UA008 Easting (0 31815	o. 3386-02 DS mE) 4.01	Grou 26. Nort 16	und Level (m .35 hing (OS mh 9044.91	n OD) N)		Start Date 11/12/2017 End Date 11/12/2017	^{Scale} 1:50 Sheet 1 of 2		
Depth	Readings (blows/100mm)				Dia	igram (N	l 100 Valu	es)				Torque (Nm)		Remarks
-		5	1	0 15	20		25	30 35	5 4	40 4	45	()		
-														
-														
- 1												_		
-	1 2 2													
	1 1 1													
- 2	2 2 1											- 15		
	1 0 1													
-	1 2 1													
	2 2 1											- 15		
-	056													
-	4 2 1		_											
	2 2 1											20		
- 4	3 4 4											20		
-	5 4 3													
-	5 4 5													
- 5 -	2 3 2											_ 20		
-	2 3 3													
-	2 3 2													
6	2 3 3											- 25		
-	4 5 5													
-	3 4 5													
- 7	4 3 5											- 30		
-	6 5 7													
-	4 7 6													
8	7 7 8											- 30		
-	9 7 4													
-	5 6 7													
9	8 8 7											- 40		
-	8 8 7													
-	6 8 9													
	8 9 7											40		
	11 C PROBE DETAILS							Remar	ks			40		
Test Type:	DPSH-B							Location	n is plann	ed, unable	to survey	/ as not ma	rked.	
Hammer M Hammer [Mass (kg): 63.5 Drop (mm): 750													
Cone Diar	meter (mm): 50.0													
Rod Diam	eter (mm): 35.0 per Type: None													Termination Depth:
														12.40m
Arc Sti AGS CF3	sdis Cymru House Hellons Business k diff 10EY Thickness (r	wise state iameter (m n), Level (r	d: im), Time nOD).	(hhmm),	Equipm Comp	ent Used	Dart		Co Ar	ntractor	onsultin	g (UK) Lto	Log	ged By Checked By

9/	RCADIS	Su Lo	per a	Heav	vy D	ynaı	mic	Prob	е					D	P110
Project Cosme Client Welsh	eston Phase 2 Goverment		<u> </u>				Project UA0 Easting 3181	No. 08386-02 (OS mE) 54.01	Gro 26 Nor 16	und Level (n .35 thing (OS ml 9044.91	n OD) N)		Start Date 11/12/2017 End Date 11/12/2017		^{Scale} 1:50 Sheet 2 of 2
Depth	Readings					Diagram (N 100 Va	lues)				Torque		Remar	ks
Dopui	(blows/100mm)	:	5	10	15	20	25	30	35	40 4	45	(Nm)		Roma	
	13 10														
-	10 11 12														
E	13 15 14				•										
- 11	15 16											- 45			
E	14 20														
-	16														
- 12	-											_			
-															
Ę															
13	-											-			
-															
- 14 -															
E															
-															
- 15	-											_			
-															
16	-											-			
-															
F															
E															
- 17												-			
F															
- 10															
-															
19	-							_				-			
-															
-															
- 20												1			
DYNAM	I IC PROBE DETAILS							Rem	arks			1	1		
Test Type	E DPSH-B							Locat	on is planr	ied, unable	e to survey	as not ma	rked.		
Hammer	мass (кg): 63.5 Drop (mm): 750														
Cone Dia	meter (mm): 50.0														
Rod Diam	neter (mm): 35.0														
Anvil Dan	nper Type: None													T	ermination Depth:
		viso stat	ed:		Fau	ipment I Isa	d		<u> </u>	ontractor				aged Rv	
AGS	Mellons Business rk Depth (m), Dia 30EY Thickness (m	ameter (r). Level (nm), Tim mOD).	e (hhmm),	Co	mpetito	Dart		A	rcadis Co	onsulting	j (UK) Lte	d. G:	STL	CPr

9/	RCADIS	Su Lo	per a	Heav	y Dy	ynan	nic F	Prob	9					DP111
Project Cosme Client Welsh	eston Phase 2 Goverment		0				Project No UA008 Easting (C 318168). 3386-02)S mE) 8.31	Grou 24. Norti 169	und Level (m . 82 hing (OS mN 9071.54	n OD) N)		Start Date 11/12/2017 End Date 11/12/2017	^{Scale} 1:50 Sheet 1 of 2
Depth	Readings (blows/100mm)		5	10 1	E)iagram (N	I 100 Value	es)	85 4	10 4	45	Torque (Nm)	я	Remarks
			Ĭ											
-														
-														
- '	1													
-	2													
-	1 3													
- 2	2 3 1											15		
-	1 0													
-	22													
-	1 2 1													
- 3	2											20		
-	1													
-	1 1 1													
-	2													
- 4 [3											- 15		
-	4 3 4													
-	34													
-	3 4 4											20		
- 5	3 2 2											20		
-	35													
-	3 4 3													
- 6	4 3											- 20		
-	4 5 5													
-	5 4 5													
-	4 4													
- 7	5 5 6											- 25		
-	7 7 6													
-	67													
-	б 5 5													
8	6 7 8											30		
-	88													
-	9 10													
-	7 7 8													
- 9	7											- 35		
-	11 12 10													
-	8 7 14													
- 10	16 20											45		
								Dam	rko					
Test Type	: DPSH-B							Locatio	rкs on is plann	ed, unable	to survey	as not ma	rked.	
Hammer	Mass (kg): 63.5										,			
Hammer	Drop (mm): 750													
Cone Dia	meter (mm): 50.0													
Anvil Dar	nper Type: None													Termination Depth:
														10.70m
	cadis Cymru House Unless other	wise state	ed:		Equip	oment Used		•	Со	ntractor			Logge	ed By Checked By



Logged By Checked GSTL CPr

A A	RCADIS	Su Log	per q	Heav	vy Dy	ynar	nic l	Prob	Ð					DP111
Project Cosme Client Welsh	ston Phase 2 Goverment		0				Project N UA00 Easting (31816	lo. 8386-02 OS mE) 88.31	Grou 24. Nort 169	und Level (m . 82 hing (OS mN 9071.54	OD) N)		Start Date 11/12/2017 End Date 11/12/2017	^{Scale} 1:50 Sheet 2 of 2
Depth	Readings				[Diagram (N	N 100 Valu	ies)				Torque		Remarks
	(blows/100mm) 18	5	i 1	10	15 2	20 :	25	30	35 4	40 4	5	(Nm)		
-	17 16 23													
-	25 28 111													
- 11														
-														
-														
-														
- 12														
-														
-														
- 13														
-														
-														
-														
- 14 -														
-														
-														
- 15														
-														
-														
- 16														
-														
-														
- 17														
-														
-														
- - - 18														
-														
-														
-														
- 19 -														
-														
-														
- - 20	-													
					1			Poma	rke		I			
Test Type	: DPSH-B							Locatio	on is plann	ed, unable	to survey as	s not ma	rked.	
Hammer I	Mass (kg): 63.5													
Cone Dia	meter (mm): 50.0													
Rod Diam	neter (mm): 35.0													
Anvil Dam	nper Type: None													Termination Depth:
	cadis Cymru House []nless other	vise state	d:		Equir	oment Used			Co	ntractor			Loaa	ed By Checked By
AGS	Mellons Business rk Depth (m), Di rdiff 3 0EY Thickness (m	ameter (m), Level (r	im), Time nOD).	(hhmm),	Cor	npetitor	Dart		Ar	cadis Co	onsulting (UK) Lto	i. GS ⁻	TL CPr

neter ((mm),
Level	(mOI

94	RCADIS	Su Lo	per a	Heav	y Dy	ynar	nic I	Probe	9					DP112
Project Cosme Client Welsh	ston Phase 2 Goverment		3				Project N UA00 Easting (31816	lo. 8386-02 (OS mE) 55.84	Grou 24. Nort 169	und Level (m .70 thing (OS mN 9066.08	1 OD) 1)		Start Date 11/12/2017 End Date 11/12/2017	^{Scale} 1:50 Sheet 1 of 2
Depth	Readings (blows/100mm)			10 11	D)iagram (N	N 100 Valu	ies)	5	40	16	Torque (Nm)		Remarks
-					<u> </u>				<u> </u>					
-														
-														
- 1 - -	1													
-	2 2 3													
-	2 3 4 3											45		
-2	1											- 15		
-	1 0 1													
-	2 1 3											20		
- 3	1											20		
-	0 1 2 1													
	1 2 1											20		
	1 0 1											20		
-	0 1 3													
5	3 2 3											- 20		
-	3 4 4 5											20		
-	3 4 5													
-	4 3 3											- 25		
	3 4 4 3											20		
-	2 4 4													
- 7	3 4 4											- 35		
-	4 5 4 5													
-	6 3 5													
	4 5 4											- 35		
-	7 8 7													
-	8 6 6													
	7 7 6 7											- 40		
-	8 7 7													
-	9 7 7													
- - - 10	6 8 8 10											- 40		
DYNAM	IC PROBE DETAILS			-				Rema	rks	1				
Test Type Hammer I	: DPSH-B Mass (kg): 63.5							Locatio	n is plann	ed, unable	to survey	r as not ma	rked.	
Hammer	Drop (mm): 750													
Cone Dia	meter (mm): 50.0 neter (mm): 35.0													
Anvil Dam	nper Type: None													Termination Depth:
	cadis Cymru House Unless other	wise state	ed:		Equip	oment Used	1		Co	ntractor			Log	12.20m ged By Checked By
AGS	Mellons Business rk Depth (m), D 3 0EY Thickness (n	iameter (n n), Level (i	nm), Time mOD).	e (hhmm),	Con	npetitor	Dart		Ar	rcadis Co	onsulting	g (UK) Lto	d. GS	TL CPr

	RCADIS	Super Loa	Heavy	Dynar	nic P	robe					DP112
Project Cosme Client Welsh	ston Phase 2 Goverment	- 5			Project No. UA008 Easting (09 318165	386-02 ^{S mE)} .84	Ground 24.70 Northin 1690	Level (m OD)) g (OS mN) 66.08		Start Date 11/12/2017 End Date 11/12/2017	^{Scale} 1:50 Sheet 2 of 2
Depth	Readings (blows/100mm)	5	10 15	Diagram (N	1 100 Values	s)) 35	40	45	Torque (Nm)	F	Remarks
- - - - - - - - - - - - - - - - - - -	11 12 13 9 10 9 14 15 15 16 15 16 12 17 10 9										
- - - - - - - - - - - - - -	-										
- 13											
- 14 	-										
- - - - - - - 16									_		
- - - - - - - - - - - - - - - - - - -	-								_		
- - - - - - - - - -	-								_		
- - - - - - - - - - - -	-										
- - 20 - DYNAMI	C PROBE DETAILS					Remark	S				
Iest Type Hammer I Hammer I Cone Diar Rod Diam	: UPSH-B Mass (kg): 63.5 Drop (mm): 750 meter (mm): 50.0 leter (mm): 35.0					Location	is pianned	, unadie to sur	vey as not ma	rkea.	
Anvil Dam	nper Type: None add cymru House Mattion Business Arr Ster Thickness (m	vise stated: Imeter (mm), Tin I, Level (mOD).	ne (hhmm),	Equipment Used	Dart		Contra Arca	actor Idis Consult	ing (UK) Ltd	Logge d. GST	Termination Depth: 12.20m ad By Checked By Checked By

Project Cosmes ^{Client} Welsh G	ton Pha overme	ise 2 ent		Project UAO Easting 3185			No. 8386-02 (OS mE) 59.28	Ground Level (mAOD) 26.29 Northing (OS mN) 169429.19	Start Date 13/12/201 End Date 13/12/201	7 1: 7 S	^{ale} 25 heet 1	of 1
SAMF	PLES		TESTS		es S		;	STRATA				
Depth	Type/	Depth	Type/	Results	Wate Strike		Descri	ption	Legend	(Thickness)	Level	Backfill
0.00 - 0.20 0.05 - 0.15	B1 ES2	-	INO.			MADE GROUND: Soft dar	rk brown sandy (CLAY.		(0.20)		
-		-				Firm light orangish brown limestone.	slightly sandy C	LAY with one boulder of subangular		0.20	26.09	
- - - -		-									-	
- - - 0.90 - 1.00 - 0.90 - 1.00	B3 ES4	-							 		- - - -	
		-										
- - - -		-								(2.30)		
- 1.70 - 2.00 - - -	B5	-									-	
- 		- - - -									- 	
- - - -		-								2.50 -	- 23.79	
-		-				weak dark blueisn grey M	UDSTONE reco	wered as angular fine to coarse grav	/el.	(0.50)	-	
- - - -		- - - -								3.00 -	- 23.29	
- - - -		-										
-		-										
-		-								-	-	
- - - -		-									-	
-		-									-	
-		- - - -										
<u> </u>		-								-	-	
	AILS	2.9		Long Axis	Orientat	ion:	Remarks Infiltration test of	conducted (SA101). Terminated on I	bedrock.			
0.6				Shoring /	Support: Stable	NA N/A						
Groundwa				แу: Stable idwater (description): Not encountered			ed			nination I 3.00n	Depth:	
Arcad	is Cymru 5 Unless otherwise stated:					Equipment Used		Contractor	Lo	ogged By	Checke	ed By

13 Tonne Tracked Excavator

Arcadis Consulting (UK) Ltd

CPr WB

TP102

Project Cosmeston Phase 2 Client Welsh Goverment						Project N UA00 Easting 31845	Start Date 13/12/2017 End Date 13/12/2017	7 1: 7 S	ale 25 heet 1	of 1		
SAMPL	ES		TESTS		- s		;	STRATA				
Depth	Type/	Depth	Type/	Results	Wate Strike		Descri	ption	Legend	Depth (Thickness)	Level	Install/ Backfill
0.00 - 0.20	B1	-	NU.			MADE GROUND: Soft dar	k brown sandy (CLAY.			+	
0.05-0.15	E32	-								(0.20)	28.36	
- 0.30 - 0.60	B3	-				Firm light orangish brown content. Gravel is angular	slightly sandy sl to subrounded f	ightly gravelly CLAY with low cobble ine to coarse of mudstone and	F	0.20	20.00	
- 0.40 - 0.50	ES4	-				limestone. Cobbles are an	gular of limesto	ne.	F	(0.50)	ŧ	
-									E	(0.50)	Ì	
-		-										
		-				Weak dark blueish grey M	UDSTONE reco	vered as angular coarse gravel.		0.70	27.86	
-		-								0.90	27.66	≝≡≝
-		-								-	-	
-		-									ł	
		-									I	
-		-									ļ	
-		-									ł	
E		-									ŧ	
		-									I	
-		-									ł	
-		-									ł	
F		-								-	ŧ	
		-									I	
-		-									ł	
-		-									ł	
E		-									Į	
-		-									ļ	
-		-									ł	
E		-									ŧ	
E		-									Į	
-		-								-	ł	
-		-									ŧ	
-		-									I	
-		-									ļ	
-		-									ł	
		-									ŧ	
E		-									I	
-		-									ł	
F		-									ł	
-		-									F	
ļ.	1	-									ļ	
F	1	-									ŧ	
E		-									Į	
F	1	-									ļ	
-		-									ŧ	
E	1										Į	
F	1	-									ŧ	
-		-								-	ŧ	
PLAN DETA	ILS	F				1	Remarks		I		1	
1		2.4		Long Axis	Orientat	ion:	Terminated on	Engineer's instruction upon reaching	g bedrock.			
						NA						
0.6				Shoring /	Support:	N/A						
				Stability:	stable	vrintion): Not encountered				Tern	ination	Depth [.]
Groundwater (descrip				ater (UES)	npion, not encountered					0 00-	n	
										0.90r	11	
Arcadis	Cymru	nless other	viso statod [.]			Equipment Used		Contractor	Lo	gged By	Checke	ed By

TP103

Project Cosmesto Client Welsh Go	on Pha verme	se 2 nt				Project N UA00 Easting (31843	lo. 8386-02 OS mE) 88.04	Ground Level (mAOD) 29.38 Northing (OS mN) 169361.56	Start Date 13/12/20 End Date 13/12/20	017 ^{Scale} 1:25 017 Sheet		of 1
SAMPL	ES		TESTS		L S		S	STRATA				
Depth	Type/	Depth	Type/	Results	Wate Strike		Descri	otion	Legen	d (Thickness)	Level	Install/ Backfill
0.00 - 0.20 0.05 - 0.15	NO. B1 ES2	- - - -	NO.			MADE GROUND: Soft dar	k brown sandy (CLAY.		(0.20)	29.18	
- 0.30 - 0.40 - 0.30 - 0.70 - - -	ES4 B3	- - - - -				content. Gravel is angular angular to subrounded of I	to subrounded fi imestone.	ne to coarse of limestone. Cobbles	are	 (0.70)		
-		-				Strong light grey LIMESTO	DNE.		 		28.48	
	LS					Strong light grey LIMESTC	DNE. IEMBER]					
PLAN DETAII	LS						Remarks					
0.6 Croundwater (c					Orientat Support: Stable	ion: NA N/A	Infiltration test o	onducted (SA103). Terminated on b	oedrock.	Tour	nination	Denth
	Cymru			Groundwa	ater (deso	cripuon): Not encountered					0.90r	



TP104

Project Cosmesto Client Welsh Go	on Pha	ise 2 ent				Project No. Ground Level (mAOD) UA008386-02 28.09 Easting (OS mE) Northing (OS mN) 318577.70 169340.61			Start Date 13/12/2017 End Date 13/12/2017	y 1: y S	ale 25 heet 1	of 1
SAMPL	ES		TEST	S	ri SS			STRATA				
Depth	Type/	Depth	Type/	Results	Wate		Desc	ription	Legend	Depth (Thickness)	Level	Install/ Backfill
0.02	B1	-	NO.			MADE GROUND: Soft da	ark brown sandy	CLAY.				m≣m
_ 0.05 - 0.15	ES2	-								(0.20)	ł	
-		-				Firm dark blueish grey Cl	LAY with low co	bble content. Cobbles are angular to		0.20	27.89	
-		-				subrounded of limestone.					ŧ	
-		_									ŧ	
E		Ē									Ī	≝≣≝
- 0.70 - 1.00	B3	_									ļ	
-		-									ļ	
- 0.90 - 1.00	ES4	-									ł	
-		-								-	+ +	
-		-									ŧ	
E											Ī	
E											I	
-		_									ļ	
F		-									ŧ	
-		-								(2.80)	ļ	
- 1.70 - 2.00 -	B5	-									ł	
-	500	-									ŧ	
- 1.90 - 2.00	ES6									_	Ł	
E										-	Ī	
-		_									ļ	
E.		-									ļ	
-		-									ļ	
-		-									ł	
-		-									ŧ	
- 2.70 - 3.00	B7	-									ŧ	
E											I	
- 2.90 - 3.00	ES8	_									ł	
-		-								3.00 -	25.09	m= m:
-		-									ļ	
-		-									ţ	
F		-									ţ	
F		-									ŧ	
E		E									Ī	
_		_									ł	
-		_									ļ	
-		-									ł	
-		-								-	+	
-		-									ţ	
-		-									ŧ	
F		-									ŧ	
E		E									Ī	
E											ŀ	
-		_									ļ	
E.		-									ļ	
-		-									ļ	
-		-									ţ	
-		-					1				-	
PLAN DETAI	LS						Remarks	- Transferrado in 1990				
		3.0		Long Axi	is Urienta	lion:	rerminated or	n Engineer's instruction.				
						NA						
				Shoring	/ Sunnort	N/A						
0.6				Stability	Stable							
				Groundy	vater (des	cription): Not encountered				Term	nination	Depth:
					(200	. ,					3 00n	n
											5.001	••
Arcadis House	Cymru U	nless other	wise stated	: 	,	Equipment Used		Contractor	Lo	gged By	Checke	ed By
AGS Busines Cardiff, 0	ns D sPark T CF30EY	eptn (m), Di hickness (n	iameter (mn n), Level (m	n), Time (hhmm OD).	ı),	13 Tonne Tracked	Excavator	Arcadis Consulting (UK) L	td W	В	CPr	

TP105

Project Cosmesto Client Welsh Go	on Pha	nse 2 ent				Project UA0 Easting 3185	cct No. Ground Level (mAOD) \008386-02 30.67 ling (OS mE) Northing (OS mN) 8513.14 169315.88		Start Date 13/12/201 End Date 13/12/201	7 1: 7 S	^{:ale} :25 heet 1	of 1
SAMPL	ES		TEST	3	ter (es			STRATA		Depth		Install
Depth	Type/ No.	Depth	Type/ No.	Results	Strij		Desc	ription	Legend	(Thickness)	Level	Backfil
0.00 - 0.20	B1 ES2	-				MADE GROUND: Soft da	ark brown sandy	CLAY.		(0.20)	-	
	202	E								(0.20)	30.47	
-		E				Firm light orangish brown	n slightly sandy (ad of limestone	CLAY with low cobble content. Col	obles	0.20	50.47	
-		-							<u> </u>	-	ļ	
-		-								-	ļ	
-		-								-	ţ	
-		-								-	ŧ	
-		E			_					-	ł	
- 0.90 - 1.00 - 0.90 - 1.30	ES4 B3	-								-	ļ	
 -		-									÷	
-		-								-	ł	
-		-								-	ł	
-										-	I	
-		-							<u> </u>		ļ	
-		-							F	(2.80)	ţ	
- 1.70 - 2.00	B5	-							F		ţ	
-		-							<u> </u>	-	ŧ	
1.90 - 2.00	ES6									-	I	
-		-									ŧ	
-		-								-	ļ	
-		-								-	ţ	≝≣≝
-		-								-	ŧ	
-		-								-	ł	
-		-								-	ł	
-		-								-	ļ	
- - 2.80 - 3.00	B7	-									1	
- - 2.90 - 3.00	ES8	-							F	-	ļ	
-		-								- 3.00 -	- 27.67	┉≝┉
-		E									I	
-		-									ļ	
-		-									ļ	
-		-									ţ	
-		-									ţ	
_		-									ł	
-											I	
-		-									ļ	
-		-									1	
-		-									ţ	
-		-			1						Ŧ	
-											ł	
-		-									ţ	
-		-									ţ	
-		-									ţ	
-		F									ļ	
-		E									I	
-		-									ļ	
		F					Pemarka					
	10	3.0			is Orienta	tion:	Terminated on	Engineer's instruction				
_ 		3.0			onorna							
						NA						
				Shoring	/ Support:	N/A						
0.6				Stability	Stable					_		
				Groundv	vater (des	cription): Seepage at 0.90 mbgl				Tern	nination	Depth:
						ŭ					3.00n	n
Arcadie	Cymru						1		1		Charl	d Du
House St Mello	ns D	Inless other epth (m), D	wise stated iameter (mn	: n), Time (hhmm	ı),	Equipment Used		Contractor	L(лууса БУ Г Б	CD-	ы БУ
Cardiff,	S Park T CF3 0EY	hickness (n	n), Level (m	OD).		IS TOTILE TRACKED		Arcaus Consulting (UK)			UFI	

TP106

Project Cosmes Client Welsh (ston Pha Goverme	nse 2 ent				Project N UA00 Easting 31846	Project No. Ground Level (mAOD) Start D UA008386-02 32.70 13/1 Easting (OS mE) Northing (OS mN) End De 318461.16 169277.30 13/1			sc 1: Si	Scale 1:25 Sheet 1		
SAM	PLES		TESTS		er es			STRATA		Dopth		Install/	
Depth	Type/	Depth	Type/	Results	Wat Strik		Descr	iption	Legend	(Thickness)	Level	Backfill	
0.00 - 0.2	0 B1	-	NO.			MADE GROUND: Soft da	rk brown sandy	CLAY.					
_ 0.05 - 0.1	5 ES2	-								(0.20)			
-		-				Firm light orangish brown	slightly sandy C	LAY with medium cobble content.		0.20	32.50		
0.30 - 0.4	0 E54 0 B3					Cobbles are subarigular o	r limestone.			(0.30)			
-		-								0.50	- 32 20		
-		-				Strong light grey LIMEST	ONE. IEMBER]		A I	0.00	02.20		
-		-				-							
-		-											
-		-											
-		_								-	-		
-		-											
-		-											
-		-											
-		-											
E		-											
F		-											
-		-											
F		-											
-		-								-	-		
E		-											
-		-											
-		-											
-		-											
-		-								-			
-													
-		-											
-		-											
-		-								-	-		
-		-											
		-											
-		-											
-		-											
-		-								-			
-		-											
-		-											
[-											
-		-								-	-		
-		-											
E		E								•	l		
-													
F		-											
- -		-								-	-		
-		-									•		
Ē		E											
		-											
-		-								-	 _		
		F					Remarks					L	
		2.4		Long Axis	s Orientat	ion:	Terminated on	bedrock.					
				-1 ° " -1		ΝΔ							
						INA							
				Shoring /	Support:	N/A							
0.6				Stability:	Stable								
				Groundw	ater (des	cription): Not encountered				Term	ination	Depth:	
											0.50r	n	
Arca	dis Cymru	Inlaca other	wise stated:			Equipment Used		Contractor	Log	aged By	Checke	ed By	



TP107

Project Cosmesto Client Welsh Go	on Pha overme	se 2 nt				Project I UA00 Easting 31844	Project No. Ground Level (mAOD) State UA008386-02 33.25 State State Easting (OS mE) Northing (OS mN) I State 318487.14 169217.88 I State			Date 12/2017 Date 12/2017	Y 1:25 Y Sheet 1		of 1
SAMPL	.ES		TESTS		بت «			STRATA					
Depth	Type/	Depth	Type/	Results	Wate		Desc	ription		Legend	Depth (Thickness)	Level	Backfill
0.00 - 0.30	B1	-	NO.			MADE GROUND: Soft da	rk brown sand	/ CLAY.					₩≣₩
0.00 - 0.30	ES2	-									(0.30)	ł	
- 0.30 - 0.60	B3	-								\times	0.30	32.05	
- 0.30 - 0.60	ES4	-				Firm light greyish oranges are subangular strong gre	slightly sandy (v limestone.	CLAY with occasional boulders. Bou	ulders		0.30	52.95	
-		-					,	Weak black thinly laminated MUDS	TONE		(0.30)	+	
-		-				Strong light grey LIMEST	ONE				0.60	32.65	
Ē		-				ST MARY'S WELL BAY N	MEMBER]		/			I	
-		-										ļ	
-		-										ł	
-		-										ŧ	
		-										I	
-		-										ļ	
-		-										ł	
-		-										ŧ	
		-										ŧ	
-		-										I	
-		-										ļ	
-		-										ł	
-		-										†	
		-										Ī	
		-										Į	
-		-										ļ	
-		-										ŧ	
-		-										ŧ	
Ē		-										I	
-		-										ł	
-		-										ł	
-		-										÷	
		-										ŧ	
_		-										I	
-		-										ł	
-		-										ł	
-		-										ŧ	
		-										Ī	
-		-										ļ	
-		-										ļ	
-		-										ţ	
E												Ī	
		-										I	
-		-										ļ	
-		-										1	
-		-										ŧ	
		-										ŧ	
Ē		-										I	
-		-										ł	
-		-									-	ł	
PLAN DETAI	LS						Remarks						
⊢		2.9		Long Axi	s Orientat	ion:	Terminated or	n bedrock.					
						NA							
				Shoring	Support	N/A							
1.2				Stability.	Stable	1.9/1							
				Groundw	ater (des	cription): Not encountered					Terr	nination	Depth:
Groundwat				`							0.60r	n	
							l						
Arcadis	Cymru U	nless other	wise stated:			Equipment Used		Contractor		Lo	gged By	Checke	ed By

TP108

Project Cosmesto Client Welsh Go	on Pha	ise 2 ent				Project UA0(Easting 3184	No.)8386-02 (OS mE) 44.84	Ground Level (mAOD) 33.73 Northing (OS mN) 169173.23	Start Date 15/12/2017 End Date 15/12/2017	′ 1: ′ S	^{ale} 25 heet 1	of 1
SAMPL	ES		TESTS		Γø			STRATA				
Depth	Type/	Depth	Type/	Posults	Vate trike		Descr	intion	Legend	Depth (Thickness)	Level	Install/ Backfill
0.00 - 0.20	No. B1	Dopui	No.	rtoouno	- 00	MADE GROUND: Soft da	ark brown sandy					m=m
0.05 - 0.15	ES2	-					and brown bandy	02/11		(0.20)	-	
-		-				Firm light orangeish brow	n slightly sandy	CLAY with low cobble content. Cob	bles	0.20	33.53	
- 0.30 - 0.70	B3	-				are angular to subangula	r of limestone.					
-		-								(0.52)		
- 0.50 - 0.60	ES4	-								(0.02)		
-		-										
-		-				Weak dark blueish grey fi	inely laminated N	MUDSTONE.		0.72 (0.08)	33.01	
-		-				Strong light grey LIMEST				0.80	32.93	
		E										
-		_										
_		_										
-		_										
-		-										
-		-										
-		-										
-		F										
-		F										
-		F										
-		-								-	-	
-		-										
-		-										
-		-										
		E										
_		E									-	
_		E										
-		_										
-		-										
-		_										
-		-								-	-	
-		-										
-		-										
-		-										
-		-										
-		-									-	
-		-										
-		-										
-		-										
-		F										
		E								-	[
-		L										
-		F										
-		F										
-		-									L	
-		-									ļ	
-		-										
-		-									ŀ	
-		-									ŀ	
		F								-	-	
- PLAN DETAI	LS	F			1	1	Remarks					1
		24		Long Axi	s Orientat	ion:	Terminated on	bedrock.				
_ 		2.7			ma							
						NA						
				Shorina /	Support:	N/A						
0.6				Stability:	Stable							
				Groundw	ater (des	cription): Not encountered				Term	ination	Depth:
											0.80r	n
Arcadis House	Cymru U	Inless other	wise stated:	The 0 1		Equipment Used		Contractor	Lo	gged By	Checke	ed By
AGS Busines Cardiff, (ns D sPark T CF3 0EY	hickness (m	ameter (mm) i), Level (mO	, rime (nhmm) D).	,	13 Tonne Tracked I	Excavator	Arcadis Consulting (UK) L	td W	В	SH	

TP109

Project Cosmesto Client Welsh Go	on Pha overme	se 2 nt			Project UA0 Easting 3185		lo. 8386-02 (OS mE) 12.21	Ground Level (mAOD) 34.60 Northing (OS mN) 169140.85	Start Date 12/12/20 End Date 12/12/20	7 1 7 5	^{cale} :25 iheet 1	of 1
SAMPL	ES		TESTS		er			STRATA		Dopth		Install/
Depth	Type/ No.	Depth	Type/ No.	Results	Wat Strik		Descr	iption	Legen	(Thickness)	Level	Backfill
0.00 - 0.20 0.05 - 0.15	B1 ES2	-				MADE GROUND: Soft dar	rk brown sandy	CLAY.		(0.25)	ļ	
- 0.30	B3	-				Firm light greyish orange s	slightly sandy C	LAY with low cobble content. Cob	bles	0.25	34.35	
- 0.30	E54	-				Strong light grey LIMEST	DNE.			- 0.40	34.20	
-		- -									Ť	
-		- -									ļ	
		- - -									ļ	
-		-									ŧ	
-		- - -									ţ	
-		- - -									ţ	
-		-									ļ	
-		- - -									ļ	
-		-									ļ	
		-									ł	
 		-									† I	
		-									ł	
-		-									ł	
F		-									ļ	
-		-									ļ	
-		- -									ļ	
		- - -									ţ	
-											+	
-		-									ţ	
		-									ł	
-		-									ŧ	
		-									ł	
		-									Į	
		-									Į	
-		- - -									† Į	
-		- -									ļ	
		- - -									ţ	
-		- -									ļ	
-		-									ţ	
-		-									ł	
-		-									ł	
- PLAN DETAI	LS	-					Remarks					
		1.9		Long Axis	Orientat	ion:	Terminated on	bedrock.				
						NA						
				Shoring /	Support:	N/A						
1.4				Stability:	Stable	vintion). Not encountered				Ter	nination	Depth [.]
				Groundw	ater (des)	anpaiony. Not encountered					0.40r	n
Arcadis	Cymru U	nless otherv	vise stated:			Equipment Used		Contractor	L	ogged By	Checke	ed By



Project Cosmesto Client Welsh Go	on Pha verme	se 2 nt				Project UA00 Easting 3185	Project No. Ground Level (mAOD) UA008386-02 34.16 Easting (OS mE) Northing (OS mN) 318561.84 169148.13			7 1 7 S	^{:ale} :25 heet 1	of 1
SAMPLI	ES		TESTS	5	<u>ر</u> م			STRATA				
Denth	Type/	Denth	Type/	Results	Natel		Desc	ription	Legend	Depth (Thickness)	Level	Install Backfil
0.05 - 0.10	No. ES2	Dopui	No.	1000110	- 00	MADE GROUND: Soft da	ark brown sandy					m=m
- 0.10 - 0.20	B1						in promiounay			(0.20)	I	
-		-				Firm light brownish gray s	slightly sandy Cl	_AY.	<u>FXXX</u>	0.20	33.96	≝≣≝
- 0.30 - 0.70	B3	_									ţ	
-		-									ţ	∭₩
-		-								(0.60)	ţ	
- 0.60 - 0.70	ES4	-									ļ	
-		-									ţ	
-		-				Light orange slightly claye	ey SAND.			0.80	33.36	
-		-				Strong light grow LIMEST				0.95	33.21	
-		-				Firm light brownish grey s	slightly sandy Cl	_AY.		1.00 -	33.16	
-		-							[ŧ	
-		-									ŧ	
-		-									ł	
-		-							F		ł	
-	B5	-									Ŧ	
-	60										ł	
-		Ļ							<u>-</u> -	(1.60)	ţ	
- 1.90 - 2.00	ES6	-							[]	(1.00)	ţ	
-		-									1	∭₩
-		_									ţ	
-		-							F		ļ	
-		-									ł	
-		-									ł	
-		_									ļ	
-		-								2.60	31 56	
- 2.70 - 3.00	B7	-				Weak black thinly laminat	ted slightly sand	y MUDSTONE.				
		-								(0.40)	ţ	
- - 2.90 - 3.00	ES8	-								(,	ļ	
-		-								3.00 -	 	
-		-									ţ	
-		-									ţ	
-		-									ţ	
-		-									ţ	
-		-									ŧ	
-		-									ŧ	
-		-									ŧ	
-		-									ŧ	
-		-									ŧ	
-		-									ŧ	
-		-									ŧ	
-		-									ŧ	
-		-									ŧ	
-		-									ŧ	
-											ł	
-		F			1						Į	
-		E L									I	
-											I	
-											ł	
		<u> </u>									ł	
PLAN DETAIL	LS	I	1		1	1	Remarks		I		1	1
		3.3		Long Ax	is Orienta	lion:	Terminated on	bedrock.				
						NA						
				Shoring	/ Support	N/A						
1.2				Stability:	Stable					_		
				Groundv	vater (des	cription): Not encountered				Tern	nination	Depth:
											3.00r	n
Arcadis House	Cymru U	nless other	wise stated	: a) Time (bbm	• •	Equipment Used		Contractor	Lo	gged By	Checke	ed By
AUS Business Cardiff, C	s Park T CF3 0EY	hickness (m	n), Level (m	OD).	.,	13 Tonne Tracked I	Excavator	Arcadis Consulting (L	JK) Ltd W	в	SH	

Project Cosmesto Client Welsh Go	on Pha	ase 2 ent			Project No. UA008386-02 Easting (OS mE) 318535.05		Ground Level (mAOD) 36.36 Northing (OS mN) 169062.94	Start Date 12/12/2017 End Date 12/12/2017	y 1 y S	:ale :25 heet 1	of 1	
SAMPL	ES		TESTS	8	<u>ب</u> ۵			STRATA				
Depth	Type/	Depth	Type/	Results	Wate		Desc	ription	Legend	Depth (Thickness)	Level	Install/ Backfill
0.00 - 0.20	No. B1		No.		- 0	MADE GROUND: Soft da	ark brown sandv	CLAY.	XXX			m≡m
0.05 - 0.15	ES2	-					,			(0.20)	I	
-		-				Firm light orangish grey s	slightly sandy CL	AY.		0.20	36.16	≝≣≞
-		-									ļ	
-		-									1	<u><u></u>≝≣</u>
-		-									+	
		-									ŧ	
- 0.70 - 1.20	B3	-								(1.10)	Ī	≣∥≣
	ES4								F		I	
		-									Ļ	
-		-									ļ	⋓∰⋓
-		-									1	
-		-				Prownich orongo glovov	SAND			1.30	35.06	
-		-				Brownish brange clayey	SAND.			(0.15)	1	
-		-				Strong light grey LIMEST	ONE.			1.45	34.91	
E		Ē								(0.25)	ł	
		-				Firm light orangish grey s	sandy CLAY.			1.70	34.66	
-		-					·				-	
-		-							F		ļ	
-2.00 - 2.40	B5	-									ŧ	
- 2.10 - 2.20	ES6	-								(0.90)	+	
-		-									ŧ	
		-									ļ	
E		_									I	
		-								2.60	33.76	
-		-				Weak black thinly lamina	ted sandy MUD	STONE.		2.00	00.70	
- 2.80 - 3.00	B7	-								(0.40)	ļ	
- - 2.90 - 3.00	ES8	-								. ,	+	L≣≣
-		-								3.00	- 33.36	┉╩┉
E		-									Ī	
_		-									ł	
-		-									ł	
-		-									ł	
-		-									ţ	
		-									ŧ	
		-									Ī	
		-									ļ	
_		-									Ļ	
-		-									ļ	
-		-									1	
-		-									ŧ	
-		-									ŧ	
		-									ł	
		-									ļ	
-		-									-	
-		-									ļ	
-		-									ł	
		-									T	
PLAN DETAII	LS						Remarks					
_⊢		3.0		Long Ax	is Urienta	uon:	rerminated on	I DEGLOCK.				
						NA						
				Shorina	/ Support	N/A						
1.2				Stability	Stable							
				Ground	vater (des	cription): Not encountered				Tern	nination	Depth:
											3.00n	n
A #	Cumm											
House St Mellor	ns D	Inless other Depth (m). Di	wise stated: iameter (mm	: n), Time (hhmm	1),	Equipment Used	-	Contractor	Lo	gged By	Checke	ed By
Business Cardiff, C	s Park T CF3 0EY	hickness (m	n), Level (m0	DD).		13 Ionne Tracked	Excavator	Arcadis Consulting (l	UN)LTO W	Б	5H	

Project Cosmesto Client Welsh Gor	Project Cosmeston Phase 2 Dilent Welsh Goverment					Project UAO Easting 3184		Ground Level (mAOD) 33.74 Northing (OS mN) 168988.51	Start Date 14/12/2017 End Date 14/11/2017	y 1: S	^{ale} 25 heet 1	of 1
SAMPLE	ES		TESTS		er			STRATA		Denth		Install/
Depth	Type/ No.	Depth	Type/ No.	Results	Wat Strik		Desci	iption	Legend	(Thickness)	Level	Backfill
0.00 - 0.10 0.00 - 0.15	ES2 B1	-				Soft dark brown slightly sa	ndy CLAY.			(0.15)		
- - 0.20 - 0.70	В3	-				Firm light orangeish brown	slightly sandy	CLAY with low cobble content. Cobb	les	0.15	33.59	
0.30 - 0.40	ES4					are angular to subangular	line to coarse t	nimesione.			Į	
-		-										
-												
-		-								(0.95)	-	
		E										
-		-										
 [- 1 10	-	
-		-				Strong light grey LIMESTO	DNE. IEMBER]			1.10	32.64	
-		-				<u> </u>	•					
-		-									-	
		_										
		Ē										
-		-									-	
		- -								-	F	
-		-									-	
		E										
-		_										
-		-									-	
											Į	
-		-									-	
-		E								-	-	
-		-									-	
		E										
-		-										
-		-									+	
-		-										
-		-										
		Ē										
-		-								-	-	
											Ì	
-		-									-	
		E										
-		-										
-		-									+	
											Į	
-		-										
F		-								-	F	
PLAN DETAIL	_S		· · · · ·		•		Remarks		I		•	·
⊢—		2.4		Long Axis	s Orientat	ion:	Groundwater a 0.8m of water	at 0.50m bgl and 1.10 m bgl. Water ris (see Soakaway sheets for details).	sen 430mm in 1	5 minutes. S	Soakawa	ay with
						NA	Terminated on	bedrock.				
				 Shorina /	Support:	N/A						
0.6				Stability:	Stable	_						
				Groundw	ater (des	cription): Seepage at 0.50 m				Tern	nination	Depth:
						-					1.10n	n
Arcadis	Cymru	Inless other	vise stated.			Equipment Used		Contractor	Lo	gged By	Checke	ed By



Project Cosmesto Client Welsh Go	on Pha verme	nse 2 ent			Project N UA000 Easting (r 31844		iect No. Ground Level (mAOD) A008386-02 34.26 titing (OS mE) Northing (OS mN) 8442.26 169099.06		Start Date 14/12/2017 End Date 14/12/2017	7 1:25 7 Sheet 1		of 1
SAMPLI	ES		TESTS		л S			STRATA				I
Depth	Type/	Depth	Type/	Results	Strike		Des	cription	Legend	(Thickness)	Level	Backfill
0.00 - 0.25 0.10 - 0.20	B1 ES2	-	NU.			Soft dark brown sandy CL	AY.			(0.30)		
- 0.30 - 0.50 - 0.35 - 0.45 -	B3 ES4	-				Firm light orangeish brown are angular to subangular	i slightly sand fine to coarse	y CLAY with low cobble content. Co of limestone.	bbles	0.30 (0.20) 0.50	33.96 - 33.76	
				Long Axis	• Orientat	Veak dark blueish grey M ST MARY'S WELL BAY M	Remarks Terminated o	n bedrock. Groundwater encounter	ed at 0.50 m bgl		33.76	
0.6				Shoring / Stability: 3 Groundwa	Support: Stable ater (deso	N/A cription): Seepage at 0.50 mbgl				Term	ination I 0.50n	Depth: N
Arcadis	Cymru I	Inless other	viso statod:			Equipment Used		Contractor	Log	ged By	Checke	ed By



Project Cosmesto Client Welsh Go	on Pha overme	se 2 nt				Project UA00 Easting 3183	No. 18386-02 (OS mE) 92.22	Ground Level (mAOD) 31.97 Northing (OS mN) 169126.98	Start I 14/1 End D 14/1	Date 2/2017 ate 2/2017	y 1 S	:25 heet 1	of 1
SAMPL	ES		TESTS		۲ S			STRATA					
Depth	Type/	Depth	Type/	Results	Wate		Descr	iption		Legend	Deptn (Thickness)	Level	Backfill
0.00 - 0.20	B1	-	NO.			MADE GROUND: Soft da	rk brown sandy	CLAY.		$\sim \sim \sim$			
- 0.10 - 0.20	ES2	-								\times	(0.28)	ļ	
E		_								\times	0.28	† I 31.69	
		_				angular to subangular fine	sh brown CLAY e to coarse of lin	with low cobble content. Cobbles nestone.	are			-	
-		-					-	and aff atom without more three atoms a				ļ	
-		-					P	and of strong light grey limestone of				ł	
0.70 - 1.10	B3	_										Ì	
_		_							ŀ		(1.02)	ł	
- 0.90 - 1.10 -	ES4	-							ł			ł	
-		-							F			† 1	
E		_							F			ŧ	
_		_									1.30	30.67	
-		-				Strong light grey LIMEST	ONE. //EMBER]		/			30.67	
-		-										ŧ	
		_										ŧ	
		_										ł	
-		-										ļ	
		-										ļ	
-		-										÷	
-		-										ļ	
-		-										ŧ	
E												ł	
E		_										I	
		_										ļ	
-		-										ļ	
-		-										ţ	
-		-										ţ	
-		-										ŧ	
E												ł	
E												ł	
_		-										ļ	
-		-										ļ	
-		-										ŧ	
-		-										ŧ	
		-										ł	
E												I	
_		-										Ļ	
F		-										ţ	
F		-										ţ	
Ē		Ē										ł	
		-										ł	
F		L -										t	
F		-										ţ	
- -		-										‡	
-		-										ţ	
-		-										ļ	
-		-										ſ.	
PLAN DETAI	ILS			on - A '	o Orio-+- '	ion:	Remarks	hedrock Groundwater ansautter	ed at 1 20	m hal			
		2.4			s Unertat	IUII.	reminated on	Sector, Groundwater encounter	cu at 1.30	n byl			
						NA							
				Shoring	/ Support:	N/A							
0.6				Stability	Stable								
				Groundy	vater (des	cription): Seepage at 1.30					Terr	nination	Depth:
					, -	ingu						1,30r	n
							<u> </u>						·•
Arcadis House	Cymru	nless other	wise stated:			Equipment Used		Contractor		Lo	gged By	Checke	ed By



Project Cosmes Client Welsh G	ton Pha	se 2 nt				Project N UA00 Easting (31836	lo. 8386-02 (OS mE) 50.77	Ground Level (mAOD) 30.66 Northing (OS mN) 169224.25	Start 14/1 End E 14/1	Date 12/2017 Date 12/2017	7 1: 7 S	25 heet 1	of 1
SAMF	PLES		TEST	8	ter (es			STRATA			Depth		Install/
Depth	Type/ No.	Depth	Type/ No.	Results	Strik		Desc	ription		Legend	(Thickness)	Level	Backfill
0.00 - 0.10	ES2 B1	-				Soft dark brown sandy CL	AY.				(0.15)		
- - 0.20 - 0.60	В3	-				Firm light orangeish brown	sandy CLAY v	with low cobble content. Cobbles are			0.15	30.51	
0.30 - 0.40	ES4	-				angular to subangular fine	to coarse of lir	nestone.					
-		-									(0.55)		
-		-									-	-	
E		-									0.70	20.06	
-		-				Strong light grey LIMEST	ONE. 1EMBER]		Λ		0.70	29.96	
-		-					•						
-		-									-	-	
Ľ													
-		-											
-		-											
Ľ		_											
E		_											
-		-											
-		-											
-		-											
<u> </u>											-	<u> </u>	
-		-											
-		-											
-		-											
E		-											
-		_										•	
-		-											
-		-											
F		-											
E											-	-	
-		-											
-		-											
-		-											
Ē		-											
-		-											
-		-											
-		-											
F		-										•	
_												_	
F		-											
F		-											
Ē													
E		-										-	
F		-											
F		-											
F		-										-	
E		_											
F		-									-	-	
PLAN DET	AILS		. 1	_			Remarks		1				·
		2.5		Long Axi	s Orientat	ion:	Terminated on	bedrock. Groundwater encountered	at 0.60	m bgl			
I Tİ				-i		NA							
				01.	Su	NI/A							
0.6				Shoring	Stable	N/A							
				Groundw	ater (des	cription): Seepage at 0.60					Term	ination	Depth:
					. (200	· ′ mbgl						0.70r	n
												5.1 01	••
Arcad	is Cymru	nless other	wise stated			Equipment Used		Contractor		Lo	gged By	Checke	ed By

13 Tonne Tracked Excavator

Arcadis Consulting (UK) Ltd

WB SH

WS101

Project Cosme	ston F	hase 2	!				Proj UA	iect No.	6-02	Ground L 31.20	evel (mAOI	D)	Start Dat 11/12/	。 2017	Scale 1:5	0	
Client Welsh	Gover	ment					Eas 31	ting (OS m 8577.58	E) B	Northing 16921	(OS mN) 3.43		End Date 11/12/	2017	Sh	et 1 o	of 1
SAM	PLES		-	TESTS	ter kes					STRAT	A			1	Depth	1	Install/
Depth	Typ No	Dep	th Type/ No.	Results	Wa Stril				0	Description				Legend	(Thickness)	Level	Backfill
0.00 - 0.2	25 B4 20 ES	4 5				MADE GR	ROUND:	Soft to firr	n dark gro	ey sandy Cl	LAY.				(0.20) 0.20	31.00	A
- 0.40 - 0.9	ю в	6				Firm yello	ff arev m	ottled ligh	.Ar it brown s	andv CLAY					(0.20) 0.40	30.80	22
- 0.50	в 80 ES	7														Ī	
-																ł	
- 1.00	Б.	2 1.0	5 5 5 7 (5)	N-13 (1,2/3,3,3,4)													
-															. (1.75)		
-																Ī	
- 1.80	B	3															
-		2.0	5 5 5 5 7 (5)	N=50 (3,5/10,13,17,10)		Verv stiff	lark grev	CLAY							2.15	29.05	
-							ant groy	02/11						<u> </u>	(0.30) 2.45	28.75	
-															2.10	20.10	
-																	
															-	-	
-																	
E																	
																ļ	
-															-	-	
																Į	
-																-	
E																	
-															-	F	
-																	
																l l	
-																	
-															-	-	
																İ	
-																-	
-																ł	
-															-	Ĺ	
-																	
-																+	
Ē																Ī	
-																-	
-															-	+	
																I	
-																-	
-																	
F															-	F	
-																-	
E																Ì	
-																ł	
F															-	ŧ	
[DRILLIN	G TECHN	IIQUE		 WATER	R OBSERVA	TIONS			H	OLE/CASI	ING DIAMETI	ER		BACKF	LL	
From	To	Te	chnique	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dla.	Depth	Casing Dia.	Depth	Тор	Base	Back	fill
1.20	1.20	Ins Dyna	mic Sample							87	2.45	120	1.00	0.00 0.20 0.45	0.20 0.45 2.45	Bento Grav	nite rel
Remarks																	
Terminate	d on ref	usal. No g	roundwater	encountered.													
																	
															Termir	nation De	epth:
																2.43	11



Arcadis Consulting (UK) Ltd.

^{oject} osmesto	n Pha	ase 2					^{№0.} 08386-02	Ground Level (mAO 29.78	D) Star 08	t Date /12/2017	1:5	• 0	
ent elsh Gov	verme	ent				Easting 3184	(OS mE) 13.26	Northing (OS mN) 169260.15	End 08/	Date /12/2017	Sh	eet 1 o	of 1
SAMPLE	S		TE	STS	ter (es			STRATA			Depth		Insta
Depth	Type/ No.	Depth	Type/ No.	Results	Wat Strik		Γ	Description		Legend	(Thickness)	Level	Back
0.00 - 0.20 0.05 - 0.15	B1 ES2					MADE GROUND: So	ft dark reddish b	rown slightly sandy C	CLAY.		(0.20)	20.58	[]]
.20 - 0.40 .25 - 0.35	B3 ES4					Reddish brown slight	y sandy CLAY.				(0.20) 0.40	29.38	12
												+	
												ŧ	
											-	F	
												I	
												+	
												ł	
												L	
												Ī	
												ł	
												+	
												ţ	
											-	ŀ	
												ļ	
												+	
												ŧ	
												Ĺ	
												ļ	
												ł	
												ł	
												ţ	
											-	ŀ	
												ļ	
												+	
												ł	
												Ĺ	
												Ī	
												ł	
												+	
												Ī	
											-	ŀ	
												ļ	
												+	
												ţ	
											_	L	
												ł	
												ł	
												ŧ	
												I	
											-	+	
												ł	
												+	
												ŧ	
											-	Ļ	
		ECHNIOL									BACKE		
om To		Techni	que	Date/Time	Strike At	Time Elapsed Rise To	Casing Sealed	Hole Dia. Depth	Casing Dia. Depth	Тор	Base	Back	cfill
00 0.0 00 0.4	0	Dynamic S Inspection	Sample on Pit							0.00	0.40	Bento	nite
arks ninated or	n refusa	l. No grou	ndwater e	ncountered.									
											Termi	nation De	epth:
												0.40	m
HCL Hou St Mellor Business	ise 15 5 Park	Unless of Depth (m	therwise s), Diamete	stated: er(mm).Time (hhm	m),	Equipment Used		Contractor	noulting (UK) Ltd	Log	Iged By	Checke	ed By
Cardiff CF3 0EY		Thicknes	s (m), Lev	vel (mÓD).		Competitor Dar		Arcadis Co	nəulung (UK) Ltd.		WD	5	эП

WS103

Project Cosme Client	estor	n Pha	ase 2					Proje UA East	ect No. 008386 ing (OS mi	5-02 ∋)	Ground L 28.72 Northing	evel (mAOI (OS mN)	D)	Start Date 08/12 End Date 08/12	/2017	Scal 1:5 Sb	e 0 0 0 1 1	of 1
weisii	GUV				-070		1		5599.70	,	10930	.04		00/12	2017			
Dant		5 Type/	Denth	Type/	Beaulta	Vater trikes					SIRAI	A			Logond	Depth (Thickness)	Level	Install/ Backfill
0.00 - 0	.20	No. B1	Deptil	No.	Results	> 0	MADE GF	ROUND: E	Dark redd	ish brown	sandv CL/	AY.			XXX			[]
_ 0.10 - 0 - 0.30 - 0	.20 .50	ES2 B3					Firm redd	ish hrown	sandy C							(0.27) 0.27	28.45	
- 0.35 - 0 -	.45	ES4					Timredd	ISTI DIOWI	Sandy O							(0.23) 0.50	- 28.22	[
-																	1	
-																	1	
_																	1	
-																	ł	
-																	Ť	
																	I	
-																	÷	
-																	1	
-																	ŧ	
_																		
-																	-	
-																	-	
															1		1	
L															1			
L -															1			
-																	+	
E																	İ	
_																	ł	
-																		
-																	+	
																	İ	
																	ļ	
-																		
-																	ł	
_																	Ī	
-																	ļ	
-																	+	
-																	1	
-																	ŧ	
_																	ļ	
-																	1	
-																	-	
_																	Ī	
L -															1			
-															1		†	
-															1		1	
-															1		+	
-															1			
-															1		1	
_															1		1	
-																	-	
	DRILI	ING T	ECHNIQI	IF		WATER		TIONS			Н	OLE/CASI	ING DIAMET	FR		BACKE		
From	To		Techn	ique	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dia.	Depth	Casing Dia.	Depth	Тор	Base	Back	fill
0.00 0.00	0.50		Inspecti Dynamic	on Pit Sample											0.00	0.50	Bento	nite
Remarks																		
Terminat	ed on	refusa	al. No grou	ndwater e	encountered													
																Termi	nation De	epth:
																	0.50	m
	HCL Hous	e	Unless o	therwise	stated:		Equipment L	lsed			Contrac	tor			Log	ged By	Checke	d By
AGS	oc Mellons Business Cardiff CF3 0EY	Park	Depth (m Thicknes), Diamet s (m), Le	ter(mm),Time (hhmn evel (mOD).	n),	Hand t	ools			Arc	adis Co	onsulting (L	JK) Ltd.	0	WB	s	ы

Project Cosm	esto	n Ph	ase 2					Proje UA	ct No.	6-02	Ground 34.21	Level (mAOI	0)	Start [08/1	Date 2/2017	Scal 1:5	e 0	
Client Welsh	Gov	/erm	ent					East	ng (OS m 3477.4	E) 7	Northing 16901	(OS mN) 17.95		End D 08/1	^{ate} 2/2017	Sh	eet 1	of 1
SA	MPLE	s		Т	ESTS	er es					STRA	TA				Dopth		Install
Dep	th	Type/ No.	Depth	Type/ No.	Results	Wat Strik				0	escription				Legend	(Thickness	Level	Backfil
0.00 - 0	0.20 0.20	B1 ES2					MADE GE		oft dark	reddish b	rown sandy	y CLAY (P	OSSIBLE R	EWORKED		(0.30)	ł	A
- 0.30 - 0	.90	B3					Stiff light	greyish gr	en sligh	ntly sandy	CLAY.					0.30	33.91	ИĽ
- 0.50 - 0 -	0.70	ES4													<u> </u>	-	ŧ	
-																(1.10)	ļ	
-		55	1.00	SPT(S)	N=20 (2,6/6,5,5,4)										<u> </u>	-	ŧ	
- 1.20 - 1 - 1.20 - 1	.40	D5 B7 D8		0.007(0)						_						1.40	32.81	
1.45		D6	1.45	SPI(S)	N>50 (7,50/0 for 0mm)		Veak ligh	t grey LIN <u>/'S WELL</u>	BAY ME	E [MBER]						- 1.45	32.76	
-																	Į	
-																	÷	
-																	ŧ	
-																	ţ	
-																	ŧ	
- 																	ł	
-																	‡	
-																	ŧ	
-																	ļ	
-																	ŧ	
-																	ł	
-																	ŧ	
-																	ł	
-																	+	
																	ŧ	
-																	ļ	
-																	ł	
-																	ļ	
-																	ļ	
-																	İ	
-																	1	
-																	ŧ	
-																	Ŧ	
-																	ł	
-																	İ	
-																	ţ	
-																	ŧ	
-																	ł	
-																	ŧ	
-																	ł	
-																	÷	
-																	ŧ	
-																	ţ	
-																	ł	
																-	<u> </u>	
	DRIL	LING 1	L FECHNIQ	UE	·	WATE	R OBSERVA	TIONS			Н	OLE/CASI	NG DIAME	TER	Ţ	BACKF	I ILL	1
From 0.00	To 1.2	0	Techr Inspect	nique tion Pit	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dia. 128	Depth 1.45	Casing Dia. 128	Depth 1.45	Top 0.00	Base 0.20	Back Conc	rete
1.20	1.4	5	Dynamic	Sample											0.20 0.50	0.50 1.45	Bento Grav	vel
Remarks Termina	ted on	refusa	al. No grou	undwater	encountered.			I		1		1	L		1	I		
							Fact 1					-4				Termi	nation De 1.45	epth: M
AGS	St Mellon Business Cardiff	s S Park	Unless of Depth (n	otherwise n), Diame	e stated: eter(mm),Time (hhmm evel (mOD)	ı),		etitor Da	rt		Contrac Are	cadis Co	nsulting (UK) Ltd.	Log	ygea By WB	Cnecke	ы ву SH

WS105

	eston	Phase 2						ect No.	6-02	Ground 32.45	Level (mAO	D)	Start D 08/1	ate 2/2017	Sca 1:5	0	
Velsh	Gove	rment					East	8410.6	6 6	16909	(05 mN) 90.18		08/1	ate 2/2017	Sh	eet 1	of 1
SAM	NPLES		T	ESTS	er es					STRA	ΓA				Denth		Instal
Dept	h Ty	pe/ Depth	Type/	Results	Wati Strik				[Description				Legend	(Thickness	Level	Backf
0.00 - 0.	.20 E	31	INO.			MADE G	ROUND: S	Soft dark	reddish b	rown sandy	/ CLAY (P	OSSIBLE RE	WORKED		(0.25)	-	(11
0.00 - 0.	.20 E .70 E	52 33				Firm light	<u>_)</u> greyish g	reen slig	htly sandy	CLAY with	low cobb	le content. C	obbles are	_ <u></u>	0.25	32.20	
0.40 - 0.	.60 E	S4				subangula	ar of limes	stone.							(0.45)	ŧ	())
						Weak ligh	t grey LIN	IESTON	E						0.70	31.75	//,
														_			
																ļ	
																ŧ	
																Ī	
																ļ	
																ŧ	
																ţ	
																ŧ	
																ł	
																Ļ	
																ļ	
																ţ	
																ţ	
																ŧ	
																ŧ	
																ļ	
																ŧ	
																ŧ	
																l	
																ł	
																ţ	
																ţ	
																ŧ	
																ł	
																ļ	
																ļ	
																ŧ	
																ŧ	
																Ť	
																ł	
																ţ	
																ţ	
																÷	
																ł	
																ļ	
																ļ	
																ļ	
																ŧ	
																ł	
																ţ	
																ļ	
																+	
					WATE		TIONS			н			FR		BACKE		
From	То	Tech	nique	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dia.	Depth	Casing Dia.	Depth	Тор	Base	Back	cfill
0.00 0.00	0.00 0.70	Dynami Inspec	c Sample tion Pit											0.00	0.70	Bento	onite
	-																
emarks	od or -	fund No	undurat	anountered													
erminat	ea on re	iusai. No gro	unawater e	encounterea.													
															Termi	nation De	epth:
																0.70	m
-	ICL House	m]	other: -	atatad:		Equipment	lsed			Control	ctor			1.07	ned By	Checks	ad By
• s	t Mellons	011655		statou.			·			Contract				LOG	J J		- - y



Arcadis Consulting (UK) Ltd.

Description 37834.44 1970/0.87 0007.2017 Beeld of 1<1	Project Cosme	ston	Pha	ise 2					Pro UA	ject No. \00838	6-02	Ground L 30.61	evel (mAO	D)	Start Da 08/12	ate 2/2017	Sca 1:5	^{le} 50	
SAME_DID TUDOR TUDOR Description Description <thdescription< th=""> Description Descripti</thdescription<>	^{Client} Welsh	Gove	erme	ent					Eas 31	ting (OS m 8344.44	E) 4	Northing 16910	(OS mN) 0.49		End Da 08/12	te 2/2017	Sh	eet 1	of 1
	SAM	IPLES			TE	ESTS	er es					STRAT	A				Denth		Install/
	Depth	ר T	ype/ No.	Depth	Type/ No.	Results	Wat Strik				C	escription				Legend	(Thickness) Level	Backfil
	0.00 - 0.	20 20	B1 ES2					MADE GR	ROUND:	Soft dark	reddish b	rown sandy	CLAY.				(0.20)	00.44	(77,
	0.30 - 0.4	40	B3					Firm light	greyish a	and green	slightly sa	andy CLAY.				<u> </u>	(0.20)	30.41	1/1
	- 0.30 - 0.4	40	234					Weak ligh	t grey LI	MESTONI L BAY ME	E. MBER]					Λ	0.40	30.21	
								u								-		1	
	_																	ŧ	
																		ł	
	_																	1	
																		1	
																		ŧ	
	_																	Ŧ	
																		1	
Image: Section of the section of th	-																	ţ	
Image: State State State Extension Contract Cont Contract Contract																		ŧ	
Image: Section of the sectio	-																	Ŧ	
DELLING TECHNOLE WATER OBSERVATIONS HOLE/CASING DUAMETER BACKFILL Texture Texture BACKFILL BACKFILL BACKFILL																		1	
DRULHO TCCHNUE WATER OBSERVATIONS HOLEGASING DUMETER BACKTU TOTAL HOLTCCHNUE Dealther Backture Hole Dia Dia Dia Dia Dia Dia Dia Dia Dia Dia																		ļ	
																		1	
PRILUNC TECHNIQUE WATE ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATE ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATE ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATE ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATE ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATE ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATE ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATE ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATER ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATER ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATER ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATER ODSERVATIONS HOLE/CASING DIAMETER RACKFILL TOTAL TECHNIQUE WATER ODSERVATIONS MATERIAL RACKFILL RACKFILL RACKFILL RACKFILL RACKFILL RACKFILL RACKFILL RACKFILL RACKFILL <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>İ</td> <td></td>																		İ	
DELLING TECHNOLE WATE OBSERVATIONS HOLECASING DIAMETER DELLING TECHNOLE WATE OBSERVATIONS HOLECASING DIAMETER Text Dia Description Based Heading sed Text Dia Description Based Heading Based Based Text Dia Description Based Heading Based <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td></td<>																		1	
DRLUND TECHNOLE WATER DESERVATIONS HOLE/CASING DIAMETER BACKFILL Trim Technole WATER DESERVATIONS HOLE/CASING DIAMETER BACKFILL Trim Technole WATER DESERVATIONS HOLE/CASING DIAMETER BACKFILL Trim Technole WATER DESERVATIONS HOLE/CASING DIAMETER BACKFILL Trim Technole WATER DESERVATIONS HOLE/CASING DIAMETER BACKFILL Trim Technole WATER DESERVATIONS HOLE/CASING DIAMETER BACKFILL Trim Technole WATER DESERVATIONS HOLE/CASING DIAMETER BACKFILL Trim Technole WATER DESERVATIONS HOLE/CASING DIAMETER BACKFILL Technole Technole Technole Backet BACKFILL Technole Technole Technole Backet BACKFILL Audio Arcadic Consulting (UK) Ltd. Uspecter Contracer Lager BY																		1	
Image: control of the control of th	-																	ţ	
minutes minutes Equipment Under Contractor Logger by minutes minutes Equipment Under Contractor Logger by Contractor gger by Contractor minutes Temporary Longer bit Equipment Under Contractor Logger by Contractor minutes Temporary Longer bit Contractor Logger by Contractor Logger by Contractor minutes Temporary Longer bit Contractor Logger by Contractor Logger by Contractor Logger by Contractor minutes Temporary Longer bit Longer by Contractor Logger by Contractor minutes Hand Loois Logae St St St																		ł	
Image: Second State Character and Second State	-																	Ŧ	
DRLLING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL DRLLING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL Transition Data Transition Data Backfill Backfill Backfill Immated on refusal. No groundwater encountered. Immated on refusal. No groundwater encountered. Immated on refusal. No groundwater encountered. Immated on refusal. No groundwater encountered. Tormated on refusal. No groundwater encountered. Equipment luted Contactor Logge B1 Contactor Tormation Data Tormation Data Equipment luted Contactor Logge B1 Contactor Tormation Data Tormation Data Equipment luted Contactor Logge B1 Contactor Tormation Data Tormation Data Equipment luted Contactor Logge B1 Contactor Tormation Data Tormation Data Hand tools Contactor Logge B1 Contactor																		1	
DRULING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL DRULING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL Total to the dring t	-																	÷	
Image: contraction provide stated: Evaluated Uted Contractor Logged By Contractor Logged By Contractor <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>ł</td> <td></td>																		ł	
Image: construction of the provide state: Equipment Used Contact Logget By Contact<	_																	l	
Image: state: Equipment Used Contactor Logget By Contac																		1	
DRULING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFUL Trime WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFUL Trime WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFUL Trime Trime Stife A Time Elapsed Base To Trime To Time Elapsed Time Elapsed Base To Data Time Trime Stife A Time Elapsed Base To Casing Stafe A Base To Trime Stife A Time Elapsed Base To Casing Depth Too Base To Trime Stife A Time Elapsed Rise To Casing Stafe A Base To Depth Dog 0.40 Base To Time Stafe A Time Elapsed Rise To Casing Stafe A Time Elapsed Rise To Casing Stafe A Time Classes Rise To Casing Stafe A Rise To Casing Stafe A Rise To Casing A No Casing A No Casing A Casing A Casing A Casing A Casing A Casing A Casing A <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td>																		1	
DRLLING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL TO TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL To Technique Date/Time Stitle AL Time Elapsed Rise To Casing Sealed Hole Date/Time BACKFILL Time and the provided of	-																	ţ	
Image: State All Time Experiment Uses Equipment Used Contractor Logget By Checked By Marking Users Market State All Equipment Used Contractor Logget By Checked By Market State All Equipment Used Contractor Logget By Checked By Market State All Equipment Used Contractor Logget By Checked By Market State All Hand tools Arcadis Consulting (UK) Ltd. WB SH																		-	
Image: Second	-																	÷	
Image: Second																		1	
Image: Second contractor Logged By Contractor Logged By Checker By Market consulting (UK) Ltd. WB	-																	ŧ	
Image: String the sector stated: Equipment Used Contractor Logged By Checked By The sector state stated: Equipment Used Contractor Logged By Checked By The sector state stated: Equipment Used Contractor Logged By Checked By The sector state stated: Equipment Used Contractor Logged By Checked By State state state stated: Equipment Used Contractor Logged By Checked By State state																		ł	
Image: Second	_																	l	
Image: Sector Private State: Equipment Used Contractor Logged By Checked By The Mark Stress Consulting (UK) Ltd. Wites otherwise stated: Equipment Used Contractor Logged By Checked By																		-	
Image: Strike All Time Elapsed Rise To Casing Sealed Hole Dia Depth Contractor Logged By Checked By Checked By Checked By Hand tools Arcadis Consulting (UK), Ltd. WB SH																		1	
Image: Strike At the provided on refusal. No groundwater encountered. Equipment Used Contractor Logged By Checked By Termination Depth: Depth (m), Diameter(mm), Time (hhmm), Equipment Used Contractor Logged By Checked By Marke Streams WHES otherwise stated: Equipment Used Contractor Logged By Checked By Marke Streams Unless otherwise stated: Equipment Used Contractor Logged By Checked By Marke Streams Marke Streams Marke Streams Marke Streams Marke Streams Streams	-																	Ť	
DRILLING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL Trom To Technique Date/Time Strike At Time Elapsed Rise To Casing Depth Casing Dia Depth Top Base Backfill 0.00 0.00 Dynamic Sample Image: Strike At Time Elapsed Rise To Casing Depth Casing Dia Depth Top Base Backfill marks marks minated on refusal. No groundwater encountered. Image: Strike At Equipment Used Contractor Logged By Checked By Pote from this bases from Jaces (mp.) Depth (m), Diameter(mm), Time (hhmm), Time (hhmm), Time (hhmm), Time (ha																		ł	
Image: Strike At Strike A	-																	÷	
Image: Strike All Strike																		1	
DRILLING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL rom To Technique Date/Time Strike At Time Elapsed Rise To Casing Sealed Hole Dia. Depth Top Base Backfill 0.00 0.40 Inspection Pit Date/Time Strike At Time Elapsed Rise To Casing Sealed Hole Dia. Depth Top Base Backfill omarks immarks immarks immarks Immarks Termination Depth: 0.00 0.40 Bentonite 0.40 Bentonite Millores Millores Strike At Equipment Used Contractor Logged By Checked By Millores Barks Depth (m), Diameter/mm), Time (hhm	-																	‡	
Image: Depth (m), Diameter(mm), Time (hhmm), Equipment Used Contractor Logged By Checked By Model Material Consulting (UK) Ltd. WB SH																		ł	
DRILLING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL From To Technique Date/Time Strike At Time Elapsed Rise To Casing Sealed Hole Dia. Depth Top Base BackKfill 0.00 0.40 Inspection Pit Date/Time Strike At Time Elapsed Rise To Casing Sealed Hole Dia. Depth Casing Dia. Depth 0.00 0.40 Bentonite 0.00 0.00 Dynamic Sample Indication Pit Indication Pit 0.00 0.40 Bentonite Image: Strike At Time Elapsed Rise To Casing Sealed Hole Dia. Depth Casing Dia. 0.00 0.40 Bentonite Image: Strike At Time Elapsed Rise To Casing Sealed Hole Dia. Depth 0.00 0.40 Bentonite Image: Strike At Time Elapsed Rise To Casing Dia. Integration Depth Contractor Contractor Contractor 0.40 Madeedeedeedeedeedeedeedeedeedeedeedeedee	_																	1	
DritLLING FECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL From To Technique Date/Time Strike At Time Elapsed Rise To Casing Sealed Hole Dia. Depth Casing Dia. Depth Top Base Backfill 0.00 0.40 Inspection Pit Do Do Depth Date/Time Strike At Time Elapsed Rise To Casing Sealed Hole Dia. Depth Casing Dia. Depth 0.00 0.40 Bentonite							10/0		TIONO									1	
0.00 0.40 Inspection Pit 0.00 0.40 Bentonite umarks mmarks Image: Contractor Pit State 0.00 0.40 Bentonite Imarks Image: Contractor Pit State	From	URILLI To	ING T	ECHNIQL Techn	ique	Date/Time	VVATE Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dia.	ULE/CAS	Casing Dia.	Depth	Тор	Base Base	ILL Back	cfill
marks rminated on refusal. No groundwater encountered. Termination Depth: 0.40m HcL House St Melons Business Park Depth (m), Diameter(mm), Time (hhmm), Hand tools Equipment Used Hand tools Arcadis Consulting (UK) Ltd. WB SH	0.00	0.40		Inspecti Dynamic	on Pit Sample											0.00	0.40	Bento	onite
Imarks Imarks		0.00		_ ,															
Termination Depth: HCL House St Mellons Business Park Contractor Unless otherwise stated: Equipment Used Contractor Logged By Checked By HCL House St Mellons Business Park Contractor Depth (m), Diameter(mm), Time (hhmm), Lower (moD) Hand tools Arcadis Consulting (UK) Ltd. WB SH	Remarks	od or	ofuc	No	ndurat	noountcrad													
HCL House St Melions Business Park Depth (m), Diameter(mm), Time (hhmm), Tickreess (m), Level (mOD) Equipment Used Contractor Logged By Checked By Hand tools Arcadis Consulting (UK) Ltd. WB SH	rerminate	ea on r	eiusa	. No grou	nawater e	encounterea.													
HCL House St Melone Business Park Business Park																	Term	ination De	epth:
HCL House St Mellons Unless otherwise stated: Equipment Used Contractor Logged By Checked By Business Park Cardiff, Thickness (m), Loval (mOD) Loval (mm), Time (hhmm), Hand tools Hand tools Arcadis Consulting (UK) Ltd. WB SH																		0.40	m
St Melions Bit Melions Cardiff The Thickness (m) Level (mm), Time (hhmm), Hand tools Arcadis Consulting (UK) Ltd. WB SH		CL House		Unless o	therwise	stated:		Equipment l	Jsed			Contrac	tor			Lon	ged By	Checke	ed By
	AGS	t Mellons usiness Pa ardiff	ark	Depth (m), Diamet	ter(mm),Time (hhmr	n),	Hand	ools			Arc	adis Co	onsulting (UK) Ltd.		WB	5	SH

Project Cosme Client	ston P	hase 2					Projec UA(Eastir	ct No. 008386 ng (OS mi	5-02 ^{≣)}	Ground L 26.05 Northing	Level (mAO (OS mN)	D)	Start D 07/12 End Da	ate 2/2017 ate 2/2017	Scal 1:5	e 50	of 1
weisn	Gover	nent						235.17		16905	92.69		07/1	2/2017	<u></u>		
SAM	IPLES	e/ Depth	TE Type/	Besults	Vater trikes					STRAT	ΓA			Legend	Depth (Thickness	Level	Install/ Backfill
0.00 - 0.1	No 10 B1		No.	rtoouno	- 00	MADE GRO	JUND: D	ark brow	nish grey	/ gravelly S	AND. Gra	vel is subang	ular fine to	Logona	0.10	25.95	(1/
0.00 - 0.1 -	10 ES	2				\coarse of n Brown suba	nixed litho angular to	ologies. o subrou	nded fine	to coarse (GRAVEL	of mixed lithol	ogies.		(0.55)	ļ	
-							0						0		(0.55)	ŧ	
-															0.65	25.40	
-																Ļ	
-																ţ	
-																ŧ	
-																Ī	
																ļ	
-																ţ	
																ŧ	
-																Ŧ	
																ļ	
																+	
																ŧ	
-																ļ	
																ļ	
-																ţ	
-																+	
																ł	
-																ŧ	
-																ļ	
-																ŧ	
																I	
-																ļ	
-																ļ	
-																ŧ	
																Ŧ	
-																ţ	
-																ŧ	
-																ŧ	
-																Ŧ	
-																ļ	
-																ŧ	
																ł	
-																Ļ	
																ļ	
																ļ	
-																Ī	
-																ļ	
-																ŧ	
-																ŧ	
-																ŧ	
-																ł	
-																Ļ	
г					WATER		IONS			н	OLE/CAS		ER	1	BACKE	 LL	
From	То	Techr	nique	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dia.	Depth	Casing Dia.	Depth	Тор	Base	Back	cfill
0.00 0.10	0.10 0.65	Inspect Dynamic	ion Pit Sample											0.00	0.65	Bento	nite
remarks Terminate	ed on refu	ısal. No grou	undwater e	ncountered.													
		5															
															Termi	nation De	epth:
																0.65	m
	CL House Mellons	Unless o	therwise	stated:	a)	Equipment Us	ed			Contrac	tor			Log	ged By	Checke	ed By
AGS S	ardiff F3 0EY	Thicknes	ss (m), Le	vel (mOD).	<i>)</i> ,	Hand to	ols			Arc	cadis Co	nsulting (U	JK) Ltd.		WB	5	SH

WS108

Project Cosmes	ton Ph	ase 2						Proje UA	ect No. 008380	6-02	Ground L 29.28	evel (mAOI	D)	Start Da 07/12	^{ite} 2/2017	Scal 1:5	0	
Client Welsh G	ioverm	ent						East 318	ing (OS ml 3279.59	E) 9	Northing 16907	(OS mN) 1 9.52		End Dat 07/12	e 2/2017	Sh	eet 1 d	of 1
SAMF	LES		Т	ESTS		<u>د</u> م					STRAT	A						
Denth	Type/	Donth	Type/		sulto	Vate				-	e . re (r	-			Logend	Depth (Thickness)	Level	Install/ Backfill
	No.	Depin	No.		esuits	> v)ork grou	hrown ar		D. Craval	io oubongula	r fina ta		. ,		m=m
0.10 - 0.30	ES2						coarse of	mixed lith	ologies.	biowirgi	avelly SAM	D. Glavel	is subaliguia			(0.30)	1	≝≣≝
- 0.30 - 0.50	B3	0.50	DID				MADE GF	ROUND: F	irm dark	reddish b	rown slightl	ly sandy C	CLAY.			0.30	28.98	
- 0.50	В4	0.50	PID	<1ppm			MADE GF	ROUND: L	ANDFILL	WASTE	constituting	g of plastic	bags, plasti	c fragments		0.50	- 28.78	<u></u>
E							anu yiass	iraginent	5.							0.80	28.48	
_																	ŧ	
_																	ł.	
-																	-	
-																		
-																	1	
-																	+	
-																	1	
-																	ŧ	
-																	ł	
E																	L	
-																	ł	
-																	ł	
-																	ŧ	
-																	1	
-																-	+	
-																	ŧ	
-																	ł	
-																	Ī	
E																	I	
_																	† I	
-																	ł	
-																	+	
-																	+	
-																	ļ	
-																	†	
-																	ŧ	
-																	ŧ	
E																	ł	
_																		
-																	ł	
-																	1	
-																	+	
-																	1	
-																	+	
-																	+	
-																	ł	
_																	Ī	
[I	
-																-	÷	
-																	ļ	
-																	1	
-																		
-																	1	
	_														-		—	
D		FECHNIQ	ÚE .			WATEF	ROBSERVA	TIONS			НС	OLE/CASI	NG DIAMET	ER	· · · ·	BACKF	ILL	
From 0.00	To 0.80	Techn Inspect	ique ion Pit	Dat	e/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole DIa.	Depth	Casing Dia.	Depth	Top 0.00	Base 0.80	Back Arisin	fill gs
0.00	0.00	Dynamic	Sample															
Remarks					[
Terminated	on refusa	al. No grou	undwater	encountere	ed.													
																Termi	nation De	pth:
																	0.80	n
	House ellons	Unless o	therwise	e stated:	imo (hhmm	\	Equipment U	lsed			Contract	tor			Logg	ged By	Checke	d By
AGS Card	ness Park liff 0EY	Thicknes	ss (m), L	evel (mOD	nne (nnmm).	,	Hand t	ools			Arc	adis Co	nsulting (L	JK) Ltd.		WB	S	бH

Project Cosme	eston F	Phase 2					Proje	ct No. 008380	6-02	Ground 30.94	Level (mAO	D)	Start Da 07/12	te 2/2017	Scale 1:5	0	
Welsh	Gover	ment					318	291.09	E) 9	16903	(OS mN) 36.48		07/12	2017	She	eet 1 o	of 1
SA	MPLES		Т	ESTS	er es					STRA	TA				Denth		Install/
Dept	h Tyj	Depth	Type/	Results	Wat				C	escription				Legend	(Thickness)	Level	Backfill
0.10 - 0	.20 B	1	110.			MADE GF	ROUND: D	ark redd	ish browr	n slightly cla	ayey SANI	D.			(0.25)		A. 6.4
- 0.30 - 0	.50 B	3				Dark brow	nish red s	lightly sa	andy CLA	Y.					0.25	30.69	
- 0.30 - 0	.50 EC	0.60	PID	<1ppm		MADE GF	ROUND: LA	ANDFILL	WASTE	constitutin	g of plastic	c bags, plast	tic fragments		0.50	30.44	
- 0.80 - 1	.00 D	5				and glass	fragments								(0.70)	+	
															-	F	
-															1.20	29.74	ùН.
-															-	+	
																I	
-															-	-	
F																ł	
Ē																	
-																+	
-																Ĺ	
-																-	
-																+	
Ē																Ì	
-																	
-															-	+	
																Į	
-															-		
-																+	
-															-	ŀ	
-																	
-															-	-	
																İ	
-															-	-	
-																	
																Ļ	
-																	
-																	
_															-		
-																-	
-															-	-	
																I	
-															-	-	
-																ł	
															-	Ì	
-																	
-															-	+	
Ē																I	
-																-	
-																ł	
-															_	Ĺ	
<u> </u>																	
From		G I ECHNIQ Techi	UE nique	Date/Time	WATE Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dia.	Depth	Casing Dia.	Depth	Тор	Base	LL Back	fill
0.00	1.20	Inspec	tion Pit					-						0.00 0.20	0.20 0.50	Concr Bento	rete nite
														0.50	1.20	Grav	el
Remarks	ed on ref	usal No gro	undwater	encountered		_	_						_			_	
remind		usai. 110 yi0i	anawalei	GROUINCICU.													
															Termir	nation De	epth:
																1.20	m
	HCL House	Unless of	otherwise	stated:		Equipment U	Ised			Contrac	ctor			Log	ged By	Checke	d By

WS110

Project Cosme	eston l	Phase 2				Pro U	oject No. A008386	6-02	Ground L 31.60	evel (mAO	D)	Start Dat 07/12	e /2017	Scale 1:5	0	
Client Welsh	Gove	rment				Ea 3'	sting (OS mE 18337.70	E))	Northing 16904	(OS mN) 1.98		End Date 07/12	, 2017	Sh	et 1	of 1
SA	MPLES		Т	ESTS	er es				STRAT	A				Denth		Instal
Dept	h Ty N	pe/ Depth	Type/ No.	Results	Wat Strik			D	escription				Legend	(Thickness)	Level	Backfi
0.10 0.10	B	11 52				MADE GROUND: coarse of mixed li	Dark grey thologies.	brown gr	avelly SAN	D. Gravel	is subangular	fine to		(0.50)		
0.50 - 0 0.50 - 0	.70 E .70 E	3 54 0.70	PID	<1ppm		Light grey sandy s MADE GROUND: and glass fragment	subangular LANDFILL nts.	fine to co WASTE	arse GRA\ constitutino	/EL of mix g of plastic	ed lithologies. bags, plastic	fragments		0.50 (0.20) 0.70	- 31.10 30.90	
-						5 5								-		
_														(2.30)		
-																
-														3.00 -	- 28.60	
_														-		
-														-		
-														-		
														-		
-														-		
_														-		
-														-		
-														-	_	
From		IG TECHNIQ Techr	UE	Date/Time	WATE Strike At	R OBSERVATIONS	Casing	Sealed	Hole Dia	OLE/CAS		R	Top	BACKF	LL Bad	cfill
0.00 1.20	1.20 3.00	Inspect	tion Pit Sample				8		87	3.00	128	1.00	0.00 0.20 0.50 1.00	0.20 0.50 1.00 3.00	Conc Arisi Bento Grav	rete ngs onite vel
emarks erminat	ed on Er	ngineer's instr	uction. N	o groundwater encou	untered.		I				1	I				
														Termir	ation De	epth: m
	HCL House St Mellons Business Park Cardiff	Unless of Depth (n	otherwise n), Diame	e stated: eter(mm),Time (hhm	ım),	Equipment Used Hand tools			Contrac Arc	tor adis Co	nsulting (U	K) Ltd.	Log	ged By	Checke	ed By SH



Arcadis Consulting (UK) Ltd.

ARCADIS Dynamic Sample Log Start Date 07/12/2017 Scale 1:50 Project Cosmeston Phase 2 Project No Ground Level (mAOD) UA008386-02 33.71 Northing (OS mN) Easting (OS mE 318358.83 Welsh Goverment 168952.44 07/12/2017 Sheet 1 of 1 SAMPLES TESTS STRATA Water Strikes Install/ Depth (Thickness Level Type No. Type/ No. Backfill Depth Results Depth Description Leaena 0.10 - 0.20 0.10 - 0.20 B1 ES2 MADE GROUND: Dark reddish brown slightly clayey SAND. ې ا (0.20) 0.20 33.51 Stiff light greenish grey slightly sandy CLAY. ES4 B3 0.30 - 0.40 0.30 - 0.60 (0.45) 0.65 33.06 MADE GROUND: LANDFILL WASTE constituting of plastic bags, plastic fragments and glass fragments. (0.65) 1.10 EW 1.30 PID <1ppm 1.30 32.41 DRILLING TECHNIQUE WATER OBSERVATIONS HOLE/CASING DIAMETER BACKFILL From То Technique Date/Time Strike At Time Elapsed Rise To Casing Sealed Hole DIa. Depth Casing Dia Depth Тор Base Backfill 0.20 0.50 0.75 1.30 0.00 0.20 0.50 0.75 Inspection Pit Dynamic Sample 1.30 1.30 128 . 1.30 128 Concrete Arisings Bentonite Gravel 0.00 1.20 1.30 Remarks Terminated on refusal. No groundwater encountered. Termination Depth:

Contractor

1.30m

Cosmo	estor	ו Ph	ase 2					UA	00838	6-02	21.93	evei (maoi)	08/12	, 2017	1:5	0	
^{Client} Welsh Goverment								Easti 318	Easting (OS mE) Northing (OS mN) End 318299.72 169255.40 08/		End Date 08/12	^{id Date} B/12/2017		Sheet 1 of 1				
SAMPLES TESTS 🖕 g								STRATA										
Dept	ih -	Type/	Depth	Type/	Results	Wate				C	Description				Legend	Depth (Thickness)	Level	Install/ Backfill
0.00 - 0	.20	B1		INU.			Dark brow	nish blacl	k pseudo	o-fibrous F	PEAT.				sile sile	(0.25)		∭≣Ш
_ 0.00 - 0 - 0.30 - 0	.20	ES2 B3					Light grey	ish green	slightly o	clayey gra	velly SAND) with med	ium cobble c	ontent.	la silla s	0.25	21.68	
- 0.30 - 0	.50	ES4					Gravel is	subangula	ar fine to	coarse of	limestone.	Cobbles a	are subangula	ar of		(0.70)	ŧ	≣≞≣
-							linestone									(0.70)	Ī	≣≣≞
-							Dark brow	n and hla		STONE						9:85 -	20.98	
-								''S WELL	BAY ME	MBER]					4		20.93	
-																	ţ	
-																	Ī	
-																	ļ	
-																-	ŧ	
-																	1	
-																	ŧ	
_																	l	
-																-	Ļ	
-																	ł	
-																	ŧ	
-																	Ī	
-																	ļ	
-																-	÷	
-																	ŧ	
-																	ł	
-																	ļ	
-																-	Ļ	
-																	ţ	
-																	İ	
-																	Ī	
-																	ļ	
-																-	ŧ	
-																	ţ	
-																	ŧ	
-																	I	
-																-	Ļ	
-																	+	
-																	1	
-																	Ī	
-																	I	
_																-	ŧ	
-																	ł	
-																	ŧ	
-																	I	
-																-	Ļ	
-																	ţ	
-																	ţ	
-																	ţ	
-																	I	
_																-	-	
	DRILL	ING 1		IE		WATEF	R OBSERVA	TIONS			H	OLE/CASI	NG DIAMET	ER	<u> </u>	BACKF		I
From	To		Techni	que	Date/Time	Strike At	Time Elapsed	Rise To	Casing	Sealed	Hole Dia.	Depth	Casing Dia.	Depth	Top	Base	Back	cfill
0.00	1.00		inspectio	ui Pit											0.00	1.00	Arisir	igs
Der:- '																		
Terminated on refusal. No groundwater encountered.																		
			5 -															
																Termi	nation De	epth:
																	1.00	m
	HCL House St Mellons)	Unless of	herwise	stated:		Equipment U	sed			Contrac	tor			Log	ged By	Checke	ed By



ARCADIS Dynamic Sampling Photography

Project	Exploratory Hole ID				
Cosmeston Farm					
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	0000
UA008386	05/09/16	22.893	318216.878	169176.468	



ARCADIS Dynamic Sampling Photography

Project	Exploratory Hole ID				
Cosmeston Farm	M602				
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	VV303
UA008386	05/09/16	26.149	318133.314	168990.041	



ARCADIS Dynamic Sampling Photography

Project	Exploratory Hole ID				
Cosmeston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	VV 304
UA008386	05/09/16	18.549	317974.718	168855.458	


ARCADIS Dynamic Sampling Photography

Project	Exploratory Hole ID				
Cosmeston Farm	MODE				
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	VV305
UA008386	05/09/16	318046.903	169064.566	16.338	



ARCADIS Dynamic Sampling Photography

Project					Exploratory Hole ID
Cosmeston Farm	14/0.00				
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	- WS06
UA008386	05/09/16	14.036	317965.759	168990.835	



ARCADIS Dynamic Sampling Photography

Project					Exploratory Hole ID
Cosmeston Farm					
					WS07
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1007
UA008386	05/09/16	16.767	317881.799	168832.609	





Project					Exploratory Hole ID
Cosmeston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1702
UA008386	08/09/16	19.079	318164.82	169230.889	







Project					Exploratory Hole ID	
Cosmeston Farm					TDOO	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)		
UA008386	08/09/16	19.079	318164.82	169230.889		





Project					Exploratory Hole ID
Cosmeston Farm	TD02				
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IFUZ
UA008386	08/09/16	19.079	318164.82	169230.889	





Project					Exploratory Hole ID	
Cosmeston Farm						
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	I IPUZ	
UA008386	08/09/16	19.079	318164.82	169230.889		





Project					Exploratory Hole ID	
Cosmeston F	arm					
Job No	Job No Date Ground Level (mAOD) Easting (OS) Northing (OS)					
UA008386	08/09/16	20.514	318154.371	169170.188		





Project					Exploratory Hole ID
Cosmeston Farm	TDAA				
^{јов No} UA008386	Date 08/09/16	Ground Level (mAOD) 20.514	Easting (OS) 318154.371	Northing (OS) 169170.188	1P03





Project					Exploratory Hole ID	
Cosmeston Farm						
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1 1 1 9 0 3	
UA008386	08/09/16	20.514	318154.371	169170.188		





Project Cosmeston Farm	Exploratory Hole ID				
_{Јов No}	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP03
UA008386	08/09/16	20.514	318154.371	169170.188	





Project					Exploratory Hole ID
Cosmeston Farm					TDOA
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP04
UA008386	08/09/16	23.89	318218.107	169149.796	





Project					Exploratory Hole ID	
Cosmeston Farm						
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP04	
UA008386	08/09/16	23.89	318218.107	169149.796		



(Face D)						
Client Welsh Government	Checker IP	Approver JV				



Project	Exploratory Hole ID				
Cosmeston Farm	TDOA				
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1904
UA008386	08/09/16	23.89	318218.107	169149.796	





Project	Exploratory Hole ID				
Cosmeston Farm	TDA				
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1204
UA008386	08/09/16	23.89	318218.107	169149.796	
			1		1





Project					Exploratory Hole ID		
Cosmeston Farm							
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1 1 1 2 3		
UA008386	08/09/16	24.68	318148.505	169040.964			





Project F							
Cosmeston Farm							
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1 1 1 9 0 5		
UA008386	08/09/16	24.68	318148.505	169040.964			





Project Cosmeston Farm			Exploratory Hole ID		
Job No UA008386	Date 08/09/16	Ground Level (mAOD) 24.68	Easting (OS) 318148.505	Northing (OS) 169040.964	TP05
0,1000000			010110.000	105040.504	





Project Cosmeston Farm					
Job No UA008386	Date 08/09/16	Ground Level (mAOD) 24.68	Easting (OS) 318148.505	Northing (OS) 169040.964	TP05





Project Cosmeston Farm	smeston Farm						
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP05		
UA008386	08/09/16	24.68	318148.505	169040.964			





Project					Exploratory Hole ID		
Cosmeston Farm							
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1906		
UA008386	08/09/16	26.754	318120.814	168957.698			





Project						
Cosmesto Farm						
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IFUO	
UA008386	08/09/16	26.754	318120.814	168957.698		





Cosmeston Farm	smeston Farm				
	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1700
UA000300	08/09/16	26.754	318120.814	168957.698	





Project					Exploratory Hole ID	
osmeston Farm						
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IFUO	
UA008386	08/09/16	26.754	318120.814	168957.698		





Project					Exploratory Hole ID	
Cosmeston Farm						
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1906	
UA008386	08/09/16	26.754	318120.814	168957.698		





Project					Exploratory Hole ID	
Cosmeston Farm	TD07					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1907	
UA008386	08/09/16	17.776	318082.723	169130.107		





Exploratory Hole ID
TD07
ng (OS) IPU/
30.07





Project					Exploratory Hole ID	
Cosmeston Farm	TD07					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)		
UA008386	08/09/16	17.776	318082.723	169130.107		





Project					Exploratory Hole ID	
Cosmeston Farm	TDAO					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)		
UA008386	08/09/16	13.981	318000.873	169130.659		





Project					Exploratory Hole ID	
Cosmeston Farm	neston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)		
UA008386	08/09/16	13.981	318000.873	169130.659		





Cosmeston Farm					
	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP08
UA008386	08/09/16	13.981	318000.873	169130.659	





Project Cosmeston Farm					Exploratory Hole ID
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP08
UA008386	08/09/16	13.981	318000.873	169130.659	





Project					Exploratory Hole ID	
Cosmeston Farm					TDOO	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1 1 1 9 9	
UA008386	06/09/16	14.522	317993.688	169072.995		





Cosmeston Farm					
	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP09
UA008386	06/09/16	14.522	317993.688	169072.995	





Project					Exploratory Hole ID		
Cosmeston Farm	smeston Farm						
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1209		
UA008386	06/09/16	14.522	317993.688	169072.995			





Project					Exploratory Hole ID
					TD10
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	
UA008386	06/09/16	15.238	318002.874	168997.867	




Project					Exploratory Hole ID
Cosmeston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP10
UA008386	06/09/16	15.238	318002.874	168997.867	





Project					Exploratory Hole ID
Cosmeston Farm			TD10		
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	
UA008386	06/09/16	15.238	318002.874	168997.867	





Project Cosmeston Farm					Exploratory Hole ID
	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP10
04000300	00/09/10	15.250	516002.874	100997.007	





Project					Exploratory Hole ID	
Cosmeston Farn	on Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	- IP10	
UA008386	06/09/16	15.238	318002.874	168997.867		





Project					Exploratory Hole ID	
Cosmeston Farm	TD44					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1811	
UA008386	06/09/16	19.096	318030.07	168947.07		





Project					Exploratory Hole ID
Cosmeston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP11
UA008386	06/09/16	19.096	318030.07	168947.07	





Project					Exploratory Hole ID
Cosmeston Farm	TD44				
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1211
UA008386	06/09/16	19.096	318030.07	168947.07	





Project					Exploratory Hole ID
Cosmeston	TD44				
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1211
UA008386	06/09/16	19.096	318030.07	168947.07	





Project					Exploratory Hole ID	
Cosmeston Farm	ston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)		
UA008386	06/09/16	15.425	317974.282	168964.178		





Project					Exploratory Hole ID
Cosmeston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP12
UA008386	06/09/16	15.425	317974.282	168964.178	





Project					Exploratory Hole ID
Cosmesto Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP12
UA008386	06/09/16	15.425	317974.282	168964.178	





Project					Exploratory Hole ID
Cosmeston Farm	TD40				
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1212
UA008386	06/09/16	15.425	317974.282	168964.178	
		1		1	1





Project					Exploratory Hole ID	
Cosmeston Farm						
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1 IP12	
UA008386	06/09/16	15.425	317974.282	168964.178		
					1	





Project					Exploratory Hole ID
Cosmeston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP13
UA008386	07/09/16	17.509	317981.972	168922.5	





Project					Exploratory Hole ID	
Cosmeston Farm						
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP13	
UA008386	07/09/16	17.509	317981.972	168922.5		



(Face D)

Client	Checker	Approver
Welsh Government	IP	JV



Project Cosmeston Farm					
_{Јов No UA008386}	Date 07/09/16	Ground Level (mAOD) 17.509	Easting (OS) 317981.972	Northing (OS) 168922.5	TP13





Project Cosmeston Farm					Exploratory Hole ID
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP13
UA008386	07/09/16	17.509	317981.972	168922.5	





Project					Exploratory Hole ID
Cosmeston Farm					TD44
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1214
UA008386	07/09/16	18.549	317974.718	168855.458	





Project					Exploratory Hole ID	
Cosmeston Farm					TD44	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP14	
UA008386	07/09/16	18.549	317974.718	168855.458		



(Face D)

Client	Checker	Approver
Welsh Government	IP	JV



Project					Exploratory Hole ID
Cosmeston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP14
UA008386	07/09/16	18.549	317974.718	168855.458	
		1		1	





Project					Exploratory Hole ID
Cosmeston					
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP14
UA008386	07/09/16	18.549	317974.718	168855.458	





Project Cosmeston Farm					Exploratory Hole ID
_{Јов} No UA008386	Date 07/09/16	Ground Level (mAOD) 20.081	Easting (OS) 318020.777	Northing (OS) 168873.457	TP15





Project					Exploratory Hole ID	
Cosmeston Farm					TD46	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1215	
UA008386	07/09/16	20.081	318020.777	168873.457		





Project					Exploratory Hole ID
Cosmeston					TD46
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1715
UA008386	07/09/16	20.081	318020.777	168873.457	





Project	Exploratory Hole ID					
Cosmeston Farm	TD4C					
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	- IP15	
UA008386	07/09/16	20.081	318020.777	168873.457		





Project					Exploratory Hole ID
Cosmeston Farm					TD 40
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP16
UA008386	07/09/16	17.35	317924.545	168824.196	





Cosmeston Farm						
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP16	
UA008386	07/09/16	17.35	317924.545	168824.196		





Project					Exploratory Hole ID
Cosmeston Farm					TD40
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1P16
UA008386	07/09/16	17.35	317924.545	168824.196	





	Project					Exploratory Hole ID	
	Cosmeston Farm					TD46	
ŀ	Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)		
	UA008386	07/09/16	17.35	317924.545	168824.196		





Project					Exploratory Hole ID	
Cosmeston Farm					TD47	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1817	
UA008386	07/09/16	18.798	317895.013	168779.367		





evel (mAOD) Easting (OS) Northing (OS)	- TP17
317895.013 168779.367	
	evel (mAOD) Easting (OS) Northing (OS) 317895.013 168779.367





Project					Exploratory Hole ID	
Cosmeston Farm					TD 4 7	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1217	
UA008386	07/09/16	18.798	317895.013	168779.367		





Project					Exploratory Hole ID
Cosmeston					TD47
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1P1/
UA008386	07/09/16	18.798	317895.013	168779.367	





Project					Exploratory Hole ID	
Cosmeston Farm					TD40	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1710	
UA008386	06/09/16	15.471	317869.45	168873.667		





Project					Exploratory Hole ID	
Cosmeston Farm	TD40					
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1918	
UA008386	07/09/16	15.471	317869.45	168873.667		





Project	ct					
Cosmeston Farm	TD40					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	IP18	
UA008386	07/09/16	15.471	317869.45	168873.667		




Project					Exploratory Hole ID	
Cosmeston Farm					TD40	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1710	
UA008386	07/09/16	15.471	317869.45	168873.667		





Project					Exploratory Hole ID
Cosmeston Farm					TD40
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1719
UA008386	07/09/16	14.54	317814.163	168898.895	





Project					Exploratory Hole ID	
Cosmeston Farm					TD40	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1919	
UA008386	07/09/16	14.54	317814.163	168898.895		





Project					Exploratory Hole ID
Cosmeston Farm	TD10				
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	
UA008386	07/09/16	14.54	317814.163	168898.895	





Project					Exploratory Hole ID	
Cosmeston Farm					TD40	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1719	
UA008386	07/09/16	14.54	317814.163	168898.895		





Project					Exploratory Hole ID	
Cosmeston Farm					троо	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1820	
UA008386	07/09/16	16.35	317826.921	168843.354		





Project					Exploratory Hole ID
Cosmeston Farm					
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	TP20
UA008386	07/09/16	16.35	317826.921	168843.354	





Project					Exploratory Hole ID	
Cosmeston Farm					TDOO	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1820	
UA008386	07/09/16	16.35	317826.921	168843.354		





Project					Exploratory Hole ID	
Cosmeston Farm					троо	
Job NO	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)	1720	
UA008386	07/09/16	16.35	317826.921	168843.354		





Project					Exploratory Hole ID	
Cosmeston Farm					TD24	
Job No	Date	Ground Level (mAOD)	Easting (OS)	Northing (OS)		
UA008386	07/09/16	13.884	317839.664	168916.938		





Cosmeston Farm	TD24
Job No Date Ground Level (mAOD) Easting (OS) Northing (OS)	IP21
UA008386 07/09/16 13.884 317839.664 168916.938	3





Cosmeston Farm	TD24
Job No Date Ground Level (mAOD) Easting (OS) Northing (OS)	IP21
UA008386 07/09/16 13.884 317839.664 168916.938	3





Project Job No Ground Level (mAOD) Start Date Hole ID 10011193 Cosmeston 26.29 Northing (OS mN) 169429.19 13/12/17 **TP101** Easting (OS mE) **318569.28** End Date 13/12/17 Client Welsh Government TP101 – Longwall Face B Contractor Checked By

Arcadis Cymru House St Mellons Business Park Fortran Road Cardiff CF3 0EY

Equipment Used 13 Tonne Tracked Arcadis Consulting (UK) Ltd Excavator

Logged By WB

CPr



Project Job No Ground Level (mAOD) Start Date Hole ID 10011193 Cosmeston 28.56 Northing (OS mN) 169393.23 13/12/17 **TP102** Easting (OS mE) 318490.15 End Date 13/12/17 Client Welsh Government TP102 – Longwall Face B Arcadis Cymru House St Mellons Business Park Fortran Road Cardiff CF3 0EY Equipment Used Unless otherwise stated: Contractor Logged By Checked By



CPr



Project

Client

Cosmeston

Job No Ground Level (mAOD) 10011193

Start Date

13/12/17

Hole ID **TP103**





ARCADIS Trial Pit Photography Sheet

Project Cosmeston Client Welsh Government Job No 10011193 Easting (OS mE) **318577.70** Ground Level (mAOD) 28.09 Northing (OS mN) 169340.61

Start Date 13/12/17 End Date 13/12/17

Hole ID TP104



13 Tonne Tracked Arcadis Consulting (UK) Ltd

Excavator

WB

CPr



ARCADIS Trial Pit Photography Sheet



Excavator

13 Tonne Tracked Arcadis Consulting (UK) Ltd

WB

CPr





Equipment Used Contractor

Excavator

Logged By Checked By WB

CPr

13 Tonne Tracked Arcadis Consulting (UK) Ltd



ARCADIS Trial Pit Photography Sheet

Project Cosmeston Client Welsh Government

Job No 10011193 Easting (OS mE) 318487.14 Ground Level (mAOD) 33.25 Northing (OS mN) 169217.88

Start Date 12/12/17 End Date 12/12/17

Hole ID **TP107**



Fortran Road Cardiff CF3 0EY

Unless otherwise stated: Depth (m), Diameter (mm), Time (hhmm), Thickness (m), Level (mOD)

Excavator

13 Tonne Tracked Arcadis Consulting (UK) Ltd

WB

CPr





Excavator



ARCADIS Trial Pit Photography Sheet

Project Cosmeston Client Welsh Government Job No 10011193 Easting (OS mE) 318512.21

Ground Level (mAOD) 34.60 Northing (OS mN) 169140.85

Start Date 12/12/17 End Date 12/12/17

Hole ID **TP109**





Project Cosmeston Client Welsh Government Job No 10011193 Easting (OS mE) 318561.84 Ground Level (mAOD) 34.16 Northing (OS mN) 169148.13 Start Date 12/12/17 End Date 12/12/17

Hole ID TP110





^k Unless otherwise stated: Depth (m), Diameter (mm), Time (hhmm), Thickness (m), Level (mOD)

Equipment Used

13 Tonne Tracke Excavator

13 Tonne Tracked Arcadis Consulting (UK) Ltd

Contractor

Logged By

Checked By



Job No Ground Level (mAOD) Start Date Project 10011193 Cosmeston 36.36 Northing (OS mN) 12/12/17 Client Easting (OS mE) End Date 12/12/17 Welsh Government 318535.05 169062.94 JOB NAME COS RESTOR PHASE 2 BOX NO. OF PROJECT NO.: 441091113. DEPTH (m).: 0.93. TO 3.90 a BOREHOLE NO 4. 1911 12/12/17 1 TITL BERE TP111 – Longwall Face B

IOB NAME COSTESTON PHASE 2 BOX NO OF 17/0 11111 11111

TP111 – Shortwall Face C



Unless otherwise stated: Depth (m), Diameter (mm), Time (hhmm), Thickness (m), Level (mOD)

Excavator

Equipment Used

Contractor

13 Tonne Tracked Arcadis Consulting (UK) Ltd

Hole ID

TP111





Excavator



WB

13 Tonne Tracked Arcadis Consulting (UK) Ltd

Excavator

CPr



ARCADIS Trial Pit Photography Sheet

Project Cosmeston Client Welsh Government Job No 10011193 Easting (OS mE) 318442.26 Ground Level (mAOD) 34.26 Northing (OS mN) 169099.06

Start Date 14/12/17 End Date 14/12/17

Hole ID **TP113**





ARCADIS Trial Pit Photography Sheet

Project Job No Ground Level (mAOD) Start Date Hole ID 10011193 Cosmeston 31.97 Northing (OS mN) 169126.98 14/12/17 TP114 Easting (OS mE) **318392.22** End Date 14/12/17 Client Welsh Government 245 TP114 – Longwall Face C Arcadis Cymru House St Mellons Business Park Fortran Road Cardiff CF3 0EY Equipment Used Unless otherwise stated: Contractor Logged By Checked By Depth (m), Diameter (mm), Time (hhmm), Thickness (m), Level (mOD) WB 13 Tonne Tracked Arcadis Consulting (UK) Ltd CPr

Excavator





Design & Consulting for natural and built assets





for natural and built assets





Project						Trial Pit No						
Cosmeston	Farm											
Job No.	Date	Ground Level (mAOD)		TP19 - SA							
10011193	08/09/2016	6 14.5	4	Easting: 31781 Northing: 1688	4.16 98.9	16 Cycle 1 3.9						
Pit Dimension Prior	r To Test		Pit Di	mension After Test								
Length		3.40		Length		3.40						
Width		0.80		Width		0.80						
Depth		0.60		Depth		0.60						
Time Lapsed (mi	inutes) De	epth to Water (m bgl)	Time	e Lapsed (minutes)	De	pth to Water (m bgl)						
0		0.17		15		0.25						
0.5		0.17		20		0.26						
15		0.17		30		0.27						
2		0.17		40 50		0.30						
2.5		0.18		60		0.36						
3		0.18		90		0.42						
3.5		0.18										
4		0.19										
4.5		0.19										
5		0.19										
6		0.20										
8		0.21										
9		0.22										
10		0.22										
			-									
0.00	Water Le	evel — 75% Effe	ctive Dept	h — 25% Effect	ive Dept	h						
-												
0.10												
Ĵ 0.20												
evel -												
- 0.30 - · · · · · · · ·												
- Gro												
ebth												
0.60												
	(1	Time Laps	e (minutes)									
Infiltration rate not calcula	ated as 25% effective	depth not attained.										
All dimension	s in metres	Client			Logge	Logged By						
		RF										



Project	Trial Pit No											
Cosmeston	Farm											
Job No.	Date	Ground	d Level (n	nAOD)	Co-Ordinates	TP19 - SA						
10011193	08/09/2016	3	14.54	ļ	Easting: 3178 Northing: 168	14.16 898.9	16 Cycle 2 5.9					
Pit Dimension Prio	or To Test			Pit Di	mension After Test							
Length		3.40			Length		3.40					
Width		0.80			Width		0.80					
Depth		0.60			Depth		0.60					
Time Lapsed (m	inutes) De	epth to Water (m	n bgl)	Time	Lapsed (minutes)	De	epth to Water (m bgl)					
0		0.10			15		0.13					
1		0.10			30		0.15					
1.5		0.10			40		0.18					
2		0.11			50		0.21					
2.5		0.11			60		0.23					
3		0.11			90		0.31					
3.5		0.11										
4		0.11										
		0.11										
6		0.11										
7		0.12										
8		0.12										
9		0.12										
		0.12										
		evel <u> </u>	5% Effec	tive Dept	h — 25% Effe	ctive Dep [.]	th					
0.00												
0.05												
0.10												
0.15												
(E)												
0.20												
آر U.25												
4 U.35												
ස් 0.40												
0.45												
0.50												
	11 20	ັດ Ti	¥ me Lapse	(minutes)	9(ž	а д					
I Infiltration rate not calcul	ated as 25% effective	depth not attain	ed.									
	· ·	Client		Logge	Logged By							
All dimension	is in metres		Wels		RF							



Project																			Tr	ial	Pit	No	
Cosmestor	n Farm																						
Job No.	Date			Grou	und Lo	evel	(mA	OD)		Со	-Orc	linat	es					Т	Έ	21	-	S	Α
10011193	08/0	08/09/2016			13.88				Easting: 317839.66 Northing: 168916.94				Cycle 1										
Pit Dimension Price	or To Test							Pi	t Din	nens	ion /	After	Tes	st									
Length			;	3.00						Le	ength	۱							2.	90			
Width			(0.80						V	/idth								0.	60			
Depth			(0.55			<u> </u>			D	epth							_	0.	55			
Time Lapsed (n	ninutes)	De	pth to \	Water	(m b	gl)		Т	ime	Laps	sed (min	utes))			Dep	oth t	o W	ate	- (m	bgl)	
0			C).18							15								0.	24			
0.5			C).18							20								0.	25			
1 5				1.18							30 40								0.	20			
1.5) 10							40 50								0.	20 31			
25			0) 19							60								0.	32			
3			C).19							90								0.	36			
3.5			C).19																			
4			C).20																			
4.5			C	0.20																			
5			C).20																			
6).20																			
8).20																			
9			0).21																			
10			C).21																			
0.00	—_w	ater Le	vel		75%	5 Effe	ectiv	/e D	epth	1		-25	5% E	ffe	ctiv	e De	eptł	ı					
0.00																		Τ					
0.05				++-		++				+			+	+	+	+	$\left \right $	+		+	$\left \right $		
0.10						++				$\left \right $	_			_		_		_		_			
0.15																							
Î																							
						++								+		+		+		+	\square		
ਸ਼੍ਰੋ 0.25						++		_		++	_			_		_	$\left \right $	+	\vdash	_	\square		
						+												+					
8 0.30 8																							
କ୍ରି 0.35						++				++			++	-				+		-			
g.40						$\downarrow\downarrow$	\square						\parallel				\square	_	\square				
0.45						+++												+					
0.50						$\downarrow \downarrow$									\vdash			+			Ц		
	1(5	30		т:	¥	(ы М		5	ŏ		i	ĸ			8			96		
					Time	Laps	se (m	inute	s)														
Infiltration rate not calcu	lated as 25% e	ffective	depth n	ot atta	ained.																		
A 11 _11:. ·	- in		Client													Logged By							
All dimensions in metres Welsh Government								RF															



Project	Trial Pit No											
Cosmeston	Farm											
Job No.	Date	Ground Level (I	mAOD)	Co-Ordinates		TP21 - SA						
10011193	08/09/2016	;	13.8	8	Easting: 3178 Northing: 1689	39.66 16.94	Cycle 1					
Pit Dimension Prio	r To Test			Pit Di	mension After Test							
Length		3.0	00		Length		2.90					
Width		۵.0 ۱ O	50 55		Width		0.60					
Time Langed (m	inutoo) Do	oth to W/	otor (m. hal)	Timo			enth to Water (m. hal)					
nine Lapsed (m	mutes) De	pun to wa ^ ۸	10	Time	15							
0.5		0. 0.	13		20		0.18					
1		0.1	13		30		0.20					
1.5		0.1	14		40		0.21					
2		0.1	14		50		0.23					
2.5		0.1	14		60 00		0.24					
35		0. 0 ·	14 14		90		0.29					
4		0.1	14									
4.5		0.1	14									
5		0.1	14									
6		0.1	14									
/ 8		0.7	14 15									
9		0.	15									
10		0.1	15									
		vel 🗕		ctive Dept	h —— 25% Effec	tive Dep	th					
0.00												
0.05												
0.10												
0.15												
0.25												
² 5 0.30												
0.35												
Q 0.40												
0.45												
0.50												
	10 20	30	4 Time Lapse	(minutes)	í Q	X	8 6					
Infiltration rate not calcula	ated as 25% effective	depth not	attained.									
All dimension	s in metres	Client				Logge	Logged By					
Welsh Government							RF					





Project								Trial	Pit No	
Cosmestor	n Farm									
Job No.	Date	G	Ground Level (mAOD)	Co-Ordinate	es				
10011193	13/12/2017	,	26.2	89	Easting: Northing:	318569. 169429	2788 .1944			
Pit Dimension Pri	or To Test			Pit D	imension After	Test				
Length		2.9	90		Length			2.90		
Width		0.6	60		Width			0.60		
Depth		3.0	00		Depth			3.00		
Time Lapsed (n	ninutes) De	epth to Wa	ater (m bgl)	Time	e Lapsed (minu	utes)	De	pth to Wate	er (m bgl)	
0.5		1.8	80		45			1.80		
		1.8	30		55			1.60		
		1.8	50		/U			1.50		
2		۲.۱ ۲	50 RA		00 115			1.45		
2.0		י. 1 ג	30		140			1.40		
4		1.8	30		ITV			1.00		
5		1.8	30							
6		1.8	80							
7		1.8	30							
8		1.8	30							
9		1.8	80							
10		1.8	30							
15		1.0	S0 20							
30		1.0	30							
0.00		vel 🗕		ctive Dept	th25	5% Effecti	ve Dept	h		
0.50										
~ 1.00										
Level (m										
р 1.50										
<u>§</u> 2.00										
bepth Be										
ц 2.50										
3.00										
0	20	40 1	G Time Laps	e (minutes)		100	120		140	
Cycle aborted due to inc	rease in water level; Inf	iltration ra	ate not calcula	ted as 25%	effective depth	n not attain	ed.			
All dimensions in metres Client Welsh Government						Logge	Logged By WB			



Project	Trial Pit No								
		Ground Level (mAOD)	Co-Ordinates		TP103			
10011193	13/12/201	7 29.37	54	Easting: 318 Northing: 169	3438.0374 9361.5609	74 Cycle 1			
Pit Dimension Pric	or To Test		Pit Di	imension After Tes	t				
Length		2.40		Length		2.40			
Width		0.60		Width		0.60			
Time Lanced (m	vinutos) D	U.90	L Time	Lansod (minutos)		onth to Water (m.hgl)			
	linutes) D			45		0 14			
1		0.00		55		0.15			
1.5		0.00		70		0.16			
2		0.00		85		0.18			
2.5		0.00		115		0.30			
4		0.02		140		0.38			
5		0.03							
6		0.04							
7 0		0.04							
9		0.05							
10		0.05							
15		0.05							
20		0.07							
0.00 0.10	Water Le	evel — 75% Effe	ctive Dept	:h25% E	ffective Dept	:h			
0.20									
€ 0.30									
el (n									
a 0.40									
n 0.50									
5 6 6 6 6 6 6 6 6 6 6 6 6 6									
Belo									
0.80									
0.90	20 - 40 -	60 - 80 -	100 -	120 -	140 -	160 - 180 -			
	Infiltration rate	Time Laps	e (minutes) 25% eff	ective depth r	not attained	I.			
		Client		•	Logge	Logged By			
All dimensior		WB							


SOAKAWAY INFILTRATION TEST

Project Cosmestor	n Farm			Trial Pit No					
Job No.	Date	Ground Le	vel (mAOD)	Co-Ordinates		TP103			
10011193	13/12/201	7 29	0.3754	Easting: 31843 Northing: 1693	38.0374 61.5609	Cycle 2			
Pit Dimension Price	or To Test		Pit D	imension After Test					
Length		2.40		Length		2.40			
Depth		0.80		Depth		0.80			
Time Lapsed (m	ninutes) D	epth to Water (m bo	I) Tim	e Lapsed (minutes)	Den	th to Water (m bol)			
0.5		0.00	.,	45	_ 0P	0.06			
1		0.00		55		0.10			
1.5		0.00		70		0.14			
2		0.00		85		0.18			
2.5		0.00		115		0.20			
а С		0.00		140		0.20			
5		0.00							
6		0.01							
7		0.01							
8		0.01							
9		0.01							
15		0.02							
20		0.02							
30		0.03							
		evel — 75%	Effective Dep	th —— 25% Effe	ctive Depth				
0.00									
0.10									
0.20									
∃ 0.30									
ै ३ 0.40									
-0.50 									
0.60 Below									
0.70 E									
0.80									
0.90									
0	20	40 60	UX UX	100	120	140			
	Infiltration rate	Time	Lapse (minutes)	factive depth pot	attained				
		Client	as 20% en		Logged	J. ed By			
All dimension	is in metres	V	Velsh Gover	nment	WB				





SOAKAWAY INFILTRATION TEST

Project																		Т		Т	ŕria	Pit	No)		
Cosmesto	n Farm																									
Job No.	Date		G	round	Leve	el (m	AOI	D)	-	Co-	Ordi	nate	s					1		•	T	P	11	2		
10011193	14	/12/2017			33.	742	2			Ea Nor	stin thir	g: (1g:	318 16	343 898	9.7 88.	735 50	55 54									
																										.
Pit Dimension Pr	or To Test							Pit [Dime	ensio	on Af	fter	Tes	st					_	_	_	_				_
Length			2.4	.0						Ler	ngth									:	2.4	0				
Width			0.6	0						Wi	dth									(D.6	0				
Depth			1.1	0						De	pth	_	_	_				_		_	1.1	0	_	_		
Time Lapsed (ninutes)	Depth	to Wa	ater (m	ı bgl)			Tim	ie La	apse	əd (m	ninu	tes))			0	Сер	oth	to ۱	Na	ter	(m l	ogl)	1	
0			0.2	:8						3	0									0).2	0				
0.5			0.2	27						4	5									C).1	8				
15			0.2	!/ 						5	15 70									L C).1 \ 1	6				
2			0.∠ ∩ 2	27 26						י 8	0									(). i ነ በ	4				
2.5			0.2	.0 26						U	0									Ľ	1.0	'				
3			0.2	25																						
4			0.2	25																						
5			0.2	25																						
6			0.2	25																						
7			0.2	:5																						
8			0.2	25																						
9 10			0.2	!4 > 4																						
15			0.2	.4 23																						
20			0.2	22																						
		•Water Level	_		5% Ef	ffect	tive	Dep	oth	-		25	% E	ffe	ctiv	ve l	Dej	pth	<u> </u>							
0.00									\top														Γ			
0.20									+		_			+				1	1	1						
	+++																									
Ê 0.40									_					_				_		_	_	+	+			
d Level									+					+				+	-	+	+		+			
U10.00				+					+	\square								+	+	+	+	\dagger	+			
tt Belov									+		_			+				+		+	+	+	+			
Dep			++-						+-	+				+				+	+	+	+	+-	+			
1.00				\square	\square			\square	+		_		$ \rightarrow$	_	_			_	+	+	_	\downarrow	+			
0	10 -	20 -	30 -			40			20			U U U	20				2				80		-			
				Tiı	me La	apse	(mir	utes)	I																	
Cycle aborted due to inc	rease in wat	er level; Infiltra	ion rat	te not	calcu	ulate	d as	25%	5 effe	ectiv	/e de	epth	not	t att	aine	ed.										
<u> </u>		Clie	ent													L	og	ged	I By	y	_					
All dimensio	ns in metr	es			W	elsł	ו G	ove	rnm	nen	t									١	WI	З				





Project				Trial Pit No
Job No. Date	Ground Level (r	mAOD) Co-Ordina	ates	TD445
10011193 14/12/201	7 30.65	64 Easting:	: 318360.7656 1: 169224 2532	19115
			. 100221.2002	
Pit Dimension Prior To Test		Pit Dimension Afte	er Test	
Length	2.50	Length		2.50
Depth	0.60 0.70	Width Depth		0.60
Time Lapsed (minutes) D	epth to Water (m bgl)	Time Lapsed (mir	nutes) De	epth to Water (m bgl)
0	0.60	30		0.60
0.5	0.60	45		0.60
1.5	0.60	70		0.60
2	0.60	85		0.60
2.5	0.60	115 140		0.60
4	0.60	180		0.60
5	0.60			
7	0.60			
8	0.60			
9	0.60 0.60			
15	0.60			
20	0.60			
	evel — 75% Effe	ctive Depth2	5% Effective Dept	:h
0.00				
0.10				
0.20				
Building 0.40				
8 8 9 0.50				
0.70 0.70 0.70 0.70	80	20	[40	
	Time Lapso	e (minutes)	-	~ ~
Infiltration rate	not calculated as	25% effective dep	oth not attained	I.
All dimensions in metres	Client	h Government	Logge	ed By WB

APPENDIX D

CERTIFICATION OF FIELD APPARATUS

Equipe Group



© Copyright 2016 Equipe Group, The Paddocks, Home Farm Offices, The Upton Estate, Banbury, Oxfordshire, OX15 6HU Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer		DART
Client		GSTL
Test No		EQU1799
Test Depth (m)		8.40
Mass of the hamn	<i>m</i> =	63.5kg
Falling height	h =	0.76m
E theor =	m x g x h =	473J

Characteristics of the instrumented rod

<i>d</i> _r = 0.052 m
0.558 m
$A = 11.61 \text{ cm}^2$
$E_a = 206843 \text{ MPa}$



10 April 2017 10 April 2018 219





Observations: 1. E meas = 0.315 kN-m \pmb{E}_{meas} Energy Ratio = (E_r) 66.50% Etheor **E** theor = 0.473 kN-m Equipe SPT Analyzer Operators: cs ð Sale / Checked by: Prepared by: NO -12/04/2017 Date:

> © Copyright 2017 Equipe Group, The Paddocks, Home Farm Offices, The Upton Estate, Banbury, Oxfordshire, OX15 6HU Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer		DART
Client		GSTL
Test No		EQU1932
Test Depth (m)		8.50
Mass of the hamn	<i>m</i> =	63.5kg
Falling height	h =	0.76m
E theor =	m x g x h =	473J

Characteristics of the instrumented rod

_{dr} = 0.052 m
0.558 m
A = 11.61 cm ²
E _o = 206843 MPa



ID

14/11/2017 14/11/2018

365





Observations: 1 0.282 kN-m \pmb{E}_{meas} E meas = Energy Ratio = (E_r) 59.56% Etheor 0.473 kN-m E theor = **Equipe SPT Analyzer Operators:** AF Care / Prepared by: Checked by: RUAS 17/11/2017 Date:

> © Copyright 2017 Equipe Group, The Paddocks, Home Farm Offices, The Upton Estate, Banbury, Oxfordshire, OX15 6HU Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

APPENDIX E

MONITORING DATA

		Projec	ij		Cosmeston								Weather:	Fine, but wi	indy.		
1	CHC V		umber:		UA008386			Date:	16/09/2016				Engineer:	sc			
Monitoring Point Reference	Date/ Time	Atmos. Pressure (mbar)	Temp. (°c)	Well Pressure (Pa)	Flow Rate (I/h)	Time (sec)	CH4 (% v/v)	(%) rer	CO2 (% v/v)	02 (% v/v)	H2S (ppm)	CO (ppm)	PID (ppm)	Depth to Water (m)	Depth to base (m)	Commen (all readings fron datum height if (i ts ר GL, note different)
		1		(n)		1	1	1	1		ľ	ľ				9.010	
						0	0.0	0.0	0.0	20.9	0	0					
						30	0.0	0.0	1.7	14.1	0	0					
						60	0.0	0.0	1.8	8.2	0	0					
WS03	16.09.16	1010	15		0.0	06	0.0	0.0	2.3	3.6	0	0			1.95		
						120	0.0	0.0	2.5	2.4	0	0					
						150	0.0	0.0	2.6	1.9	0	0					
						180	0.0	0.0	2.8	1.8	0	0					
						0	0.0	0.0	0.0	20.9	0	0					
						30	0.0	0.0	1.6	21.1	0	0					
						60	0.0	0.0	1.4	18.8	0	0					
WS01	16.09.16	1009	15		0.0	06	0.0	0.0	1.10	19.5	0	0			2.15		
						120	0.0	0.0	06.0	19.9	0	0					
						150	0.0	0.0	0.80	20.1	0	0					
						180	0.0	0.0	0.60	20.4	0	0					
Notes:																Ambient Conce	entration
OR = Over r	ange															CH4	0
																C02	0
																02	20.9
																H2S	0
																CO	0
Previous weather c	onditions, Atmosphic	c pressure trend and rate	e, flooding, so	oil moisture, water d	raw in tube, wind c	direction/stren	jth, condition of mo	nitoring point, mi	ssing/open tap, da	tum level, vegetat	ion stress, odours, i	bubbles, etc.					

Image: Image:		SIC VUC	Project		<u>~</u>	Cosmeston								Weather:	Sunny			
Image: contractive points Targe Targe Targe Cut Contractive points Cont Contractive points		つうてつ	Job Nur	nber:		JA008386			Date:	23/09/2016				Engineer:	sc			
Montanial building Matrix manual (mixed) Term (mixed) (mixed) Very (mixed) (mixed) Very (mixed)																		
WS03 23/09/2016 101 12 0 00 00 23 134 0 0 1 WS03 23/09/2016 101 15 0 0 0 23 134 0 0 1	Monitoring Point Reference	Date/ Time	Atmos. Pressure (mbar)	Temp. (°c)	Well Pressure (Pa)	Flow Rate (I/h)	Time (sec)	CH4 (% v/v)	(%)	CO2 (% v/v)	02 (% v/v)	H2S (ppm)	CO (ppm)	PID (ppm)	Depth to Water (m)	Depth to base (m)	Comments (all readings from GL datum height if diffe	, note erent)
WS03 33/09/2016 11 12 0.0 0.0 28 18.1 0 0 1.95 WS03 33/09/2016 1017 15 0.0 0.0 28 18.2 0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>21.0</td><td>0</td><td>0</td><td></td><td></td><td></td><td></td><td></td></t<>							0	0.0	0.0	0.0	21.0	0	0					
WS03 13/09/2016 101 15 0 00 00 28 18.2 0 0 0 0 WS03 101 15 0 00 00 00 00 <							30	0.0	0.0	2.8	18.4	0	0					
W303 13/10/2016 107 15 0.7 90 00 23/10/2016 1.155 1.155 W301 1						<u> </u>	60	0.0	0.0	2.8	18.2	0	0					
Note: 120 01 29 181 0 <th< td=""><td>WS03</td><td>23/09/2016</td><td>1017</td><td>15</td><td></td><td>0.7</td><td>90</td><td>0.0</td><td>0.0</td><td>2.8</td><td>18.1</td><td>0</td><td>0</td><td></td><td></td><td>1.95</td><td></td><td></td></th<>	WS03	23/09/2016	1017	15		0.7	90	0.0	0.0	2.8	18.1	0	0			1.95		
Image: line biase in the						<u> </u>	120	0.1	0.1	2.9	18.1	0	0					
Image: line Image: line							150	0.1	0.1	2.8	18.1	0	0					
WS01 1018 101 0 0.1 0.1 0.2 18.6 0							180	0.1	0.1	2.8	18.1	0	0					
WS01 108 105 00 01 01 02 185 00 0 0 0 WS01 108 10 0							0	0.1	0.1	0.0	21.0	0	0					
W501 33/09/2016 108 15 60 0.1 0.2 18.5 0 0 0 1 W501 108 15 90 0.1 0.1 0.20 18.5 0							30	0.1	0.1	0.2	18.6	0	0					
WS01 23/09/2016 101 15 0.0 0.1 0.20 18.4 0 0 10 WS01 120 0.1 0.1 0.20 18.4 0							60	0.1	0.1	0.2	18.5	0	0					
Image: Network in the state of the	WS01	23/09/2016	1018	15		0.5	06	0.1	0.1	0.20	18.5	0	0			2.15		
Image: Network in the state of the							120	0.1	0.1	0.20	18.4	0	0					
Note: 180 0.1 0.0 0 0 1 Note: Imbined in the impired integration of the impired integration of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution of montening point, missing/opent to, solution is solution in the impired in the impi							150	0.1	0.1	0.20	18.4	0	0					
Notes: Ambient Concentration OR = Over range CH4 0 OR = Over range CO2 0 Prover range O O Prover range O O Prover range O O O O O Prover range O O Prover range O O O O O Prover range CO O Prover range O O Prover range CO O Prover range CO O							180	0.1	0.1	0.20	18.4	0	0					
OR = Over range CH4 0 CO2 0 CO2 0 H2S 21 Provious wordner conditions, Atmosphic pressure trend and rate, flooding, soil moisture, water draw in tube, wind direction/strength, condition of monitoring point, missing/open top, datum level, vegetation stress, odours, bubbles, etc. 0	Notes:																Ambient Concentr	ation
Previous weather condition, Atmosphic pressure trend and rate, floading, soil moisture, water draw in tube, wind direction/Strength, condition of monitoring point, missing/open top, datum level, vegetation stress, adaurs, bubbles, etc. CO2 0	OR = Over ri	ange															CH4	0
O2 21 H2S 0 Previous weather conditions, Atmosphic pressure trend and rate, flooding, soil moisture, water draw in tube, wind direction/strength, condition of monitoring point, missing/open tap, dotum level, vegetation stress, odours, bubbles, etc. 0 0																	C02	0
H2S 0 CO 0 Previous weather conditions, Atmosphic pressure trend and rate, flooding, soil moisture, water draw in tube, wind direction/strength, condition of monitoring point, missing/open tap, dotum level, vegetation stress, odours, bubbles, etc.																	07	21
CO 0																	H2S	0
Previous weather conditions, Atmosphic pressure trend and rate, floading, soil moisture, water draw in tube, wind direction/strength, condition of monitoring point, missing/open tap, datum level, vegetation stress, adours, bubbles, etc.																	CO	0
	Previous weather cu	onditions, Atmosphic pressu	ure trend and rate, floc	ding, soil mo	isture, water draw	v in tube, wind direv	ction/strength,	condition of mon	toring point, miss.	aing/open tap, datı	um level, vegeta	tion stress, odour:	s, bubbles, etc.					

	Project:		Cosi	neston Phase 2	Weather:	Mist and fine drizzle
AROADIS	Job Number:	10011193	Date:	09/01/2018	Engineer:	Amy Mayer/Siân Carter

Monitoring Point Reference	Date/ Time	Atmos. Pressure (mbar)	Temp. (°C)	Well Pressure (Pa)	Flow Rate (I/h)	Time (sec)	CH4 (% v/v)	LEL (%)	CO2 (% v/v)	O2 (% v/v)	H2S (ppm)	CO (ppm)	Hex. (%)	PID cf	VOC (ppm)	Depth to Water (m)	Depth to base (m)	Comments (all readings from GL, note datum height if different)			
				Peak:	Peak:	Initial	0	0	0	20.1	0	0	0.012								
						30	0	0	0	20.1	0	0	0.012								
					0.3	60	0	0	0	20.3	0	0	0.012			-		No water sample taken as			
WS01	09/01/2018 09:30	1006	8			90	0	0	0	20.3	0	0	0.012			2.10	2.15	ner instruction			
				Steady:	Steady:	120	0	0	0	20.3	0	0	0.012								
					0.1	150	0	0	0	20.3	0	0	0.012			_					
						180	0	0	0	20.3	0	0	0.012								
				Peak:	Peak:	Initial	0	0	2.3	16.3	0	0	0.012			-					
						30	0	0	2.1	16.2	0	0	0.012			-					
					0.6	60	0	0	2.1	14.1	0	0	0.010					Insufficient water quantity to			
WS101	09/01/2018 10:50	1006	8	Stoody:		90	0	0	2.1	14.1	0	0	0.009			1.80	2.10	take sample			
				<u>steauy.</u>	Steady:	120	0	0	2.1	14.1	0	0	0.009			-					
						150	0	0	2.1	14.1	0	0	0.009			-					
				Dealu	0.3	180	0	0	2.1	14.1	0	0	0.009								
				Peak.	Peak:	Initial	0	0	0.7	19.0	0	0	0.007			-					
						30	0	0	1.2	18.0	0	0	0.007			-		Water sample taken (2x			
WC104	00/01/2010 11:10	1000			0.2	60	0	0	1.2	18.0	0	0	0.009			0.00	1 45	300ml bottle and 1x 40ml			
WS104	09/01/2018 11:10	1006	× ×	Stoodyr		90	0	0	1.2	18.0	0	0	0.009			0.90	1.45	vial, insufficient water			
				Steday.	Steady:	120	0	0	1.2	18.0	0	0	0.007			-		quantity for 4x bottles)			
					0.1	150	0	0	1.2	17.9	0	0	0.006			-					
				Peak:	0.1	18U	0	0	1.2	18.0	0	0	0.009								
				- cum	Peak:	initiai	33.3	0	20	0.8	0	0	0.713			-					
						50	30.4	0	20.4	0.4	0	0	0.715			1.20 1.20	1 20	Landfill Site Insufficient			
W/\$100	00/01/2019 12:00	1006			0.6	00	37.0	0	20.4	0.1	0	0	0.717								
VV3109	03/01/2018 12.00	1000	0	Steady:		120	27.0	0	20.0	0.0	0	0	0.719				1.20	sample			
					Steady:	120	27.1	0	20.5	0.0	0	0	0.710					sample			
					0.4	180	27.1	0	20.8	0.0	0	0	0.719								
				Peak:	0.4	Initial	1.0	71.7	21.4	0.0 E 4	0	0	0.721								
					Peak:	20	2.0	71.7	12.2	0.5	0	0	0.174								
					1.0		2.1	71.7	12.5	0.5	0	0	0.174			-		Landfill Site. Water sample			
WS111	09/01/2018 12:30	1006	8		1.0	90	2.1	71.7	12.4	0.0	0	0	0.174	k	1 1 1 1		1.05	1 30	taken (1x 300 ml bottle,		
**5111	05/01/2010 12:50	1000		Steady:	Steady:	120	3.1	71.4	12.5	0.0	0	0	0.174			74 74 74 75	D.174 D.174 D.174 D.174 D.175	74 74 75	74 74 74		1.05
						150	3.1	72.1	12.5	0.0	0	0	0.175).174							-
					0.6	180	3.1	72.4	12.5	0.0	0	0	0.175								
				Peak:	Dealu	Initial	12.6	0	12.5	2.1	0	0	0.170								
					Pedk.	30	16.5	0	20.3	0.1	0	0	0.453			-					
					0.4	60	16.8	0	20.5	0.1	0	0	0.459			-		Landfill Site Insufficient			
WS110	09/01/2018 12:50	1006	8		0.7	90	16.8	0	20.4	0.0	0	0	0.460			2.90	3.00	water quantity to take			
		2000		Steady:	Steady:	120	16.7	0	20.4	0.0	0	0	0.459					sample			
						150	16.8	0	20.3	0.1	0	0	0.459			-					
					0.3	180	16.8	0	20.5	0.1	0	0	0.460								
			1	1	I	100	10.0	U	20.4	0.0	U	U	0.400								

Notes:	Ambient Co	ncentration
Gas concentrations 0% unless otherwise specified.	CH4	0%
WS03 could not be located (drilled >1 year ago, Sep 2016, vegetation growth and animal grazing have covered location)	CO2	0%
	02	20.50%
	H2S	0%
	со	0%
Previous weather conditions. Atmosphic pressure trend and rate. floading, soil moisture, water draw in tube, wind direction/strength, condition of monitoring point, missing/open tap, datum, level, vegetation stress, adours, bubbles, etc.		

Serial No.

N/A Geo Sense Dip-30 3698

Hyder/other ref. Hired from Shaw City

QA Checklist:			
Weather conditions logged for previous 24 hrs	x		Instrument Details:
Gas monitor calibrated		Landfill Gas Analyser	
All filters in place	x]	PID
Flow reading stable and zeroed]	Dip meter/ interface probe	



	Project:		Cosr	neston Phase 2	Weather:	Showers/Windy
AROADIS	Job Number:	10011193	Date:	16/01/2018	Engineer:	Siân Carter

WSD HAU HAU HORE O <tho< th=""><th>Monitoring Point Reference</th><th>Date/ Time</th><th>Atmos. Pressure (mbar)</th><th>Temp. (°C)</th><th>Well Pressure (Pa)</th><th>Flow Rate (I/h)</th><th>Time (sec)</th><th>CH4 (% v/v)</th><th>LEL (%)</th><th>CO2 (% v/v)</th><th>O2 (% v/v)</th><th>H2S (ppm)</th><th>CO (ppm)</th><th>Hex. (%)</th><th>PID cf</th><th>VOC (ppm)</th><th>Depth to Water (m)</th><th>Depth to base (m)</th><th>Comments (all readings from GL, note datum height if different)</th></tho<>	Monitoring Point Reference	Date/ Time	Atmos. Pressure (mbar)	Temp. (°C)	Well Pressure (Pa)	Flow Rate (I/h)	Time (sec)	CH4 (% v/v)	LEL (%)	CO2 (% v/v)	O2 (% v/v)	H2S (ppm)	CO (ppm)	Hex. (%)	PID cf	VOC (ppm)	Depth to Water (m)	Depth to base (m)	Comments (all readings from GL, note datum height if different)			
With the series of t					Peak:	Peak:	Initial	0	0	0	20.5	0	0	0.000								
W501 16/01/2018 09:00 1000 4000 2.4 17.4 0.0 0.004							30	0	0	2.4	17.4	0	0	0.005								
WS01 15/01/2018 09:00 1002 6 						0.3	60	0	0	2.4	17.3	0	0	0.004								
Image: box image: bo	WS01	16/01/2018 09:00	1002	1002 6			90	0	0	2.4	17.2	0	0	0.004			No GW	2.15				
Image: Probability of the section of the sectin of the section of the section of the section of the sec					Steady:	Steady:	120	0	0	2.4	17.2	0	0	0.004								
Meth International (1) Internatis (1) Internati						0.1	150	0	0	2.4	17.2	0	0	0.004								
WS101 16/01/2018 10:50 1102 6 matrix here matrix here 0<							180	0	0	2.4	17.2	0	0	0.004								
WS101 16/01/2018 10:50 1002 64 03 0 </td <td></td> <td></td> <td rowspan="2"></td> <td></td> <td>Peak:</td> <td>Peak:</td> <td>Initial</td> <td>0</td> <td>0</td> <td>0</td> <td>20.3</td> <td>0</td> <td>0</td> <td>0.000</td> <td></td> <td></td> <td></td> <td></td> <td></td>					Peak:	Peak:	Initial	0	0	0	20.3	0	0	0.000								
WS101 16/01/2018 01:0 1002 6 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4							30	0	0	0.6	20.1	0	0	0.003								
WS101 16/01/2018 10:50 1002 6 200 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td>1.3</td> <td>60</td> <td>0</td> <td>0</td> <td>0.6</td> <td>20.1</td> <td>0</td> <td>0</td> <td>0.010</td> <td></td> <td></td> <td></td> <td></td> <td></td>						1.3	60	0	0	0.6	20.1	0	0	0.010								
Matrix Matrix<	WS101	16/01/2018 10:50	1002	6	Stooduu		90	0	0	0.6	20.1	0	0	0.006			1.80	2.10				
Image: biase intermation of the section of					Steduy.	Steady:	120	0	0	0.5	20.1	0	0	0.003								
WS104 Interface In							150	0	0	0.5	20.1	0	0	0.004				ſ				
WS104 16/01/2018 11:10 1002 6 / () 1004 0					Book:	0.6	180	0	0	0.4	20.2	0	0	0.004								
WS104 16/01/2018 11:10 1002 6 4 30 6 0 6 0 0 22 6 8.0 6 0 0 0 0 0 0 0 0 0 0 22 8.0 8.0 0 0 0 0.003 0 0.003 0 0.003 0 0.003 0 0.003 0.003 0 0.003 0 0.003 0 0.003 0 0.003 0 0.003 0 0.003 0 0.00 0 0.003 0 0.00 0 0.003 0 0.003 0 0.003 0 0.003 0 0.003 0 0.003 0 0.003 0 0.003 0 0.003 0 0.000 0 0.003 0 0.003 <					reak.	Peak:	Initial	0	0	0	20.4	0	0	0.000								
WS104 16/01/2018 11:10 1002 6 mark 1002 mark 6 mark 100 0 mark										30	0	0	2.2	8.3	0	0	0.003					
WS104 16/01/2018 11:10 1002 6 120 0 0 1.1 8.7 0 0 0.003 0.053 1.45 100 100 100 0 0.0 1.3 12.4 0.0 0.003 0 0.03 0 0.03 0 0.000 0 0.000 0 0.000 0 0.000 0 0.000 0 0.000 0 0.000 0 0.000 0 0 0.000 0.000 0 0.000 <td< td=""><td></td><td>10/01/2010 11/10</td><td>1000</td><td></td><td></td><td>0.4</td><td>60</td><td>0</td><td>0</td><td>2.2</td><td>8.0</td><td>0</td><td>0</td><td>0.001</td><td></td><td></td><td>0.65</td><td>4.45</td><td></td></td<>		10/01/2010 11/10	1000			0.4	60	0	0	2.2	8.0	0	0	0.001			0.65	4.45				
$ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	WS104	16/01/2018 11:10	1002 6	1002	o l	Steady:		90	0	0	2.1	8.7	0	0	0.003			0.65	1.45			
Image: Figure					Steady.	Steady:	120	0	0	1.9	9.6	0	0	0.002								
WS109 16/01/2018 09:30 1002 0.1 100 0 0.0 0.0 0.003 0						0.1	190	0	0	1.3	12.4	0	0	0.003								
WS109 16/01/2018 09:30 1002 6 6 0 <td></td> <td></td> <td></td> <td>Peak:</td> <td>0.1</td> <td>Initial</td> <td>0</td> <td>0</td> <td>0.8</td> <td>20.4</td> <td>0</td> <td>0</td> <td>0.003</td> <td></td> <td></td> <td></td> <td></td> <td></td>					Peak:	0.1	Initial	0	0	0.8	20.4	0	0	0.003								
$ \begin{tabular}{ \ \ \ \ \ \ \ \ \ \ \ \ \ $			1002						Peak:	20	26.4	0	17.7	20.4	0	0	0.000					
$ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				002 6	6		2.4	60	27.2	0	17.7	0.5	0	0	0.720			-				
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	W/\$109	16/01/2018 09.30				6	6		2.4	00	27 /	0	10.1	0.2	0	0	0.724			1 20	1 20	
$ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	W3105	10/01/2010 05.50				Steady:	Stoodu	120	37.4	0	18.1	0.0	0	0	0.724			1.20	1.20			
$ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$						steady:	120	37.3	0	18.5	0.0	0	0	0.723								
WS111 16/01/2018 10:50 1002 6 1001 1001 0.0						0 0	180	37.3	0	10.0	0.0	0	0	0.723								
$ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$					Peak:	Deale	Initial	0.0	00	0	20.4	0	0	0.000								
$ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$						Peak.	30	0.0	0.0	0.2	20.4	0	0	0.006								
$ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$						0.4	60	0.0	0.0	0.1	20.3	0	0	0.005								
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	WS111	16/01/2018 10:50	1002	6		0.1	90	0.0	0.0	0.1	20.3	0	0	0.005			1.10	1.30	1 x 300ml water sample			
WS110 16/01/2018 09:50 1002 6 No.0 0.00 0.0 0.000 0.0 0.000 0.0 0.0 0.0 0.0 0.000 0.0 0.0 0.000 0.0 0.000 0.0 0.001/201809:50 1002 6 16/0 16/0 20.3 0.2 20.3 0 0 0.001/2 2.90 3.00 2.90 3.00 2.90 3.00 2.90 3.00 2.90 <th< td=""><td></td><td>20,01,2010 10:00</td><td>1001</td><td></td><td>Steady:</td><td>Steady:</td><td>120</td><td>0.0</td><td>0.0</td><td>0.1</td><td>20.3</td><td>0</td><td>0</td><td>0.004</td><td></td><td></td><td></td><td>2.00</td><td>taken</td></th<>		20,01,2010 10:00	1001		Steady:	Steady:	120	0.0	0.0	0.1	20.3	0	0	0.004				2.00	taken			
WS110 16/01/2018 09:50 1002 6 New Yeak: New Y						0.1	150	0.0	0.0	0.1	20.3	0	0	0.004								
WS110 16/01/2018 09:50 1002 6 Peak: 100 Initial 0.0 0.0 0.0 0.0 20.0 0.0 0.000 0.0012 0 0 0.0012 0 0 0.0012 0 0 0.0012 0 0 0.0012 0 0 0.0012 0 0 0.0013 0 0 0.0012 0 0 0 0.0013 0 0 0 0						0.1	180	0.0	0.0	0.1	20.3	0	0	0.004								
WS110 16/01/2018 09:50 1002 6 Steady: NMA 0.0 0 0.2 20.3 0 0 0.018 0.9 60 1.6 31.2 29.7 0.2 20.3 0 0 0.018 1002 16/01/2018 09:50 1002 6 1.6 31.2 0.2 20.3 0 0 0.012 1002 Steady: 5teady: 120 2.6 35.7 0.8 19.4 0 0 0.048 0.4 150 3.3 37.6 0.8 17.6 0 0 0.063 1002					Peak:	Peak:	Initial	0.0	0	0	20.4	0	0	0.000								
WS110 16/01/2018 09:50 1002 6 6 1.6 31.2 0.2 20.3 0 0 0.012 0.9 60 1.6 31.2 0.2 20.3 0 0 0.012 2.90 3.00 Steady: 5teady: 120 2.6 35.7 0.8 19.4 0 0 0.048 0.4 150 3.3 37.6 0.8 17.6 0 0 0.063						- com	30	1.2	29.7	0.2	20.3	0	0	0.018								
WS110 16/01/2018 09:50 1002 6 6 90 2.3 32.3 0.4 20.1 0 0 0.021 2.90 3.00 WS110 16/01/2018 09:50 1002 6 5teady: 120 2.6 35.7 0.8 19.4 0 0 0.048 2.90 3.00 0.4 150 3.3 37.6 0.8 17.6 0 0 0.063 0 0.063 0 0.063 0 0.063 0 0.063 0 0.063 0 0.063 0 0.063 0 0.063 0 0.063 0 0.063 0 0.063 0 0 0.063 0 0 0.063 0 0 0.063 0 0 0.063 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.9</td> <td>60</td> <td>1.6</td> <td>31.2</td> <td>0.2</td> <td>20.3</td> <td>0</td> <td>0</td> <td>0.012</td> <td></td> <td></td> <td></td> <td></td> <td></td>						0.9	60	1.6	31.2	0.2	20.3	0	0	0.012								
Steady: Steady: 120 2.6 35.7 0.8 19.4 0 0 0.048 0.4 150 3.3 37.6 0.8 17.6 0 0 0.063	WS110	16/01/2018 09:50	1002	6			90	2.3	32.3	0.4	20.1	0	0	0.021			2.90	3.00				
0.4 150 3.3 37.6 0.8 17.6 0 0 0.063	WSIIO				1002 0	Steady:	Steady:	120	2.6	35.7	0.8	19.4	0	0	0.048							
								0.4	150	3.3	37.6	0.8	17.6	0	0	0.063						
180 3.5 52 0.8 13.3 0 0 0.090							0.4	180	3.5	52	0.8	13.3	0	0	0.090							

Notes:	Ambient Co	ncentration
Gas concentrations 0% unless otherwise specified.	CH4	0%
WS03 could not be located (drilled >1 year ago, Sep 2016, vegetation growth and animal grazing have covered location)	CO2	0%
	02	0.00%
	H2S	0%
	со	0%
Previous weather conditions. Atmosphic pressure trend and rate floading, soil maisture, water draw in tube, wind direction/strength, condition of monitoring point mission/open tan, datum, level vegetation stress, adours, hubbles, etc.		

QA Checklist:			
Weather conditions logged for previous 24 hrs	x		Instrument Details:
Gas monitor calibrated	x		Landfill Gas Analyser
All filters in place	x	1	PID
Flow reading stable and zeroed	x]	Dip meter/ interface probe

Instrument Details:	Serial No.	Hyder/other ref.
Landfill Gas Analyser		Hired from Shaw City
PID	N/A	
Dip meter/ interface probe	Geo Sense Dip-30 3698	
PID Dip meter/ interface probe	N/A Geo Sense Dip-30 3698	



	Project:		Cosr	neston Phase 2	Weather:	Sun & Showers
ARCADIS	Job Number:	10011193	Date:	25/01/2018	Engineer:	Siân Carter

Monitoring Point Reference	Date/ Time	Atmos. Pressure (mbar)	Temp. (°C)	Well Pressure (Pa)	Flow Rate (I/h)	Time (sec)	CH4 (% v/v)	LEL (%)	CO2 (% v/v)	O2 (% v/v)	H2S (ppm)	CO (ppm)	Hex. (%)	PID cf	VOC (ppm)	Depth to Water (m)	Depth to base (m)	Comments (all readings from GL, note datum height if different)			
	25/01/2018 09:00			Peak:	Peak:	Initial	0	0	0	20.4	0	0	0.000								
WS01						30	0	0	2.3	17.9	0	0	0.004								
					0.3	60	0	0	2.3	17.8	0	0	0.004								
		1006	7			90	0	0	2.4	17.8	0	0	0.003			No GW	2.15				
				Steady:	Steady:	120	0	0	2.2	17.6	0	0	0.002								
					0.1	150	0	0	2.1	17.7	0	0	0.002								
						180	0	0	2	17.7	0	0	0.002								
				Peak:	Peak:	Initial	0	0	0	20.4	0	0	0.000								
1						30	0	0	1.7	16.3	0	0	0.003								
					0.6	60	0	0	1.6	16.4	0	0	0.003								
WS101	25/01/2018 10:50	1006	/	Stoody		90	0	0	1.3	17.2	0	0	0.001			1.85	2.10				
				Steady.	Steady:	120	0	0	1.3	17.8	0	0	0.001								
					0.0	150	0	0	0.9	18.7	0	0	0.001								
				Peak:	0.2	10U	0	0	0.8	19.1	0	0	0.001								
						Peak:	20	0	0	1.0	20.4	0	0	0.000							
1					0.2	50	0	0	1.9	13.8	0	0	0.002								
W/\$104	25/01/2018 11.10	1006	7		0.5	00	0	0	1.9	14.1	0	0	0.001			0.80	1 / 5				
VV3104	25/01/2018 11.10	1000	'	Steady:	Character.	120	0	0	1.0	14.9	0	0	0.001			0.80	1.45				
					<u>steady:</u>	120	0	0	1.7	16.7	0	0	0.001								
					0.1	180	0	0	1.5	17.4	0	0	0.001								
				Peak:	Peak:	Initial	0	0	0	20.5	0	0	0.000								
					0	<u>rean</u>	30	35.4	0	17.3	0.4	0	0	0.705							
		1006	06 7			0.9	60	36.3	0	17.5	0.1	0	0	0.709			-				
WS109	25/01/2018 09:20					90	36.3	0	17.6	0.0	0	0	0.711		1.10	1.10	1.20				
						Steady:	Steady:	Steady:	120	36.4	0	17.7	0.0	0	0	0.710					
						150	36.4	0	17.8	0.0	0	0	0.709								
					0.5	180	36.3	0	18	0.0	0	0	0.708								
				Peak:	Peak:	Initial	0.0	0.0	0	20.5	0	0	0.000								
						30	0.0	0.0	6.9	5.1	0	0	0.013								
					0.3	60	0.0	0.0	7	4.5	0	0	0.012								
WS111	25/01/2018 10:00	1006	7			90	0.0	0.0	7.1	4.4	0	0	0.012			1.15	1.30				
				Steady:	Steady:	120	0.0	0.0	7.1	4.3	0	0	0.011								
					0.1	150	0.0	0.0	7.1	4.3	0	0	0.010								
						180	0.0	0.0	7.1	4.3	0	0	0.010								
				Peak:	Peak:	Initial	0.0	0	0	20.5	0	0	0.000								
						30	0.0	0	4	9.1	0	0	0.035								
					0.7	60	0.0	0	2.3	14.6	0	0	0.024								
WS110	25/01/2018 09:40	1006	7			90	0.0	0	0.9	18.1	0	0	0.020			2.95	3.00				
			<u>s</u>				Steady:	Steady:	120	0.0	0	0.4	19.7	0	0	0.017					
						0.3	150	0.0	0	0.2	20.0	0	0	0.015							
						180	0.0	0	0.2	20.1	0	0	0.014								

Notes:	Ambient Co	ncentration
Gas concentrations 0% unless otherwise specified.	CH4	0%
WS03 could not be located (drilled >1 year ago, Sep 2016, vegetation growth and animal grazing have covered location)	CO2	0%
	02	0.00%
	H2S	0%
	со	0%
Previous weather conditions. Atmosphic pressure trend and rate floading, soil moisture water draw in tube wind direction/strength condition of monitoring point missing/open tan datum level vegetation stress adjurs hubbles etc.		

QA Checklist:			
Weather conditions logged for previous 24 hrs	x		Instrument Details:
Gas monitor calibrated	x		Landfill Gas Analyser
All filters in place	x]	PID
Flow reading stable and zeroed	x]	Dip meter/interface probe





APPENDIX F

GEOTECHNICAL LABORATORY TEST DATA





Qty

7

7

1

6

6

2

1

Contract Number: 32431

Client's Reference: UA008386

Laboratory Report

Report Date: 11-10-2016

Client Arcadis Fortran Rd St Mellons Cardiff CF3 0EY

Contract Title: Cosmeston For the attention of: Sian Carter

Date Received: 20-09-2016 Date Commenced: 20-09-2016 Date Completed: 11-10-2016

Test Description

4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS

Moisture Content

1377 : 1990 Part 2 : 3.2 - * UKAS

PSD Wet Sieve method

1377 : 1990 Part 2 : 9.2 - * UKAS

Water Soluble Sulphate 2:1 extract

1377 : 1990 Part 3 : 5 - @ Non Accredited Test

pH Value of Soil...

1377 : 1990 Part 3 : 9 - @ Non Accredited Test

Dry Den/MC (2.5kg Rammer Method 1 Litre Mould)

1377 : 1990 Part 4 : 3.3 - * UKAS

Disposal of Samples on Project

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 except in full, without the prior written approval of the laboratory.

Approved Signatories:

Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - Emma Sharp (Office Manager) Paul Evans (Quality/Technical Manager) - Vaughan Edwards (Managing Director)

Client ref:	UA008386
Location:	Cosmeston
Contract Number:	32431

Hole	Sample			
Number	Number	Туре	Depth (m)	Description of Sample*
TP02	5	В	2.30 - 3.50	Brown fine to medium silty CLAY.
TP11	3	В	0.35 - 0.90	Brown fine to medium silty CLAY.
TP18	3	В	0.30 - 0.90	Brown slightly fine to medium silty CLAY.
TP19	3	В	0.30 - 0.60	Brown fine to medium silty CLAY with rootlets.
WS01	5	В	2.20 - 2.50	Brown fine to medium silty CLAY.
WS03	2	В	0.20 - 1.20	Brown fine to medium silty CLAY.
WS06	4	В	0.40 - 0.60	Brown fine to medium silty CLAY.

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory



For and behalf of GEO Site & Testing Services Ltd

Authorised By: Ben Sharp (Contracts Manager) Date: 11.10.16





Test Report: Method of the Determination of the plastic limit and plasticity index BS 1377 : Part 2 : 1990 Method 5

Client ref:	UA008386
Location:	Cosmeston
Contract Number:	32431

Hole/			Moisture	Liquid	Plastic	Plasticity	%	
Sample	Sample	Depth	Content	Limit	Limit	Index	Passing	Remarks
Number	Туре	m	%	%	%	%	.425mm	
			Cl. 3.2	Cl. 4.3/4.4	Cl. 5.	Cl. 6.		
TP02/5	В	2.30 - 3.50	34	58	28	30	90	CH High Plasticity
TP11/3	В	0.35 - 0.90	22	42	17	25	93	CI Intermediate Plasticity
TP18/3	В	0.30 - 0.90	32	54	25	29	96	CH High Plasticity
TP19/3	В	0.30 - 0.60	29	52	24	28	87	CH High Plasticity
WS01/5	В	2.20 - 2.50	23	49	25	24	82	CI Intermediate Plasticity
WS03/2	В	0.20 - 1.20	22	49	24	25	86	CI Intermediate Plasticity
WS06/4	В	0.40 - 0.60	25	55	28	27	90	CH High Plasticity

Symbols:

NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.





For and behalf of GEO Site & Testing Services Ltd

Authorised By: Ben Sharp (Contracts Manager) Date: 11.10.16





Test Report:

Particle Size Distribution Test BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref:	UA008386	Sample Number:	3
Contract Number:	32431	Depth from (m):	0.30
Hole Number:	TP04	Depth to (m):	1.00
		Sample Type:	В
Location:	Cosmeston		
Description:	Brown fine to coarse sandy claye	y silty fine to coarse GRAVEL wit	h cobbles.



Remarks: #- not determined



For and behalf of GEO Site & Testing Services Ltd

Authorised By: Ben Sharp (Contracts Manager)



Date: 11.10.16





Unit 4 Heol Aur Dafen Ind Estate Dafen Carmarthenshire SA14 8QN Tel: 01554 784040 01554 750752 Fax: 01554 770529 01554 784041 Web: www.geo.uk.com

Certificate of Analysis

Date:	28-09-16
Client:	Arcadis
Our Reference:	32431-
Client Reference:	UA008386
Contract Title:	Cosmeston
Description: (Total Samples)	5
Date Started:	26-09-16
Date Completed:	28-09-16
Test Procedures:	(B.S. 1377 : PART 3 : 1990)

Notes:

Solid samples will be disposed 1 month and liquids 2 weeks

Approved By:

Authorised Signatories:

Emma Sharp Laboratory Office Manager Ben Sharp Contracts Manager



Paul Evans Quality Manager

Contract No:	32431-
Client Ref:	UA008386
Location:	Cosmeston
Date:	28-09-2016

SUMMARY OF CHEMICAL ANALYSIS

(B.S. 1377 : PART 3 : 1990)

				Sulphate Content SO ₃ Chloride Conten		ontent					
				Acid	Aqueous	Ground-	2/1	Acid	pН	Organic	Redox
Hole	Sample	Sample	Depth	Soluble	Extract	water	Water Soluble	Soluble	Value	Matter	Mv
Number	Number	Type	m	Sulphate	Sulphate		Chloride ions	Chloride	@ 25°C	Content	
		- //		as % SO ₂	as q/I SO ₂	a/I	%	%	Redox	%	
						Glausso E 4	Clause 7.2	Clause 7.2	Clause 0 F	Clause 3	Clause 4
TD04	5	P	1 20-2 90	Ciduse 5.2 & 5.5.		Ciduse 5.4.	Clause 7.2	Clause 7.5	7 25	Clause 5	Clause 4
	J 1		1.20-2.00		0.05				7.23		
1206	1	В	0.00-0.25		0.02				7.44		
TP10	3	В	0.75-1.10		0.02				7.89		
TP20	3	В	0.30-1.20		0.03				7.56		
WS01	3	В	1.30-1.50		0.02				7.39		
WS03	2	В	0.20-1.20		0.01				7.22		
	L										

NCP - No Chloride present

Dry Density/Moisture Content Relationship BS 1377:Part 4:1990

Client ref:	UA008386
Location:	Blacktoft to Yokefleet
Contract Number:	32431
Hole Number:	TP09
Sample Number:	1
Depth (m):	0.00 - 0.30
Sample Type:	В
Sample Description:	Brown slightly fine to coarse gravelly silty CLAY with rootlets.



Remarks:



Checked By: Ben Sharp

Approved By: Paul Evans





Date Approved:

11.10.16

Dry Density/Moisture Content Relationship BS 1377:Part 4:1990

Client ref:	UA008386				
Location:	Blacktoft to Yokefleet				
Contract Number:	32431				
Hole Number:	ТР14				
Sample Number:	1				
Depth (m):	0.00 - 0.30				
Sample Type:	В				
Sample Description:	Brown very silty CLAY with rootlets.				



Remarks:



Checked By: Ben Sharp

Approved By: Paul Evans





Date Approved:

11.10.16





Contract Number: 37495

Client Ref: **10011193 - 08** Client PO: **14002356**

Laboratory Report

Report Date:

Client Arcadis Fortran Rd St Mellons Cardiff CF3 0EY

Contract Title: Cosmeston For the attention of: Christopher Pristavec

Date Received: 05-12-2017 Date Commenced: 05-12-2017 Date Completed:

Test Description Qty Mobilisation to Site 2 Provision of WS tracked rig with 2 man crew & hand tools excludes liners and breaker and mob 4 Provision of geotechnical engineer to supervise works and log pits. Price includes day rate 8 supervision **DP Cone Tip** 8 **Clear Core Wall Liners 1m Length** 24 Hire of RD4000 - NR approved Cable detector 1 Day rate to provide Technician and equipment including mobilisation but excluding provision of 1 machine as kentiledge (to be provided by others) & Determination of the vertical deformation and strength characteristics of soil by the plate loading test, using a 600 mm diameter steel plate. The test comprises 4 No. loading and 1 No. unloading cycles, as specified by the Client. As many tests are required by client that can be done in one day.

- * UKAS

Notes: Observations and Interpretations are outside the UKAS Accreditation

- * denotes test included in laboratory scope of accreditation
- # denotes test carried out by approved contractor
- $\ensuremath{@}$ 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 except in full, without the prior written approval of the laboratory. **Approved Signatories:**

Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager) Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative Assistant) Vaughan Edwards (Managing Director) - Wayne Honey (Administrative/Quality Assistant)

GEO Site & Testing Services Ltd Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk





Contract Number: 37495

T+	Decembration	
rest	Description	

Postcrete

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 except in full, without the prior written approval of the laboratory. **Approved Signatories:**

Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager) Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative Assistant) Vaughan Edwards (Managing Director) - Wayne Honey (Administrative/Quality Assistant)

CCTI	Determination of the Vertical Deformation Tests BS	Contract Number	37495-051217
GOIL	1377: Part 9: 1990 Clause 4.8	Client Reference	10011193 - 08
Client	Arcadis Consulting Limited	Test Date	11/12/2017
Site Location	Cosmeston	Test Location	PL101
Soil Description	Brown gravelly soft silty CLAY	Test Depth (m)	1.20
		Kentledge Type	Tracked Excavator

Bearing Pressure (kPa)



Maximum Applied Pressure (kn/m2)168.51Maximum Deformation (mm)19.91Plate Area (m2)0.16331Assumed Poissons Ratio0.25Remarks0.25

Ground to soft max travel reached



CCTI	Determination of the Vertical Deformation Tests BS	Contract Number	37495-051217
GJIL	1377: Part 9: 1990 Clause 4.8	Client Reference	10011193 - 08
Client	Arcadis Consulting Limited	Test Date	11/12/2017
Site Location	Cosmeston	Test Location	PL102
Soil Description	Brown gravelly soft silty CLAY	Test Depth (m)	1.20
		Kentledge Type	Tracked Excavator

Bearing Pressure (kPa)



Ben Steele Date 12/12/2017	Test Operator	Checked and	Authorised by	Vaughan Edwards	wh	
	Ben Steele	Date	12/12/2017		-tah-	





Contract Number: 37675

Client Ref: **UA008386-02** Client PO: **14002356**

Laboratory Report

Report Date: 13-01-2018

Client Arcadis Fortran Rd St Mellons Cardiff CF3 0EY

Contract Title: Cosmeston Phase 2 For the attention of: Team Arcadis

Date Received: 21-12-2017 Date Commenced: 21-12-2017 Date Completed: 13-01-2018

Test Description

Moisture Content BS 1377 : Part 2 : 3.2 - * UKAS

4 Point Liquid & Plastic Limit (LL/PL)

BS 1377 Part 2 : 4.3 & 5.3 - * UKAS

Dry Den/MC (2.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.3 - * UKAS

BRE Suite D Ph Total Sulphate, Aqueous Sulphate, Total Sulphur, Aqueous Nitrate, Aqueous Mag, Chloride,

- @ Non Accredited Test

Disposal of Samples on Project

1

Qty

9

6

3

2

Notes: Observations and Interpretations are outside the UKAS Accreditation

- * denotes test included in laboratory scope of accreditation
- # denotes test carried out by approved contractor
- $\ensuremath{@}$ 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 except in full, without the prior written approval of the laboratory. Approved Signatories:

Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager) Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative Assistant) Vaughan Edwards (Managing Director) - Wayne Honey (Administrative/Quality Assistant)

GSTL

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377 : Part 2 : 1990 Method 5)

DESCRIPTIONS

 Contract Number
 37675

 Site Name
 Cosmeston Phase 2

TP	Sample	Sample	Depth (m)		n)	Descriptions				
Iriaipit	Number	туре								
TP101	3	В	0.90	-	1.00	Brown fine to coarse gravelly silty CLAY				
TP101	5	В	1.70	-	2.00	Brown silty CLAY				
TP105	3	В	0.90	-	1.30	Brown slightly fine gravelly sandy silty CLAY				
TP105	5	В	1.70	-	2.00	Brown silty CLAY				
TP105	7	В	2.80	-	3.00	Brown silty sandy CLAY				
TP111	3	В	0.70	-	1.20	Brown slightly fine gravelly silty CLAY				
TP111	5	В	2.00	-	2.40	Brown fine gravelly silty CLAY				
TP111	7	В	2.80	-	3.00	Brown slightly fine to medium gravelly silty CLAY				
TP114		В	0.70	-	1.10	Brown fine to medium gravelly silty CLAY				
				-						
				-						
				-						
				-						
				-						
				-						
				-						
				-						
				-						
				-						
				-						
				-						
				-						
				-						
				-						

Operators	Checked	12/01/2018	Sean Penn	B.C.
RO/MH	Approved	13/01/2018	Ben Sharp	R





LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377 : Part 2 : 1990 Method 5)

37675

Contract Number

Site Name		Cos				
TD						

TP Trialoit	Sample Number	Sample Type	De	epth (r	n)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity	Passing .425mm %	Remarks
TP101	3	B	0.90	-	1.00	28	59	18	41	75	CH High Plasticity
TP101	5	B	1.70	-	2.00	22					
TP105	3	B	0.90	-	1.30	22	43	15	28	96	CI Intermediate Plasticity
TP105	5	В	1.70	-	2.00	28	-				- ,
TP105	7	В	2.80	-	3.00	33	50	19	31	100	CI/H Inter/High Plasticity
TP111	3	В	0.70	-	1.20	35	39	16	23	95	CI Intermediate Plasticity
TP111	5	В	2.00	-	2.40	24					
TP111	7	В	2.80	-	3.00	20	36	22	14	92	CI Intermediate Plasticity
TP114		В	0.70	-	1.10	28	72	32	40	78	CV Very High Plasticity
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
Symbols: NP : Non P	lastic	# : Liquid Li	mit and Plas	stic Lir	nit Wet Sie	ved					

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION

BS 5930:1999+A2:2010









CCTI	Certificate of Chemical Analysis	Contract Number	37675		
GOIL	(BRE BR 279)	Client Reference	UA008386-02		
Client	Arcadis	Date Received			
Site Name	Cosmeston Phase 2	Date Started	05/01/2018		
		Date Completed	13/01/2018		
		No. of Samples	2		

Hole Number	Sample Number	Sample Type		Depth (m)	Acid Soluble Sulphate	Aqueous Extract Sulphate	Chloride Content	Ph Value	Total Sulphur	Magnesium	Nitrate
TP104	3	В	0.70	-	1.00	0.39	0.03	NCP	8.16	0.14	<1	<10
TP114		В	0.70	-	1.10	0.29	0.02	NCP	7.59	0.11	<1	0-25
				-								
				- 1								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
				-								-
				1.								-
				- 1								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
				-								
Key		Repor	ted As					Rem	arks			
Acid Soluble S	Sulphate	%	SO₄				N	CP = No Ch	loride Prese	ent		
Aqueous Extrac	t Sulphate	g/l :	SO₄									
Chloride Conte	ent (Semi)	ma	CI/I	1								
PH Val	ue /	@	25°									
Total Sul	phur	%	S									
Magnesi	um	a/I	SO₄	-								
Nitrate	Nitrate NO ₂ mg/l											
	-	1.03										
Test Operato	or	Checke	d and Aut	horised	by	Bon	Sharn	_	>	-		
Darren Bourr	Darren Bourne		Date		/2018	Della	Sharp	\leq	\rightarrow	\sim		
APPENDIX G

GEO-ENVIRONMENTAL LABORATORY TEST DATA



Arcadis Consulting (UK) Ltd HCL House St Mellon's Business Park Cardiff CF3 OEY

t: 029 2092 6873

e: Sian.Carter@arcadis.com

Preliminary Report Number : 16-27453

Project / Site name:	Cosmeston	Samples received on:	12/09/2016
Your job number:	UA008386	Samples instructed on:	12/09/2016
Your order number:		Analysis completed by:	not complete
Report Issue Number:	0	Report issued on:	20/09/2016
Samples Analysed:	5 leachate samples - 24 soil samples		

Signed:

Rexona Rahman Reporting Manager For & on behalf of i2 Analytical Ltd. Signed:

Emma Winter Assistant Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

 soils
 - 4 weeks from reporting

 leachates
 - 2 weeks from reporting

 waters
 - 2 weeks from reporting

 asbestos
 - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Preliminary reports provided at the request of the client should be considered as incomplete and have not been through the complete quality control procedure.

Results contained in preliminary reports may be subject to change and therefore should not be used as a basis for decision making, except at the risk of the client.



i2 Analytical Ltd. 7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com





Lab Sample Number		627556	627557	627558	627559	627560		
Sample Reference				WS01	WS03	WS03	WS04	WS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Denth (m)				0 20-0 50	0.00-0.20	2 30-2 40	0.00-0.50	0 10-0 40
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	05/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	14	17	16	18	18
Total mass of sample received	ka	0.001	NONE	1.5	1.2	1.2	1.3	1.2
Ashestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
	1,750	.,,,	100 17020	Hot detected		not detected	Hot detected	Hot detected
General Inorganics								
nH - Automated	nH Unite	N/A	MCEDIC	85	81	87	82	7.8
Total Cvanide	ma/ka	1	MCEDIC	< 1	< 1	< 1	< 1	<pre>/.0 </pre>
Free Cvanide	mg/kg	1	MCEDTC	< 1		< 1	< 1	<u> </u>
Water Soluble SO4 16br extraction (2:1 Leachate	пу/ку	1	PICERTS	< I	< 1	< I		< I
Fourivalent)	۵/۱	0.00125	MCERTS	0.032	0.014	0.056	0.023	0.0094
Eraction Organic Carbon (EOC)	9/1 N/Δ	0.001	NONE	0.021	0.029	-	0.037	-
	,/	0.001	Hone	01021	01025		01007	
Total Phenois								
Total Phenols (monohydric)	ma/ka	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	nig/kg	1	PICENTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Nanhthalana	ma // ca	0.05	MCEDIC	< 0.0F	< 0.0F	< 0.0F	0.97	< 0.0F
	niy/ky	0.05	MCERTS	< 0.03	< 0.03	< 0.03	0.07	< 0.03
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphtnene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.4/	< 0.10
Fluorene Disasantinana	mg/кg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.38	< 0.10
Anthrease	mg/kg	0.1	MCERIS	< 0.10	< 0.10	< 0.10	2./	< 0.10
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.54	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	6.3	< 0.10
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	5.2	< 0.10
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	3.2	< 0.10
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	4.4	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	5.7	< 0.10
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	2.1	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	3.1	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	1.6	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.59	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.7	< 0.05
Total PAH	-	-						
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	< 1.60	38.8	< 1.60
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	19	18	3.4	10	10
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	2.2	0.7	0.6	2.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.3
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kq	1	MCERTS	20	27	12	13	27
Copper (agua regia extractable)	ma/ka	1	MCERTS	34	35	25	48	37
Lead (agua regia extractable)	ma/ka	1	MCERTS	26	34	8.9	33	34
Mercury (agua regia extractable)	ma/ka	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (agua regia extractable)	ma/ka	1	MCERTS	30	38	24	33	47
Selenium (agua regia extractable)	ma/ka	1	MCERTS	< 1.0	4.0	< 1.0	2.4	2.6
Zinc (aqua regia extractable)	ma/ka	1	MCERTS	100	110	19	64	75





Project / Site name: Cosmeston

Lab Sample Number				627556	627557	627558	627559	627560
Sample Reference				WS01	WS03	WS03	WS04	WS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.50	0.00-0.20	2.30-2.40	0.00-0.50	0.10-0.40
Date Sampled			05/09/2016	05/09/2016	05/09/2016	05/09/2016	05/09/2016	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	< 8.0
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	< 8.0
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	< 10	< 10
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	-	27	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	-	< 10	-	66	22
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	93	22

Environmental Forensics Organochlorine Pesticides

Aldrin	µg/kg	10	NONE	To follow	-	-	-	-
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	To follow	-	-	-	-
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	To follow	-	-	-	-
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	To follow	-	-	-	-
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	To follow	-	-	-	-
Dieldrin	µg/kg	10	NONE	To follow	-	-	-	-
Endosulphan A	µg/kg	10	NONE	To follow	-	-	-	-
Endosulphan B	µg/kg	10	NONE	To follow	-	-	-	-
Endrin	µg/kg	10	NONE	To follow	-	-	-	-
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	To follow	-	-	-	-
HCB (Hexachlorobenzene)	µg/kg	10	NONE	To follow	-	-	-	-
Heptachlor	µg/kg	10	NONE	To follow	-	-	-	-
Heptachlor Epoxide	µg/kg	10	NONE	To follow	-	-	-	-
Isodrin	µg/kg	10	NONE	To follow	-	-	-	-
pp-Methoxychlor	µg/kg	10	NONE	To follow	-	-	-	-
o,p-DDE	µg/kg	10	NONE	To follow	-	-	-	-
o,p-DDT	µg/kg	10	NONE	To follow	-	-	-	-
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	To follow	-	-	-	-
p,p-DDE	µg/kg	10	NONE	To follow	-	-	-	-
p,p-DDT	µg/kg	10	NONE	To follow	-	-	-	-
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	To follow	-	-	-	-
Trifluralin	µg/kg	10	NONE	To follow	-	-	-	-

Organophosphorous pesticides

- Jane Procession Procession								
Azinphos-methyl	µg/kg	10	NONE	To follow	-	-	-	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	To follow	-	-	-	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	To follow	-	-	-	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	To follow	-	-	-	-
Diazinon	µg/kg	10	NONE	To follow	-	-	-	-
Dichlorvos	µg/kg	10	NONE	To follow	-	-	-	-
Dimethoate	µg/kg	10	NONE	To follow	-	-	-	-
E-mevinphos	µg/kg	10	NONE	To follow	-	-	-	-
Z-mevinphos	µg/kg	10	NONE	To follow	-	-	-	-
Fenitrothion	µg/kg	10	NONE	To follow	-	-	-	-
Fenthion	µg/kg	10	NONE	To follow	-	-	-	-
Malathion	µg/kg	10	NONE	To follow	-	-	-	-
Parathion-ethyl	µg/kg	10	NONE	To follow	-	-	-	-
Parathion-methyl	µg/kg	10	NONE	To follow	-	-	-	-
Phorate	µg/kg	10	NONE	To follow	-	-	-	-





Lab Sample Number				627556	627557	627558	627559	627560
Sample Reference				WS01	WS03	WS03	WS04	WS05
Sample Number			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)			0.20-0.50	0.00-0.20	2.30-2.40	0.00-0.50	0.10-0.40	
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	05/09/2016
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Analytical Parameter Units Contract of Con							





Lab Sample Number		627561	627562	627563	627564	627565		
Sample Reference				WS06	WS06	WS07	WS07	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Denth (m)				0.00-0.20	0.40-0.60	0.00-0.20	0.20-0.50	0.00-0.30
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	06/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
				Hone Supplied	None Supplied		None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	21	17	26	22	21
Total mass of sample received	kg	0.001	NONE	1.4	1.5	1.4	1.2	1.5
• •		•						
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
	• .							
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.4	8.0	7.4	8.0	8.1
Total Cvanide	ma/ka	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cvanide	ma/ka	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate								
Equivalent)	g/l	0.00125	MCERTS	0.012	0.0092	0.062	0.035	0.0091
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	-	-	0.039	-	0.021
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.61	< 0.10	< 0.10
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.53	< 0.10	< 0.10
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.37	< 0.10	< 0.10
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.42	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.43	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.27	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.33	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	2.96	< 1.60	< 1.60
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	13	16	11	15
Boron (water soluble)	mg/kg	0.2	MCERTS	2.2	1.6	2.5	1.9	2.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	< 0.2	0.8	0.9	0.6
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	23	33	27	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	39	35	40	40	48
Lead (aqua regia extractable)	mg/kg	1	MCERTS	35	27	60	32	48
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	45	41	57	63	41
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	2.7	3.4	1.9
Zinc (agua regia extractable)	ma/ka	1	MCERTS	91	67	180	150	140





Project / Site name: Cosmeston

Lab Sample Number		627561	627562	627563	627564	627565		
Sample Reference				WS06	WS06	WS07	WS07	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.20	0.40-0.60	0.00-0.20	0.20-0.50	0.00-0.30
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	06/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Petroleum Hydrocarbons					-		-	-
TPH6 - Aliphotic (C6 - C9)	ma/ka	0.1	NONE	< 0.1	1	< 0.1	1	< 0.1
TPH6 - Aliphatic $(C0 - C0)$	ma/ka	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
TPH6 - Aliphatic $(C0 - C10)$	mg/kg	0.1	INUINE	< 1.0	-	< 1.0	-	< 1.0
TPH6 - Aliphatic (C12 - C12)	mg/kg	2	ISO 17025	< 1.0	-	< 1.0	-	< 1.0
TPH6 - Aliphatic (C16 - C21)	ma/ka	8	ISO 17025	< 8.0		< 2.0		< 2.0
TPH6 - Aliphatic (C21 - C35)	ma/ka	8	ISO 17025	< 8.0	_	< 8.0	_	< 8.0
TPH6 - Aliphatic (C6 - C35)	ma/ka	10	NONE	< 10	-	< 10	-	< 10
	5, 5							
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	< 1.0	-	< 1.0	-	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	< 2.0	-	< 2.0	-	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	< 10	-	< 10	-	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	< 10	-	< 10	-	< 10
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	< 10	-	< 10	-	< 10
Environmental Forensics Organochlorine Pesticides								

Aldrin	µg/kg	10	NONE	-	-	-	-	To follow
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	-	-	-	-	To follow
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	-	-	-	-	To follow
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	-	-	-	-	To follow
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	-	-	-	-	To follow
Dieldrin	µg/kg	10	NONE	-	-	-	-	To follow
Endosulphan A	µg/kg	10	NONE	-	-	-	-	To follow
Endosulphan B	µg/kg	10	NONE	-	-	-	-	To follow
Endrin	µg/kg	10	NONE	-	-	-	-	To follow
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	-	-	-	-	To follow
HCB (Hexachlorobenzene)	µg/kg	10	NONE	-	-	-	-	To follow
Heptachlor	µg/kg	10	NONE	-	-	-	-	To follow
Heptachlor Epoxide	µg/kg	10	NONE	-	-	-	-	To follow
Isodrin	µg/kg	10	NONE	-	-	-	-	To follow
pp-Methoxychlor	µg/kg	10	NONE	-	-	-	-	To follow
o,p-DDE	µg/kg	10	NONE	-	-	-	-	To follow
o,p-DDT	µg/kg	10	NONE	-	-	-	-	To follow
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	-	-	-	-	To follow
p,p-DDE	µg/kg	10	NONE	-	-	-	-	To follow
p,p-DDT	µg/kg	10	NONE	-	-	-	-	To follow
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	-	-	-	-	To follow
Trifluralin	µg/kg	10	NONE	-	-	-	-	To follow

Organophosphorous pesticides

Azinphos-methyl	µg/kg	10	NONE	-	-	-	-	To follow
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	-	-	-	To follow
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	-	-	-	To follow
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	-	-	-	To follow
Diazinon	µg/kg	10	NONE	-	-	-	-	To follow
Dichlorvos	µg/kg	10	NONE	-	-	-	-	To follow
Dimethoate	µg/kg	10	NONE	-	-	-	-	To follow
E-mevinphos	µg/kg	10	NONE	-	-	-	-	To follow
Z-mevinphos	µg/kg	10	NONE	-	-	-	-	To follow
Fenitrothion	µg/kg	10	NONE	-	-	-	-	To follow
Fenthion	µg/kg	10	NONE	-	-	-	-	To follow
Malathion	µg/kg	10	NONE	-	-	-	-	To follow
Parathion-ethyl	µg/kg	10	NONE	-	-	-	-	To follow
Parathion-methyl	µg/kg	10	NONE	-	-	-	-	To follow
Phorate	µg/kg	10	NONE	-	-	-	-	To follow

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Lab Sample Number				627561	627562	627563	627564	627565
Sample Reference				WS06	WS06	WS07	WS07	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.20	0.40-0.60	0.00-0.20	0.20-0.50	0.00-0.30
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	06/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					





Lab Sample Number				627566	627567	627568	627569	627570
Sample Reference				TP08	TP09	TP10	TP11	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-1.30	0.00-0.30	0.00-0.30	0.00-0.20	0.00-0.30
Date Sampled				06/09/2016	06/09/2016	06/09/2016	06/09/2016	06/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	20	21	23	24
Total mass of sample received	kg	0.001	NONE	1.0	1.4	1.5	1.4	1.4
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics		N//A	MCEDIC	9.6	77	7.0	75	7.2
Tetal Cranida	pri Units	N/A 1	MCEDIC	0.0	/./	7.0	7.5	7.5
	mg/kg	1	MCEDIC			< 1		
Water Soluble SO4 16hr extraction (2:1 Leachate	nig/Kg		MCEK15	× 1				<u>\</u>
Equivalent)	a/l	0.00125	MCERTS	0.0091	0.011	0.012	0.017	0.032
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	-	-	-	-	-
	• •	•			•			
Total Phenois								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.30
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.95
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.73
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.55
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.62
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.91
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.27
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.53
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.27
	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(gni)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.27
Total DAH								
Speciated Total EDA_16 DAHs	ma/ka	16	мсертс	< 1.60	< 1.60	< 1.60	< 1.60	5.40
	iiig/kg	1.0	PICENTS	< 1.00	< 1.00	< 1.00	< 1.00	5.10
Heavy Metals / Metalloids								
Arsenic (agua regia extractable)	ma/ka	1	MCERTS	4.5	13	16	19	19
Boron (water soluble)	ma/ka	0.2	MCERTS	0.7	2.9	2.4	3.8	4.0
Cadmium (aqua regia extractable)	mg/ka	0.2	MCERTS	< 0.2	0.6	0.5	0.6	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	8.8	26	27	24	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24	42	43	45	44
Lead (aqua regia extractable)	mg/kg	1	MCERTS	9.7	49	46	46	61
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	40	44	54	44
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	3.1	4.0	2.7	1.6
Zinc (aqua regia extractable)	ma/ka	1	MCERTS	47	130	110	140	160





Project / Site name: Cosmeston

ab Sample Number				627566	627567	627568	627569	627570
Sample Reference				TP08	TP09	TP10	TP11	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-1.30	0.00-0.30	0.00-0.30	0.00-0.20	0.00-0.30
Date Sampled				06/09/2016	06/09/2016	06/09/2016	06/09/2016	06/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Petroleum Hydrocarbons								
TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	< 8.0
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	< 8.0
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	< 10	< 10
	-							
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	-	< 10	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	-	< 10	-	< 10	23
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	< 10	23

Environmental Forensics Organochlorine Pesticides

Aldrin	µg/kg	10	NONE	-	-	-	To follow	-
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	-	-	-	To follow	-
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	-	-	-	To follow	-
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	-	-	-	To follow	-
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	-	-	-	To follow	-
Dieldrin	µg/kg	10	NONE	-	-	-	To follow	-
Endosulphan A	µg/kg	10	NONE	-	-	-	To follow	-
Endosulphan B	µg/kg	10	NONE	-	-	-	To follow	-
Endrin	µg/kg	10	NONE	-	-	-	To follow	-
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	-	-	-	To follow	-
HCB (Hexachlorobenzene)	µg/kg	10	NONE	-	-	-	To follow	-
Heptachlor	µg/kg	10	NONE	-	-	-	To follow	-
Heptachlor Epoxide	µg/kg	10	NONE	-	-	-	To follow	-
Isodrin	µg/kg	10	NONE	-	-	-	To follow	-
pp-Methoxychlor	µg/kg	10	NONE	-	-	-	To follow	-
o,p-DDE	µg/kg	10	NONE	-	-	-	To follow	-
o,p-DDT	µg/kg	10	NONE	-	-	-	To follow	-
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	-	-	-	To follow	-
p,p-DDE	µg/kg	10	NONE	-	-	-	To follow	-
p,p-DDT	µg/kg	10	NONE	-	-	-	To follow	-
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	-	-	-	To follow	-
Trifluralin	µg/kg	10	NONE	-	-	-	To follow	-

Organophosphorous pesticides

Azinphos-methyl	µg/kg	10	NONE	-	-	-	To follow	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	-	-	To follow	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	-	-	To follow	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	-	-	To follow	-
Diazinon	µg/kg	10	NONE	-	-	-	To follow	-
Dichlorvos	µg/kg	10	NONE	-	-	-	To follow	-
Dimethoate	µg/kg	10	NONE	-	-	-	To follow	-
E-mevinphos	µg/kg	10	NONE	-	-	-	To follow	-
Z-mevinphos	µg/kg	10	NONE	-	-	-	To follow	-
Fenitrothion	µg/kg	10	NONE	-	-	-	To follow	-
Fenthion	µg/kg	10	NONE	-	-	-	To follow	-
Malathion	µg/kg	10	NONE	-	-	-	To follow	-
Parathion-ethyl	µg/kg	10	NONE	-	-	-	To follow	-
Parathion-methyl	µg/kg	10	NONE	-	-	-	To follow	-
Phorate	µg/kg	10	NONE	-	-	-	To follow	-





Lab Sample Number				627566	627567	627568	627569	627570
Sample Reference				TP08	TP09	TP10	TP11	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-1.30	0.00-0.30	0.00-0.30	0.00-0.20	0.00-0.30
Date Sampled				06/09/2016	06/09/2016	06/09/2016	06/09/2016	06/09/2016
Time Taken			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					





Lab Sample Number				627571	627572	627573	627574	627575
Sample Reference				TP18	TP21	TP13	TP14	TP15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Denth (m)				0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.20
Date Sampled				06/09/2016	06/09/2016	07/09/2016	07/09/2016	07/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
				Hone Supplied	None Supplied		None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	24	21	18	27	20
Total mass of sample received	ka	0.001	NONE	1.2	1.5	1.4	1.1	1.5
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.6	7.3	8.1	7.5	7.3
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate								
Equivalent)	g/l	0.00125	MCERTS	0.017	0.019	0.017	0.018	0.011
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	0.025	-	0.028	-	-
Total Phenols		-						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs		-						
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.28	0.28	< 0.10
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.60	1.8	< 0.10
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.52	1.2	< 0.10
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.31	1.4	< 0.10
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.38	1.1	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.36	2.1	< 0.10
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.26	0.75	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.31	1.3	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.55	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.15	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.48	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	3.02	11.2	< 1.60
Heavy Metals / Metalloids		.						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	16	14	8.6	14
Boron (water soluble)	mg/kg	0.2	MCERTS	3.9	2.5	2.4	3.2	2./
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	0./	0.8	0.6	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg		MCERTS	30	30	22	22	24
Copper (aqua regia extractable)	mg/kg		MCERTS	42	3/	43	3/	36
Lead (aqua regia extractable)	mg/kg	1	MCERTS	65	49	65	51	49
Miercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
INICKEI (aqua regia extractable)	mg/kg		MCERTS	41	52	4/	38	3/
	mg/kg		MCERTS	2.9	3.3	< 1.0	< 1.0	3.3
ZINC (aqua regia extractable)	I ma/ka	1 1	MULERIS	140	110	120	120	100





Project / Site name: Cosmeston

Lab Sample Number				627571	627572	627573	627574	627575
Sample Reference				TP18	TP21	TP13	TP14	TP15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.20
Date Sampled				06/09/2016	06/09/2016	07/09/2016	07/09/2016	07/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Petroleum Hydrocarbons							-	
TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	-
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	-
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	-	< 8.0	-	9.4	-
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	< 10	-
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	-
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	-	< 10	-
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	-	< 10	-	26	-
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	26	-

Environmental Forensics Organochlorine Pesticides

Aldrin	µg/kg	10	NONE	To follow	-	-	-	-
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	To follow	-	-	-	-
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	To follow	-	-	-	-
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	To follow	-	-	-	-
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	To follow	-	-	-	-
Dieldrin	µg/kg	10	NONE	To follow	-	-	-	-
Endosulphan A	µg/kg	10	NONE	To follow	-	-	-	-
Endosulphan B	µg/kg	10	NONE	To follow	-	-	-	-
Endrin	µg/kg	10	NONE	To follow	-	-	-	-
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	To follow	-	-	-	-
HCB (Hexachlorobenzene)	µg/kg	10	NONE	To follow	-	-	-	-
Heptachlor	µg/kg	10	NONE	To follow	-	-	-	-
Heptachlor Epoxide	µg/kg	10	NONE	To follow	-	-	-	-
Isodrin	µg/kg	10	NONE	To follow	-	-	-	-
pp-Methoxychlor	µg/kg	10	NONE	To follow	-	-	-	-
o,p-DDE	µg/kg	10	NONE	To follow	-	-	-	-
o,p-DDT	µg/kg	10	NONE	To follow	-	-	-	-
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	To follow	-	-	-	-
p,p-DDE	µg/kg	10	NONE	To follow	-	-	-	-
p,p-DDT	µg/kg	10	NONE	To follow	-	-	-	-
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	To follow	-	-	-	-
Trifluralin	µg/kg	10	NONE	To follow	-	-	-	-

Organophosphorous pesticides

Azinphos-methyl	µg/kg	10	NONE	To follow	-	-	-	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	To follow	-	-	-	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	To follow	-	-	-	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	To follow	-	-	-	-
Diazinon	µg/kg	10	NONE	To follow	-	-	-	-
Dichlorvos	µg/kg	10	NONE	To follow	-	-	-	-
Dimethoate	µg/kg	10	NONE	To follow	-	-	-	-
E-mevinphos	µg/kg	10	NONE	To follow	-	-	-	-
Z-mevinphos	µg/kg	10	NONE	To follow	-	-	-	-
Fenitrothion	µg/kg	10	NONE	To follow	-	-	-	-
Fenthion	µg/kg	10	NONE	To follow	-	-	-	-
Malathion	µg/kg	10	NONE	To follow	-	-	-	-
Parathion-ethyl	µg/kg	10	NONE	To follow	-	-	-	-
Parathion-methyl	µg/kg	10	NONE	To follow	-	-	-	-
Phorate	µg/kg	10	NONE	To follow	-	-	-	-

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Lab Sample Number				627571	627572	627573	627574	627575
Sample Reference				TP18	TP21	TP13	TP14	TP15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.20
Date Sampled				06/09/2016	06/09/2016	07/09/2016	07/09/2016	07/09/2016
Time Taken			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					





I ah Sample Number				627576	627577	627578	627579	
Sample Reference				TP16	TD17	TD10	TP20	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Denth (m)				0.00-0.30		0.00-0.30		
Date Sampled				07/09/2016	07/09/2016	07/09/2016	07/09/2016	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
			~	Hone Supplied	Hone Supplied	Hone Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	occreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	24	23	24	20	
Total mass of sample received	kg	0.001	NONE	1.4	1.2	1.3	1.4	
	-		-					
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.9	6.9	7.6	7.2	
I otal Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Fauivalent)	o/I	0 00125	MCEDTC	0.025	0.015	0.014	0.011	
Eraction Organic Carbon (EQC)	9/1 N/Δ	0.00125	NONE	-	-	-	-	
	N/A	0.001	NONE					
Total Phenols								
Total Phenols (monohydric)	ma/ka	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
		_						
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	
Phenanthrene	mg/kg	0.1	MCERTS	0.26	< 0.10	< 0.10	< 0.10	
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	
Fluoranthene	mg/kg	0.1	MCERTS	0.98	< 0.10	0.54	< 0.10	
Pyrene	mg/kg	0.1	MCERTS	0.77	< 0.10	0.40	< 0.10	
Benzo(a)anthracene	mg/kg	0.1	MCERTS	0.60	< 0.10	0.26	< 0.10	
Chrysene	mg/kg	0.05	MCERTS	0.46	< 0.05	0.30	< 0.05	
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	0.49	< 0.10	0.36	< 0.10	
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	0.20	< 0.10	0.19	< 0.10	
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.38	< 0.10	0.26	< 0.10	
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	0.26	< 0.10	< 0.10	< 0.10	
Didenz(a,n)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	
Benzo(gni)perviene	mg/kg	0.05	MCERTS	0.27	< 0.05	< 0.05	< 0.05	
Total PAH								
Speciated Total EPA-16 PAHs	ma/ka	1.6	MCEPTS	4 67	< 1.60	2 31	< 1.60	
	iiig/kg	1.0	PICENTS	1.07	× 1.00	2.31	× 1.00	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/ka	1	MCERTS	16	9.2	15	15	
Boron (water soluble)	mg/kq	0.2	MCERTS	2.6	3.0	3.0	2.8	
Cadmium (aqua regia extractable)	mg/kq	0.2	MCERTS	0.5	< 0.2	0.6	0.6	
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	27	26	31	26	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	29	23	38	33	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	40	37	53	47	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	< 0.3	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	36	34	39	40	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.6	< 1.0	1.8	2.6	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	82	110	110	





Project / Site name: Cosmeston

Lab Sample Number	b Sample Number			627576	627577	627578	627579	
Sample Reference				TP16	TP17	TP19	TP20	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	
Date Sampled				07/09/2016	07/09/2016	07/09/2016	07/09/2016	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Petroleum Hydrocarbons					-	-	-	-
					-	-	-	-
TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	< 0.1	< 0.1	
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	< 0.1	< 0.1	
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	< 1.0	< 1.0	
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	< 2.0	< 2.0	
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	< 8.0	< 8.0	
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	-	< 8.0	< 8.0	< 8.0	
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	< 10	< 10	< 10	
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	< 0.1	< 0.1	
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	< 0.1	< 0.1	
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	< 1.0	< 1.0	
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	< 2.0	< 2.0	
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	< 10	< 10	
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	-	< 10	< 10	< 10	
			NONE		. 10	. 10	- 10	

Organochlorine Pesticides

Aldrin	µg/kg	10	NONE	-	-	-	-	
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	-	-	-	-	
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	-	-	-	-	
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	-	-	-	-	
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	-	-	-	-	
Dieldrin	µg/kg	10	NONE	-	-	-	-	
Endosulphan A	µg/kg	10	NONE	-	-	-	-	
Endosulphan B	µg/kg	10	NONE	-	-	-	-	
Endrin	µg/kg	10	NONE	-	-	-	-	
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	-	-	-	-	
HCB (Hexachlorobenzene)	µg/kg	10	NONE	-	-	-	-	
Heptachlor	µg/kg	10	NONE	-	-	-	-	
Heptachlor Epoxide	µg/kg	10	NONE	-	-	-	-	
Isodrin	µg/kg	10	NONE	-	-	-	-	
pp-Methoxychlor	µg/kg	10	NONE	-	-	-	-	
o,p-DDE	µg/kg	10	NONE	-	-	-	-	
o,p-DDT	µg/kg	10	NONE	-	-	-	-	
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	-	-	-	-	
p,p-DDE	µg/kg	10	NONE	-	-	-	-	
p,p-DDT	µg/kg	10	NONE	-	-	-	-	
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	-	-	-	-	
Trifluralin	µg/kg	10	NONE	-	-	-	-	

Organophosphorous pesticides

Azinphos-methyl	µg/kg	10	NONE	-	-	-	-	
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	-	-	-	
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	-	-	-	
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	-	-	-	
Diazinon	µg/kg	10	NONE	-	-	-	-	
Dichlorvos	µg/kg	10	NONE	-	-	-	-	
Dimethoate	µg/kg	10	NONE	-	-	-	-	
E-mevinphos	µg/kg	10	NONE	-	-	-	-	
Z-mevinphos	µg/kg	10	NONE	-	-	-	-	
Fenitrothion	µg/kg	10	NONE	-	-	-	-	
Fenthion	µg/kg	10	NONE	-	-	-	-	
Malathion	µg/kg	10	NONE	-	-	-	-	
Parathion-ethyl	µg/kg	10	NONE	-	-	-	-	
Parathion-methyl	µg/kg	10	NONE	-	-	-	-	
Phorate	µg/kg	10	NONE	-	-	-	-	





Lab Sample Number		627576	627577	627578	627579			
Sample Reference				TP16	TP17	TP19	TP20	
Sample Number			None Supplied	None Supplied	None Supplied	None Supplied		
Depth (m)			0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30		
Date Sampled	07/09/2016	07/09/2016	07/09/2016	07/09/2016				
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					





Lab Sample Number		627580	627581	627582	627583	627584				
Sample Reference				WS03	WS04	WS07	TP08	TP21		
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Denth (m)				0.00-0.20	0.00-0.50	0.00-0.20	0.00-0.30	0.00-0.30		
Date Sampled				07/09/2016	07/09/2016	07/09/2016	07/09/2016	07/09/2016		
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
				Hone Supplied	Hone Supplied			Hone Supplied		
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status							
General Inorganics										
pH	pH Units	N/A	ISO 17025	8.0	8.0	8.1	7.9	7.6		
Total Cyanide	mg/l	0.01	ISO 17025	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		
Free Cyanide	µq/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10		
Sulphate as SO ₄	mg/l	0.1	ISO 17025	2.6	8.7	28	1.7	3.9		
Alkalinity	mgCaCO3/I	3	ISO 17025	100	88	120	92	44		
Total Phenols										
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10		
Speciated PAHs										
Naphthalene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Acenaphthylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Total PAH										
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		
Heavy Metals / Metalloids										
Arsenic (dissolved)	µg/l	1.1	ISO 17025	1.3	< 1.1	< 1.1	< 1.1	1.2		
Boron (dissolved)	µg/l	10	ISO 17025	39	22	76	58	65		
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08		
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0		
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4	0.9	< 0.4	< 0.4	2.2		
Copper (dissolved)	µg/l	0.7	ISO 17025	16	7.1	25	21	18		
Lead (dissolved)	µg/l	1	ISO 17025	1.8	1.2	< 1.0	< 1.0	1.3		
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.5	0.7	5.1	1.6	7.8		
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0		
ZINC (dissolved)	µg/I	0.4	150 17025	5.8	3.5	20	/.0	8.3		





Lab Sample Number				627580	627581	627582	627583	627584		
Sample Reference				WS03	WS04	WS07	TP08	TP21		
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Depth (m)				0.00-0.20	0.00-0.50	0.00-0.20	0.00-0.30	0.00-0.30		
Date Sampled				07/09/2016	07/09/2016	07/09/2016	07/09/2016	07/09/2016		
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status							
Environmental Forensics										
Organochlorine Pesticides							•			
Alpha-HCH (Alpha BHC)	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Aldrin	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Beta-HCH (Beta-BHC)	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Chlordane (sum of cis & trans isomers)	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Delta-HCH (Delta-BHC)	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Dieldrin	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Endosulphan A	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Endosulphan B	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Endrin	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Gamma-HCH (Lindane) (Gamma-BHC)	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
HCB (Hexachlorobenzene)	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Heptachlor Epoxide	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Heptachlor	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Isodrin	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
o,p-DDE	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
o,p-DDT	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
o,p-TDE (o,p-DDD)	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
p,p-DDE	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
p,p-DDT	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
pp-Methoxychlor	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
p,p-TDE (p,p-DDD)	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		
Trifluralin	µg/l	0.01	NONE	To follow	-	To follow	To follow	-		





Preliminary Report Number : 16-27453

Project / Site name: Cosmeston

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
627556	WS01	None Supplied	0.20-0.50	Brown loam and clay with gravel and vegetation.
627557	WS03	None Supplied	0.00-0.20	Brown loam and clay with gravel and vegetation.
627558	WS03	None Supplied	2.30-2.40	Grey clay and sand.
627559	WS04	None Supplied	0.00-0.50	Brown loam and sand with gravel and vegetation.
627560	WS05	None Supplied	0.10-0.40	Brown loam and clay with gravel and vegetation.
627561	WS06	None Supplied	0.00-0.20	Brown loam and clay with gravel.
627562	WS06	None Supplied	0.40-0.60	Brown loam and clay with gravel.
627563	WS07	None Supplied	0.00-0.20	Brown loam and clay with vegetation.
627564	WS07	None Supplied	0.20-0.50	Brown loam and clay with vegetation.
627565	TP08	None Supplied	0.00-0.30	Brown loam and clay.
627566	TP08	None Supplied	0.70-1.30	Brown sandy clay.
627567	TP09	None Supplied	0.00-0.30	Brown loam and sand with gravel and vegetation.
627568	TP10	None Supplied	0.00-0.30	Brown loam and sand with gravel and vegetation.
627569	TP11	None Supplied	0.00-0.20	Brown loam and clay with vegetation.
627570	TP12	None Supplied	0.00-0.30	Brown loam and clay.
627571	TP18	None Supplied	0.00-0.30	Brown clay and sand with gravel and vegetation.
627572	TP21	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627573	TP13	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627574	TP14	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627575	TP15	None Supplied	0.00-0.20	Brown loam and clay with gravel and vegetation.
627576	TP16	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627577	TP17	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627578	TP19	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627579	TP20	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.





4041 772CERTS Preliminary Report Number : 16-27453

Project / Site name: Cosmeston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Alkalinity in Leachate	Determination of Alkalinity by discreet analyser (colorimetry).	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	w	ISO 17025
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	w	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	w	NONE
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	NONE
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	w	ISO 17025
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	w	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	w	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	w	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	w	NONE
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	w	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	w	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	w	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS

Iss No 16-27453-0 Cosmeston UA008386

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





4041 772CERTS Preliminary Report Number : 16-27453

Project / Site name: Cosmeston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	w	ISO 17025
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP- OES.	L038-PL	D	MCERTS
TO - Organochlorine pesticides in leachate	Determination of organochlorine pesticides in leachate by GC-MS	In-house method Determination of organochlorine pesticides in leachate by GC- MS		W	NONE
TO - Organochlorine pesticides in soil	Determination of OCPs by extraction with hexane followed by GC-MS.	In-house method		w	NONE
TO - Organophosphorous pesticides in soil	Determination of OPPs by extraction with DCM followed by GC-MS.	In-house method		w	NONE
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	w	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
TPH6 (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method	L076-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Sian Carter Arcadis Consulting (UK) Ltd HCL House St Mellon's Business Park Cardiff CF3 OEY The second secon

i2 Analytical Ltd. 7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com

t: 029 2092 6873

e: Sian.Carter@arcadis.com

Analytical Report Number : 16-27453

Project / Site name:	Cosmeston	Samples received on:	12/09/2016
Your job number:	UA008386	Samples instructed on:	12/09/2016
Your order number:		Analysis completed by:	22/09/2016
Report Issue Number:	1	Report issued on:	22/09/2016
Samples Analysed:	5 leachate samples - 24 soil samples		

Signed:

Rexona Rahman Reporting Manager For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter Assistant Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.





Project / Site name: Cosmeston

Lab Sample Number		627556	627557	627558	627559	627560		
Sample Reference				WS01	WS03	WS03	WS04	WS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.50	0.00-0.20	2.30-2.40	0.00-0.50	0.10-0.40
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	05/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	14	17	16	18	18
Total mass of sample received	kg	0.001	NONE	1.5	1.2	1.2	1.3	1.2
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics	-							
pH - Automated	pH Units	N/A	MCERTS	8.5	8.1	8.7	8.2	7.8
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
water Soluble SO4 160r extraction (2:1 Leachate	a//	0.001.25	MCEDTC	0 032	0.014	0.056	0.022	0 0004
Fraction Organic Carbon (FOC)	y/i N/A	0.00125	NONE	0.021	0.029	-	0.025	-
Tatal Rhanala								
Total Phenois	ma/ka	1	МСЕРТС	< 10	< 10	< 1.0	< 10	< 10
	ilig/kg	<u> </u>	MCENTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs	1							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.87	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.4/	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.38	< 0.10
Anthrasana	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	2.7	< 0.10
Eluoranthene	mg/kg	0.1	MCEDTS	< 0.10	< 0.10	< 0.10	63	< 0.10
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	5.2	< 0.10
Benzo(a)anthracene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	< 0.10	3.2	< 0.10
Chrysene	ma/ka	0.05	MCERTS	< 0.05	< 0.05	< 0.05	4.4	< 0.05
Benzo(b)fluoranthene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	< 0.10	5.7	< 0.10
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	2.1	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	3.1	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	1.6	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.59	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.7	< 0.05
Total DAL								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	< 1.60	38.8	< 1.60
Heavy Metals / Metalloids		1	MCEDIC	10	10	2.4	10	10
Roron (water soluble)	mg/kg	0.2	MCEDTC	13	10	0.7	10	2.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCEDIS	< 0.0	< 0.2	< 0.7	< 0.0	0.3
Chromium (hexavalent)	ma/ka	4	MCERTS	< 4.0	< 4 0	< 4 0	< 4 0	< 4 0
Chromium (agua regia extractable)	ma/ka	1	MCERTS	20	27	12	13	27
Copper (agua regia extractable)	ma/ka	1	MCERTS	34	35	25	48	37
Lead (aqua regia extractable)	mg/kg	1	MCERTS	26	34	8.9	33	34
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	30	38	24	33	47
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	4.0	< 1.0	2.4	2.6
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	110	19	64	75
Petroleum Hydrocarbons								
TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	< 8.0
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	< 8.0
[ТРН6 - Aliphatic (Сб - С35)	mg/kg	10	NONE	-	< 10	-	< 10	< 10
TPH6 - Aromatic (C6 - C8)	mg/kq	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
						•		

Iss No 16-27453-1 Cosmeston UA008386

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Project / Site name: Cosmeston

Lab Sample Number				627556	627557	627558	627559	627560
Sample Reference				WS01	WS03	WS03	WS04	WS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)		0.20-0.50	0.00-0.20	2.30-2.40	0.00-0.50	0.10-0.40		
Date Sampled		05/09/2016	05/09/2016	05/09/2016	05/09/2016	05/09/2016		
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	-	27	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	-	< 10	-	66	22
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	93	22

Environmental Forensics

organocinorme resticides								
Aldrin	µg/kg	10	NONE	< 10	-	-	-	-
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	< 10	-	-	-	-
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	< 10	-	-	-	-
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	< 10	-	-	-	-
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	< 10	-	-	-	-
Dieldrin	µg/kg	10	NONE	< 10	-	-	-	-
Endosulphan A	µg/kg	10	NONE	< 10	-	-	-	-
Endosulphan B	µg/kg	10	NONE	< 10	-	-	-	-
Endrin	µg/kg	10	NONE	< 10	-	-	-	-
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	< 10	-	-	-	-
HCB (Hexachlorobenzene)	µg/kg	10	NONE	< 10	-	-	-	-
Heptachlor	µg/kg	10	NONE	< 10	-	-	-	-
Heptachlor Epoxide	µg/kg	10	NONE	< 10	-	-	-	-
Isodrin	µg/kg	10	NONE	< 10	-	-	-	-
pp-Methoxychlor	µg/kg	10	NONE	< 10	-	-	-	-
o,p-DDE	µg/kg	10	NONE	< 10	-	-	-	-
o,p-DDT	µg/kg	10	NONE	< 10	-	-	-	-
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	< 10	-	-	-	-
p,p-DDE	µg/kg	10	NONE	< 10	-	-	-	-
p,p-DDT	µg/kg	10	NONE	< 10	-	-	-	-
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	< 10	-	-	-	-
Trifluralin	µg/kg	10	NONE	< 10	-	-	-	-





Lab Sample Number				627556	627557	627558	627559	627560
Sample Reference				WS01	WS03	WS03	WS04	WS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.50	0.00-0.20	2.30-2.40	0.00-0.50	0.10-0.40
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	05/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Organophosphorous pesticides	-		-	-				
Azinphos-methyl	µg/kg	10	NONE	< 10	-	-	-	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	< 10	-	-	-	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	< 10	-	-	-	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	< 10	-	-	-	-
Diazinon	µg/kg	10	NONE	< 10	-	-	-	-
Dichlorvos	µg/kg	10	NONE	< 10	-	-	-	-
Dimethoate	µg/kg	10	NONE	< 10	-	-	-	-
E-mevinphos	µg/kg	10	NONE	< 10	-	-	-	-
Z-mevinphos	µg/kg	10	NONE	< 10	-	-	-	-
Fenitrothion	µg/kg	10	NONE	< 10	-	-	-	-
Fenthion	µg/kg	10	NONE	< 10	-	-	-	-
Malathion	µg/kg	10	NONE	< 10	-	-	-	-
Parathion-ethyl	µg/kg	10	NONE	< 10	-	-	-	-
Parathion-methyl	µg/kg	10	NONE	< 10	-	-	-	-
Phorate	µg/kg	10	NONE	< 10	-	-	-	-





Project / Site name: Cosmeston

Lab Sample Number				627561	627562	627563	627564	627565
Sample Reference				WS06	WS06	WS07	WS07	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.20	0.40-0.60	0.00-0.20	0.20-0.50	0.00-0.30
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	06/09/2016
Time Taken	-			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	21	17	26	22	21
Total mass of sample received	kg	0.001	NONE	1.4	1.5	1.4	1.2	1.5
Ashestos in Soil	Turpo	N/A	150 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
	турс	N/A	150 17025	Not detected	Not detected	Not detected	Not detected	Not detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.4	8.0	7.4	8.0	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
water Soluble SO4 16nr extraction (2:1 Leachate	c/l	0.00125	MCEDTC	0.012	0 0002	0.062	0.025	0.0001
Fraction Organic Carbon (FOC)	9/1 N/A	0.00125	NONF	-	-	0.039	-	0.071
		0.001				0.000		0.021
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs		0.05		0.05	0.05	0.05	0.05	0.05
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.61	< 0.10	< 0.10
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.53	< 0.10	< 0.10
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.37	< 0.10	< 0.10
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.42	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.43	< 0.10	< 0.10
Benzo(k)huoranthene	mg/kg	0.1	MCEDIC	< 0.10	< 0.10	0.27	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH		-						
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	2.96	< 1.60	< 1.60
Hanny Matala / Matallaida								
Arsenic (aqua regia extractable)	ma/ka	1	MCEPTS	14	13	16	11	15
Boron (water soluble)	ma/ka	0.2	MCERTS	2.2	1.6	2.5	1.9	2.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	< 0.2	0.8	0.9	0.6
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	23	33	27	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	39	35	40	40	48
Lead (aqua regia extractable)	mg/kg	1	MCERTS	35	27	60	32	48
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	45	< 1.0	27	34	1 9
Zinc (aqua regia extractable)	ma/ka	1	MCERTS	91	67	180	150	1.9
	ilig/kg	-	PICENTS	51	07	100	150	110
Petroleum Hydrocarbons								
TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	< 1.0	-	< 1.0	-	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	< 2.0	-	< 2.0	-	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	15U 1/025	< 8.0	-	< 8.0	-	< 8.0
TPH6 - Aliphatic (C6 - C35)	ma/ka	10	NONE	< 10	-	< 8.0 < 10	-	< 8.0 < 10
		10		~ 10		. 10		. 10
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1

Iss No 16-27453-1 Cosmeston UA008386

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Project / Site name: Cosmeston

Lab Sample Number				627561	627562	627563	627564	627565
Sample Reference				WS06	WS06	WS07	WS07	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.20	0.40-0.60	0.00-0.20	0.20-0.50	0.00-0.30
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	06/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied None Supplied None	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	< 1.0	-	< 1.0	-	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	< 2.0	-	< 2.0	-	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	< 10	-	< 10	-	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	< 10	-	< 10	-	< 10
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	< 10	-	< 10	-	< 10

Environmental Forensics

µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
µg/kg	10	NONE	-	-	-	-	< 10
	µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg	μg/kg 10 μg/kg 10	μg/kg 10 NONE μg/kg<	μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE	μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - - μg/kg 10 NONE - <td>μg/kg 10 NONE - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE -<</td> <td>μg/kg 10 NONE - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - <td< td=""></td<></td>	μg/kg 10 NONE - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE -<	μg/kg 10 NONE - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - - μg/kg 10 NONE - - - <td< td=""></td<>





				_				
Lab Sample Number				627561	627562	627563	627564	627565
Sample Reference				WS06	WS06	WS07	WS07	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.20	0.40-0.60	0.00-0.20	0.20-0.50	0.00-0.30
Date Sampled				05/09/2016	05/09/2016	05/09/2016	05/09/2016	06/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Organophosphorous pesticides								
Azinphos-methyl	µg/kg	10	NONE	-	-	-	-	< 10
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	-	-	-	< 10
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	-	-	-	< 10
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	-	-	-	< 10
Diazinon	µg/kg	10	NONE	-	-	-	-	< 10
Dichlorvos	µg/kg	10	NONE	-	-	-	-	< 10
Dimethoate	µg/kg	10	NONE	-	-	-	-	< 10
E-mevinphos	µg/kg	10	NONE	-	-	-	-	< 10
Z-mevinphos	µg/kg	10	NONE	-	-	-	-	< 10
Fenitrothion	µg/kg	10	NONE	-	-	-	-	< 10
Fenthion	µg/kg	10	NONE	-	-	-	-	< 10
Malathion	µg/kg	10	NONE	-	-	-	-	< 10
Parathion-ethyl	µg/kg	10	NONE	-	-	-	-	< 10
Parathion-methyl	µg/kg	10	NONE	-	-	-	-	< 10
Phorate	µg/kg	10	NONE	-	-	-	-	< 10





Project / Site name: Cosmeston

Lab Sample Number				627566	627567	627568	627569	627570
Sample Reference				TP08	TP09	TP10	TP11	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-1.30	0.00-0.30	0.00-0.30	0.00-0.20	0.00-0.30
Date Sampled				06/09/2016	06/09/2016	06/09/2016	06/09/2016	06/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	20	21	23	24
Total mass of sample received	kg	0.001	NONE	1.0	1.4	1.5	1.4	1.4
	-	N1/A	100 17005	No. data da	Not detected	Not data da	Not detected	Not detected
Aspestos III Soli	туре	N/A	150 17025	Not-detected	NOT-defected	Not-detected	NOL-DELECTED	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.6	7.7	7.6	7.5	7.3
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate								
Equivalent)	g/l	0.00125	MCERTS	0.0091	0.011	0.012	0.017	0.032
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	-	-	-	-	-
Total Phenois								
Total Phenols (monohydric)	ma/ka	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	ing/kg	-	HIGERTS	\$ 1.0	< 1.0	\$ 1.0	(1.0	\$ 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.30
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.95
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.73
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.55
Benzo(h)fluoranthene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	0.02
Benzo(k)fluoranthene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.91
Benzo(a)pyrene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.53
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.27
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.27
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	< 1.60	< 1.60	5.40
neavy metals / metalloids	ma/lin	1	MCEDTO	A E	12	16	10	10
Boron (water soluble)	ma/ka	0.2	MCERTS	л.э 0 7	29	24	3.8	4 0
Cadmium (agua regia extractable)	ma/ka	0.2	MCERTS	< 0.2	0.6	0.5	0.6	0.8
Chromium (hexavalent)	mg/kq	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	8.8	26	27	24	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24	42	43	45	44
Lead (aqua regia extractable)	mg/kg	1	MCERTS	9.7	49	46	46	61
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	40	44	54	44
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	3.1	4.0	2.7	1.6
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	47	130	110	140	160
Patroloum Hydrocarbons								
TPH6 - Aliphatic (C6 - C8)	ma/ka	0.1	NONE	-	< 0.1	_	< 0.1	< 0.1
TPH6 - Aliphatic (C8 - C10)	ma/ka	0.1	NONE	-	< 0.1	_	< 0.1	< 0.1
TPH6 - Aliphatic (C10 - C12)	ma/ka	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	< 8.0
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	< 8.0
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	< 10	< 10
		~ /	NON-					
IPHO - AROMATIC (LO - LO)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Project / Site name: Cosmeston

Lab Sample Number				627566	627567	627568	627569	627570
Sample Reference				TP08	TP09	TP10	TP11	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-1.30	0.00-0.30	0.00-0.30	0.00-0.20	0.00-0.30
Date Sampled				06/09/2016	5/09/2016 06/09/2016 06/09/2016 06/09/2016		06/09/2016	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	-	< 10	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	-	< 10	-	< 10	23
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	< 10	23

Environmental Forensics

µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
µg/kg	10	NONE	-	-	-	< 10	-
	µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg µg/kg	μg/kg 10 μg/kg 10	μg/kg 10 NONE μg/kg<	μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE - μg/kg 10 NONE	μg/kg 10 NONE - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE -<	μg/kg 10 NONE - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE - - - μg/kg 10 NONE -<	$\begin{array}{c c c c c c c c c c c c c c c c c c c $





Lab Sample Number				627566	627567	627568	627569	627570
Sample Reference				TP08	TP09	TP10	TP11	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-1.30	0.00-0.30	0.00-0.30	0.00-0.20	0.00-0.30
Date Sampled				06/09/2016	06/09/2016	06/09/2016	06/09/2016	06/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Organophosphorous pesticides					-			
Azinphos-methyl	µg/kg	10	NONE	-	-	-	< 10	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	-	-	< 10	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	-	-	< 10	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	-	-	< 10	-
Diazinon	µg/kg	10	NONE	-	-	-	< 10	-
Dichlorvos	µg/kg	10	NONE	-	-	-	< 10	-
Dimethoate	µg/kg	10	NONE	-	-	-	< 10	-
E-mevinphos	µg/kg	10	NONE	-	-	-	< 10	-
Z-mevinphos	µg/kg	10	NONE	-	-	-	< 10	-
Fenitrothion	µg/kg	10	NONE	-	-	-	< 10	-
Fenthion	µg/kg	10	NONE	-	-	-	< 10	-
Malathion	µg/kg	10	NONE	-	-	-	< 10	-
Parathion-ethyl	µg/kg	10	NONE	-	-	-	< 10	-
Parathion-methyl	µg/kg	10	NONE	-	-	-	< 10	-
Phorate	µg/kg	10	NONE	-	-	-	< 10	-





Project / Site name: Cosmeston

Lab Sample Number				627571	627572	627573	627574	627575
Sample Reference				TP18	TP21	TP13	TP14	TP15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.20
Date Sampled				06/09/2016	06/09/2016	07/09/2016	07/09/2016	07/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	24	21	18	27	20
Total mass of sample received	kg	0.001	NONE	1.2	1.5	1.4	1.1	1.5
	_							
Asbestos in Soil	Туре	N/A	150 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Conoral Inorganics								
nH - Automated	nH Unite	N/A	MCERTS	7.6	73	8.1	75	73
Total Cvanide	ma/ka	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cvanide	ma/ka	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate	و. بر							
Equivalent)	g/l	0.00125	MCERTS	0.017	0.019	0.017	0.018	0.011
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	0.025	-	0.028	-	-
Total Phenols								
Total Phenols (monohydric)	ma/ka	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	iiig/kg		PICEINIS	< 1.0	× 1.0	< 1.0	× 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.28	0.28	< 0.10
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.60	1.8	< 0.10
Pyrene Renze(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.52	1.2	< 0.10
	mg/kg	0.1	MCEDTS	< 0.10	< 0.10	0.31	1.4	< 0.10
Benzo(b)fluoranthene	ma/ka	0.05	MCERTS	< 0.10	< 0.10	0.36	2.1	< 0.10
Benzo(k)fluoranthene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	0.26	0.75	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.31	1.3	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.55	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.15	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.48	< 0.05
Total PAH		1.0		.1.00	.1.00	2.02	11.2	.1.00
Speciated Total EPA-16 PAHS	mg/kg	1.6	MCERTS	< 1.60	< 1.60	3.02	11.2	< 1.60
Hoovy Motols / Motolloids								
	ma/ka	1	MCERTS	14	16	14	8.6	14
Boron (water soluble)	mg/kg	0.2	MCERTS	3.9	2.5	2.4	3.2	2.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	0.7	0.8	0.6	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	30	30	22	22	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	42	37	43	37	36
Lead (aqua regia extractable)	mg/kg	1	MCERTS	65	49	65	51	49
Miercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
INICKEI (dyud reyid extractable)	mg/kg	1	MCEDIC	41	<u> </u>	4/	<u> </u>	3/
Jelenium (aqua regia extractable)	mg/kg	1	MCEDTC	140	3.3 110	< 1.U 150	< 1.U 150	3.3 160
בוויכ (עקעם וכקום כאנומנומטול)	iiig/Ky		MCER13	140	110	130	130	100
Petroleum Hydrocarbons								
TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	-
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	-	< 8.0	-
1 PH6 - Aliphatic (C21 - C35)	mg/kg	8	150 17025	-	< 8.0	-	9.4	-
1 Prio - Alipnatic (Co - C35)	mg/kg	10	NONE	-	< 10	-	< 10	-
TPH6 - Aromatic (C6 - C8)	ma/ka	0.1	NONE	- 1	< 0.1	_	< 0.1	
	פיי /פייי	0.1			< 0.1	-	< 0.1	

Iss No 16-27453-1 Cosmeston UA008386

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Project / Site name: Cosmeston

Lab Sample Number				627571	627572	627573	627574	627575
Sample Reference				TP18	TP21	TP13	TP14	TP15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.20
Date Sampled				06/09/2016	06/09/2016 06/09/2016 07/09/2016 07/09/2016		07/09/2016	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	-
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	< 1.0	-
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	< 2.0	-
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	-	< 10	-
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	-	< 10	-	26	-
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	26	-

Environmental Forensics

organochionne resticides								
Aldrin	µg/kg	10	NONE	< 10	-	-	-	-
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	< 10	-	-	-	-
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	< 10	-	-	-	-
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	< 10	-	-	-	-
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	< 10	-	-	-	-
Dieldrin	µg/kg	10	NONE	< 10	-	-	-	-
Endosulphan A	µg/kg	10	NONE	< 10	-	-	-	-
Endosulphan B	µg/kg	10	NONE	< 10	-	-	-	-
Endrin	µg/kg	10	NONE	< 10	-	-	-	-
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	< 10	-	-	-	-
HCB (Hexachlorobenzene)	µg/kg	10	NONE	< 10	-	-	-	-
Heptachlor	µg/kg	10	NONE	< 10	-	-	-	-
Heptachlor Epoxide	µg/kg	10	NONE	< 10	-	-	-	-
Isodrin	µg/kg	10	NONE	< 10	-	-	-	-
pp-Methoxychlor	µg/kg	10	NONE	< 10	-	-	-	-
o,p-DDE	µg/kg	10	NONE	< 10	-	-	-	-
o,p-DDT	µg/kg	10	NONE	< 10	-	-	-	-
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	< 10	-	-	-	-
p,p-DDE	µg/kg	10	NONE	< 10	-	-	-	-
p,p-DDT	µg/kg	10	NONE	< 10	-	-	-	-
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	< 10	-	-	-	-
Trifluralin	µg/kg	10	NONE	< 10	-	-	-	-





Lab Sample Number				627571	627572	627573	627574	627575
Sample Reference				TP18	TP21	TP13	TP14	TP15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.20
Date Sampled				06/09/2016	06/09/2016	07/09/2016	07/09/2016	07/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Organophosphorous pesticides								
Azinphos-methyl	µg/kg	10	NONE	< 10	-	-	-	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	< 10	-	-	-	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	< 10	-	-	-	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	< 10	-	-	-	-
Diazinon	µg/kg	10	NONE	< 10	-	-	-	-
Dichlorvos	µg/kg	10	NONE	< 10	-	-	-	-
Dimethoate	µg/kg	10	NONE	< 10	-	-	-	-
E-mevinphos	µg/kg	10	NONE	< 10	-	-	-	-
Z-mevinphos	µg/kg	10	NONE	< 10	-	-	-	-
Fenitrothion	µg/kg	10	NONE	< 10	-	-	-	-
Fenthion	µg/kg	10	NONE	< 10	-	-	-	-
Malathion	µg/kg	10	NONE	< 10	-	-	-	-
Parathion-ethyl	µg/kg	10	NONE	< 10	-	-	-	-
Parathion-methyl	µg/kg	10	NONE	< 10	-	-	-	-
Phorate	µg/kg	10	NONE	< 10	-	-	-	-





Project / Site name: Cosmeston

Lab Sample Number				627576	627577	627578	627579	
Sample Reference				TP16	TP17	TP19	TP20	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	
Date Sampled			07/09/2016	07/09/2016	07/09/2016	07/09/2016		
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	24	23	24	20	
Total mass of sample received	kg	0.001	NONE	1.4	1.2	1.3	1.4	
	_							
Asdestos in Soli	Туре	N/A	150 17025	Not-detected	Not-detected	Not-detected	Not-detected	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.9	6.9	7.6	7.2	
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Water Soluble SO4 16hr extraction (2:1 Leachate								
Equivalent)	g/l	0.00125	MCERTS	0.025	0.015	0.014	0.011	
FIACUUN OFGANIC CARDON (FUC)	N/A	0.001	NONE	-	-	-	-	
Total Phenols								
Total Phenols (monohydric)	mg/kq	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
	<u>,</u>							
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	
Huorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	
Anthracene	mg/kg	0.1	MCEPTS	0.26	< 0.10	< 0.10	< 0.10	
Eluoranthene	ma/ka	0.1	MCERTS	0.98	< 0.10	0.10	< 0.10	
Pvrene	ma/ka	0.1	MCERTS	0.77	< 0.10	0.40	< 0.10	
Benzo(a)anthracene	mg/kg	0.1	MCERTS	0.60	< 0.10	0.26	< 0.10	
Chrysene	mg/kg	0.05	MCERTS	0.46	< 0.05	0.30	< 0.05	
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	0.49	< 0.10	0.36	< 0.10	
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	0.20	< 0.10	0.19	< 0.10	
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.38	< 0.10	0.26	< 0.10	
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	0.26	< 0.10	< 0.10	< 0.10	
Benzo(ghi)nen/ene	mg/kg	0.1	MCEDTS	0.10	< 0.10	< 0.10	< 0.10	
benzo(gin)peryrene	iiig/kg	0.05	MCLK13	0.27	< 0.05	< 0.05	< 0.05	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	4.67	< 1.60	2.31	< 1.60	
Heavy Metals / Metalloids					· · · · ·		· · · · · · · · · · · · · · · · · · ·	
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	9.2	15	15	
Dururi (Waler Soluble) Cadmium (aqua regia extractable)	mg/kg	0.2		2.0	3.0	3.0	2.δ	
Chromium (aqua regia exitaciable)	ma/ka	4	MCFRTS	v.5 < 4.0	< 0.2	0.0 < 4.0	0.0 < 4 0	
Chromium (aqua regia extractable)	ma/ka	1	MCERTS	27	26	31	26	
Copper (agua regia extractable)	mg/kg	1	MCERTS	29	23	38	33	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	40	37	53	47	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	< 0.3	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	36	34	39	40	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.6	< 1.0	1.8	2.6	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	82	110	110	
Petroleum Hydrocarbons								
TPH6 - Aliphatic (C6 - C8)	ma/ka	0.1	NONE	-	< 0.1	< 0.1	< 0.1	
TPH6 - Aliphatic (C8 - C10)	mg/ka	0.1	NONE	-	< 0.1	< 0.1	< 0.1	
TPH6 - Aliphatic (C10 - C12)	mg/ka	1	ISO 17025	-	< 1.0	< 1.0	< 1.0	
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	< 2.0	< 2.0	
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	< 8.0	< 8.0	
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	-	< 8.0	< 8.0	< 8.0	
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	< 10	< 10	< 10	
TPH6 - Aromatic ($C6 - C8$)	ma/ka	0.1	NONE		< 0.1	< 0.1	< 0.1	
	<u>9</u> /wg	0.1	HONE	-	< 0.1	< 0.1	< U.1	

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.




Project / Site name: Cosmeston

Lab Sample Number				627576	627577	627578	627579	
Sample Reference				TP16	TP17	TP19	TP20	
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied				
Depth (m)	0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30				
Date Sampled	07/09/2016	07/09/2016	07/09/2016	07/09/2016				
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	< 0.1	< 0.1	
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	< 1.0	< 1.0	
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	< 2.0	< 2.0	
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	< 10	< 10	
TPH6 - Aromatic (C21 - C35) mg/kg 10 ISO 17025			-	< 10	< 10	< 10		
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	< 10	< 10	

Environmental Forensics

Organochionne Pesticides								
Aldrin	µg/kg	10	NONE	-	-	-	-	
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	-	-	-	-	
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	-	-	-	-	
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	-	-	-	-	
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	-	-	-	-	
Dieldrin	µg/kg	10	NONE	-	-	-	-	
Endosulphan A	µg/kg	10	NONE	-	-	-	-	
Endosulphan B	µg/kg	10	NONE	-	-	-	-	
Endrin	µg/kg	10	NONE	-	-	-	-	
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	-	-	-	-	
HCB (Hexachlorobenzene)	µg/kg	10	NONE	-	-	-	-	
Heptachlor	µg/kg	10	NONE	-	-	-	-	
Heptachlor Epoxide	µg/kg	10	NONE	-	-	-	-	
Isodrin	µg/kg	10	NONE	-	-	-	-	
pp-Methoxychlor	µg/kg	10	NONE	-	-	-	-	
o,p-DDE	µg/kg	10	NONE	-	-	-	-	
o,p-DDT	µg/kg	10	NONE	-	-	-	-	
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	-	-	-	-	
p,p-DDE	µg/kg	10	NONE	-	-	-	-	
p,p-DDT	µg/kg	10	NONE	-	-	-	-	
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	-	-	-	-	
Trifluralin	µg/kg	10	NONE	-	-	-	-	





Project / Site name: Cosmeston

				_				
Lab Sample Number				627576	627577	627578	627579	
Sample Reference				TP16	TP17	TP19	TP20	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	
Date Sampled	07/09/2016	07/09/2016	07/09/2016	07/09/2016				
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Organophosphorous pesticides					-			
Azinphos-methyl	µg/kg	10	NONE	-	-	-	-	
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	-	-	-	
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	-	-	-	
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	-	-	-	
Diazinon	µg/kg	10	NONE	-	-	-	-	
Dichlorvos	µg/kg	10	NONE	-	-	-	-	
Dimethoate	µg/kg	10	NONE	-	-	-	-	
E-mevinphos	µg/kg	10	NONE	-	-	-	-	
Z-mevinphos	µg/kg	10	NONE	-	-	-	-	
Fenitrothion	µg/kg	10	NONE	-	-	-	-	
Fenthion	µg/kg	10	NONE	-	-	-	-	
Malathion	µg/kg	10	NONE	-	-	-	-	
Parathion-ethyl	µg/kg	10	NONE	-	-	-	-	
Parathion-methyl	µg/kg	10	NONE	-	-	-	-	
Phorate	µg/kg	10	NONE	-	-	-	-	





Project / Site name: Cosmeston

Lab Sample Number				627580	627581	627582	627583	627584		
Sample Reference				WS03	WS04	WS07	TP08	TP21		
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Depth (m)				0.00-0.20	0.00-0.50	0.00-0.20	0.00-0.30	0.00-0.30		
Date Sampled				07/09/2016	07/09/2016	07/09/2016	07/09/2016	07/09/2016		
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status							
General Inorganics										
pH	pH Units	N/A	ISO 17025	8.0	8.0	8.1	7.9	7.6		
Total Cyanide	mg/l	0.01	ISO 17025	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10		
Sulphate as SO ₄	mg/l	0.1	ISO 17025	2.6	8.7	28	1.7	3.9		
Alkalinity	mgCaCO3/I	3	ISO 17025	100	88	120	92	44		
rotal Phenois (mononyuric)	µg/i	10	150 17025	< 10	< 10	< 10	< 10	< 10		
Speciated DAVe										
Specialeu PARS		0.01	NONE	+ 0.01	+ 0.01	10.01	10.01	1 0 01		
	µg/i	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Acenaphthylene	µg/I	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/I	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Fluorene	µg/I	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Fluorantnene	µg/I	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
Total PAH										
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		
Heavy Metals / Metalloids										
Arsenic (dissolved)	µg/l	1.1	ISO 17025	1.3	< 1.1	< 1.1	< 1.1	1.2		
Boron (dissolved)	µg/l	10	ISO 17025	39	22	76	58	65		
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08		
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0		
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4	0.9	< 0.4	< 0.4	2.2		
Copper (dissolved)	µg/l	0.7	ISO 17025	16	7.1	25	21	18		
Lead (dissolved)	µg/l	1	ISO 17025	1.8	1.2	< 1.0	< 1.0	1.3		
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.5	0.7	5.1	1.6	7.8		
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0		
ZINC (alssolved)	µg/l	0.4	ISO 17025	5.8	3.5	20	7.0	8.3		





Project / Site name: Cosmeston

Lab Sample Number				627580	627581	627582	627583	627584			
Sample Reference				WS03	WS04	WS07	TP08	TP21			
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)				0.00-0.20	0.00-0.50	0.00-0.20	0.00-0.30	0.00-0.30			
Date Sampled				07/09/2016	07/09/2016	07/09/2016	07/09/2016	07/09/2016			
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status								
Environmental Forensics Organochlorine Pesticides											
Alpha-HCH (Alpha BHC)	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Aldrin	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Beta-HCH (Beta-BHC)	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Chlordane (sum of cis & trans isomers)	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Delta-HCH (Delta-BHC)	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Dieldrin	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Endosulphan A	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Endosulphan B	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Endrin	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Gamma-HCH (Lindane) (Gamma-BHC)	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
HCB (Hexachlorobenzene)	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Heptachlor Epoxide	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Heptachlor	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Isodrin	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
o,p-DDE	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
o,p-DDT	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
o,p-TDE (o,p-DDD)	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
p,p-DDE	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
p,p-DDT	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
pp-Methoxychlor	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
p,p-TDE (p,p-DDD)	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			
Trifluralin	µg/l	0.01	NONE	< 0.01	-	< 0.01	< 0.01	-			





Project / Site name: Cosmeston

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
627556	WS01	None Supplied	0.20-0.50	Brown loam and clay with gravel and vegetation.
627557	WS03	None Supplied	0.00-0.20	Brown loam and clay with gravel and vegetation.
627558	WS03	None Supplied	2.30-2.40	Grey clay and sand.
627559	WS04	None Supplied	0.00-0.50	Brown loam and sand with gravel and vegetation.
627560	WS05	None Supplied	0.10-0.40	Brown loam and clay with gravel and vegetation.
627561	WS06	None Supplied	0.00-0.20	Brown loam and clay with gravel.
627562	WS06	None Supplied	0.40-0.60	Brown loam and clay with gravel.
627563	WS07	None Supplied	0.00-0.20	Brown loam and clay with vegetation.
627564	WS07	None Supplied	0.20-0.50	Brown loam and clay with vegetation.
627565	TP08	None Supplied	0.00-0.30	Brown loam and clay.
627566	TP08	None Supplied	0.70-1.30	Brown sandy clay.
627567	TP09	None Supplied	0.00-0.30	Brown loam and sand with gravel and vegetation.
627568	TP10	None Supplied	0.00-0.30	Brown loam and sand with gravel and vegetation.
627569	TP11	None Supplied	0.00-0.20	Brown loam and clay with vegetation.
627570	TP12	None Supplied	0.00-0.30	Brown loam and clay.
627571	TP18	None Supplied	0.00-0.30	Brown clay and sand with gravel and vegetation.
627572	TP21	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627573	TP13	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627574	TP14	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627575	TP15	None Supplied	0.00-0.20	Brown loam and clay with gravel and vegetation.
627576	TP16	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627577	TP17	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627578	TP19	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.
627579	TP20	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation.





Project / Site name: Cosmeston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Alkalinity in Leachate	Determination of Alkalinity by discreet analyser (colorimetry).	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	w	ISO 17025
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	w	NONE
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	NONE
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	w	ISO 17025
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	w	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	w	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	w	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	w	NONE
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	w	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	w	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	w	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS

Iss No 16-27453-1 Cosmeston UA008386

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Project / Site name: Cosmeston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP- OES.	L038-PL	D	MCERTS
TO - Organochlorine pesticides in leachate	Determination of organochlorine pesticides in leachate by GC-MS	In-house method Determination of organochlorine pesticides in leachate by GC- MS		W	NONE
TO - Organochlorine pesticides in soil	Determination of OCPs by extraction with hexane followed by GC-MS.	In-house method		W	NONE
TO - Organophosphorous pesticides in soil	Determination of OPPs by extraction with DCM followed by GC-MS.	In-house method		W	NONE
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
TPH6 (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method	L076-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Sian Carter Arcadis Consulting (UK) Ltd **HCL** House St Mellon's Business Park Cardiff CF3 OEY

Environmental Science

i2 Analytical Ltd. 7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com

t: 029 2092 6873

e: Sian.Carter@arcadis.com

Preliminary Report Number : 16-27480

Project / Site name:	Cosmeston	Samples received on:	12/09/2016
Your job number:	UA008386	Samples instructed on:	12/09/2016
Your order number:	PO0062396-1	Analysis completed by:	not complete
Report Issue Number:	0	Report issued on:	21/09/2016
Samples Analysed:	3 leachate samples - 10 soil samples		

Signed:

Rexona Rahman **Reporting Manager** For & on behalf of i2 Analytical Ltd.

111_ Signed:

Emma Winter Assistant Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Preliminary reports provided at the request of the client should be considered as incomplete and have not been through the complete quality control procedure.

Results contained in preliminary reports may be subject to change and therefore should not be used as a basis for decision making, except at the risk of the client.





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number			627679	627680	627681	627682	627683			
Sample Reference				TP06	TP06	TP05	TP05	TP04		
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Depth (m)				0.00-0.25	1.00-1.90	0.00-0.30	0.60-2.10	0.00-0.30		
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016		
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status							
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	17	14	16	12	18		
Total mass of sample received	kg	0.001	NONE	1.5	1.5	1.4	1.5	1.5		
Asbestos in Soil Screen / Identification Name	Туре	N/A	ISO 17025	-	Chrysotile- Loose fibres	-	-	-		
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-detected	Not-detected		
General Inorganics										
pH - Automated	pH Units	N/A	MCERTS	8.3	8.5	8.3	8.7	8.3		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1		
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1		
Water Soluble SO4 16hr extraction (2:1 Leachate										
Equivalent)	g/l	0.00125	MCERTS	0.012	0.059	0.0093	0.071	0.023		
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	0.026	0.018	0.025	-	-		
lotal Phenois										
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
Constant of DALLS										
		0.05		0.05	0.05	0.05	0.05	0.05		
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Acenaphthone	mg/kg	0.1	MCEDITC	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Eluoropo	mg/kg	0.1	MCEDIC	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Phononthrono	mg/kg	0.1	MCEDTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Anthracono	mg/kg	0.1	MCEDIC	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Flueranthono	mg/kg	0.1	MCEDIC	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Durono	mg/kg	0.1	MCEDTC	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Renze(a)anthracene	mg/kg	0.1	MCEDTC	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Chrysona	mg/kg	0.1	MCEDTC	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo(h)fluoranthene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	mg/kg	0.1	MCEDTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo(a)nvrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Indeno(1,2,3-cd)pyrene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Dibenz(a,h)anthracene	ma/ka	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo(ghi)perylene	ma/ka	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Total PAH										
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60		
					-					
Heavy Metals / Metalloids										
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	53	11	110	15	37		
Boron (water soluble)	mg/kg	0.2	MCERTS	2.3	0.8	2.4	1.3	2.0		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.3	0.6		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	31	15	37	18	29		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	46	33	49	33	44		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	51	10	69	15	51		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	0.6	< 0.3	0.5		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	43	29	55	33	42		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.9		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	64	160	64	110		





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627679	627680	627681	627682	627683
Sample Reference				TP06	TP06	TP05	TP05	TP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.25	1.00-1.90	0.00-0.30	0.60-2.10	0.00-0.30
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	< 1.0	2.6	< 1.0	-	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	< 2.0	8.1	< 2.0	-	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	< 8.0	< 8.0	< 8.0	-	< 8.0
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	< 8.0	< 8.0	< 8.0	-	< 8.0
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	< 10	11	< 10	-	< 10
							-	
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	< 2.0	< 2.0	< 2.0	-	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	< 10	< 10	< 10	-	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	< 10	< 10	< 10	-	< 10
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	< 10	< 10	< 10	-	< 10

Environmental Forensics

Organochlorine Pesticides

Aldrin	µg/kg	10	NONE	-	-	-	-	-
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	-	-	-	-	-
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	-	-	-	-	-
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	-	-	-	-	-
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	-	-	-	-	-
Dieldrin	µg/kg	10	NONE	-	-	-	-	-
Endosulphan A	µg/kg	10	NONE	-	-	-	-	-
Endosulphan B	µg/kg	10	NONE	-	-	-	-	-
Endrin	µg/kg	10	NONE	-	-	-	-	-
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	-	-	-	-	-
HCB (Hexachlorobenzene)	µg/kg	10	NONE	-	-	-	-	-
Heptachlor	µg/kg	10	NONE	-	-	-	-	-
Heptachlor Epoxide	µg/kg	10	NONE	-	-	-	-	-
Isodrin	µg/kg	10	NONE	-	-	-	-	-
pp-Methoxychlor	µg/kg	10	NONE	-	-	-	-	-
o,p-DDE	µg/kg	10	NONE	-	-	-	-	-
o,p-DDT	µg/kg	10	NONE	-	-	-	-	-
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	-	-	-	-	-
p,p-DDE	µg/kg	10	NONE	-	-	-	-	-
p,p-DDT	µg/kg	10	NONE	-	-	-	-	-
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	-	-	-	-	-
Trifluralin	µg/kg	10	NONE	-	-	-	-	-





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627679	627680	627681	627682	627683
Sample Reference				TP06	TP06	TP05	TP05	TP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)		0.00-0.25	1.00-1.90	0.00-0.30	0.60-2.10	0.00-0.30		
Date Sampled			08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Organophosphorous pesticides

Azinphos-methyl	µg/kg	10	NONE	-	-	-	-	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	-	-	-	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	-	-	-	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	-	-	-	-
Diazinon	µg/kg	10	NONE	-	-	-	-	-
Dichlorvos	µg/kg	10	NONE	-	-	-	-	-
Dimethoate	µg/kg	10	NONE	-	-	-	-	-
E-mevinphos	µg/kg	10	NONE	-	-	-	-	-
Z-mevinphos	µg/kg	10	NONE	-	-	-	-	-
Fenitrothion	µg/kg	10	NONE	-	-	-	-	-
Fenthion	µg/kg	10	NONE	-	-	-	-	-
Malathion	µg/kg	10	NONE	-	-	-	-	-
Parathion-ethyl	µg/kg	10	NONE	-	-	-	-	-
Parathion-methyl	µg/kg	10	NONE	-	-	-	-	-
Phorate	µg/kg	10	NONE	-	-	-	-	-





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number		627684	627685	627686	627687	627688					
Sample Reference				TP04	TP02	TP02	TP03	WS02			
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Denth (m)				0 30-1 00	0.00-0.40	0.60-1.20	0.00-0.30	0.00-0.10			
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016			
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status								
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	9.4	23	16	19	15			
Total mass of sample received	ka	0.001	NONE	1.4	1.4	1.4	1.5	1.4			
Asbestos in Soil Screen / Identification Name	Туре	N/A	ISO 17025	-	-	-	-	-			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected			
	.76-2										
General Inorganics	General Inorganics										
pH - Automated	pH Units	N/A	MCERTS	8.7	8.1	8.5	8.1	8,8			
Total Cvanide	ma/ka	1	MCERTS	< 1	< 1	< 1	< 1	< 1			
Free Cvanide	ma/ka	1	MCERTS	< 1	< 1	< 1	< 1	< 1			
Water Soluble SO4 16hr extraction (2:1 Leachate				• •			• •	• •			
Equivalent)	g/l	0.00125	MCERTS	0.13	0.015	0.023	0.018	0.066			
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	-	0.044	0.012	-	-			
Total Phenois											
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0			
Speciated PAHs											
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	0.48	< 0.10	< 0.10	< 0.10			
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	0.64	< 0.10	< 0.10	< 0.10			
Pyrene	mg/kg	0.1	MCERTS	< 0.10	0.49	< 0.10	< 0.10	< 0.10			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	0.32	< 0.10	< 0.10	< 0.10			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.52	< 0.05	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	0.44	< 0.10	< 0.10	< 0.10			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	0.25	< 0.10	< 0.10	< 0.10			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	0.29	< 0.10	< 0.10	< 0.10			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			
Total PAH		-									
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	3.43	< 1.60	< 1.60	< 1.60			
Heavy Metals / Metalloids		-									
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	23	9.5	20	25			
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	2.3	1.5	2.3	1.8			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	< 0.2	< 0.2	0.5			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	32	25	33	30			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	51	30	41	38			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	9.9	180	23	34	40			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.0	< 0.3	< 0.3	1.0			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21	42	29	34	35			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2.0	3.7	< 1.0	< 1.0	2.7			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	38	180	75	97	96			





Project / Site name: Cosmeston

Your Order No: PO0062396-1

I ah Sample Number				627684	627685	627686	627687	627688
Sample Reference				TP04	TP02	TP02	TP03	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-1.00	0.00-0.40	0.60-1.20	0.00-0.30	0.00-0.10
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016
Time Taken			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	-	< 0.1
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	-	< 0.1
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	-	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	-	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	-	-	< 8.0
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	-	< 8.0	-	-	< 8.0
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	-	< 10
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	-	< 0.1
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	-	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	-	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	-	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	-	-	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	-	< 10	-	-	< 10
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	-	< 10

Environmental Forensics

Organochlorine Pesticides

Aldrin	µg/kg	10	NONE	-	To follow	-	-	-
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	-	To follow	-	-	-
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	-	To follow	-	-	-
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	-	To follow	-	-	-
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	-	To follow	-	-	-
Dieldrin	µg/kg	10	NONE	-	To follow	-	-	-
Endosulphan A	µg/kg	10	NONE	-	To follow	-	-	-
Endosulphan B	µg/kg	10	NONE	-	To follow	-	-	-
Endrin	µg/kg	10	NONE	-	To follow	-	-	-
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	-	To follow	-	-	-
HCB (Hexachlorobenzene)	µg/kg	10	NONE	-	To follow	-	-	-
Heptachlor	µg/kg	10	NONE	-	To follow	-	-	-
Heptachlor Epoxide	µg/kg	10	NONE	-	To follow	-	-	-
Isodrin	µg/kg	10	NONE	-	To follow	-	-	-
pp-Methoxychlor	µg/kg	10	NONE	-	To follow	-	-	-
o,p-DDE	µg/kg	10	NONE	-	To follow	-	-	-
o,p-DDT	µg/kg	10	NONE	-	To follow	-	-	-
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	-	To follow	-	-	-
p,p-DDE	µg/kg	10	NONE	-	To follow	-	-	-
p,p-DDT	µg/kg	10	NONE	-	To follow	-	-	-
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	-	To follow	-	-	-
Trifluralin	µg/kg	10	NONE	-	To follow	-	-	-





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627684	627685	627686	627687	627688
Sample Reference				TP04	TP02	TP02	TP03	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-1.00	0.00-0.40	0.60-1.20	0.00-0.30	0.00-0.10
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Organophosphorous pesticides								
Azinphos-methyl	µg/kg	10	NONE	-	To follow	-	-	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	To follow	-	-	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	To follow	-	-	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	To follow	-	-	-
Diazinon	µg/kg	10	NONE	-	To follow	-	-	-
Dichlorvos	µg/kg	10	NONE	-	To follow	-	-	-
Dimethoate	µg/kg	10	NONE	-	To follow	-	-	-
E-mevinphos	µg/kg	10	NONE	-	To follow	-	-	-
Z-mevinphos	µg/kg	10	NONE	-	To follow	-	-	-
Fenitrothion	µg/kg	10	NONE	-	To follow	-	-	-
Fenthion	µg/kg	10	NONE	-	To follow	-	-	-
Malathion	µg/kg	10	NONE	-	To follow	-	-	-
Parathion-ethyl	µg/kg	10	NONE	-	To follow	-	-	-
Parathion-methyl	µg/kg	10	NONE	-	To follow	-	-	-
Phorate	µg/kg	10	NONE	-	To follow	-	-	-





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627689	627690	627691	
Sample Reference				TP06	TP04	TP02	
Sample Number			None Supplied	None Supplied	None Supplied		
Depth (m)			1.00-1.90	0.00-0.30	0.00-0.40		
Date Sampled				08/09/2016	08/09/2016	08/09/2016	
Time Taken				None Supplied	None Supplied	None Supplied	
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status				

General Inorganics

рН	pH Units	N/A	ISO 17025	7.7	8.1	8.1	
Total Cyanide	mg/l	0.01	ISO 17025	< 0.010	< 0.010	< 0.010	
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	
Sulphate as SO ₄	mg/l	0.1	ISO 17025	4.4	12	4.3	
Alkalinity	mgCaCO3/I	3	ISO 17025	36	110	98	

Phenols by HPLC

Catechol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Resorcinol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Ethylphenol & Dimethylphenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Cresols	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Naphthols	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Isopropylphenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Phenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Trimethylphenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	

< 3.5

< 3.5

< 3.5

µg/l 3.5 NONE

Total Phenols Total Phenols (HPLC)

Speciated PAHs							
Naphthalene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Acenaphthylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Acenaphthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	< 1.1	2.6	3.2	
Boron (dissolved)	µg/l	10	ISO 17025	< 10	28	29	
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.4	< 0.4	0.4	
Copper (dissolved)	µg/l	0.7	ISO 17025	6.4	< 0.7	16	
Lead (dissolved)	µg/l	1	ISO 17025	1.4	1.5	2.7	
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	
Nickel (dissolved)	µg/l	0.3	ISO 17025	2.3	2.4	1.5	
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	
Zinc (dissolved)	ua/l	0.4	ISO 17025	7.4	7.5	7.8	





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627689	627690	627691	
Sample Reference				TP06	TP04	TP02	
Sample Number				None Supplied	None Supplied	None Supplied	
Depth (m)				1.00-1.90	0.00-0.30	0.00-0.40	
Date Sampled	08/09/2016	08/09/2016	08/09/2016				
Time Taken	-			None Supplied	None Supplied	None Supplied	
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status				

Environmental Forensics

Organochiorine Pesticides							
Alpha-HCH (Alpha BHC)	µg/l	0.01	NONE	-	-	To follow	
Aldrin	µg/l	0.01	NONE	-	-	To follow	
Beta-HCH (Beta-BHC)	µg/l	0.01	NONE	-	-	To follow	
Chlordane (sum of cis & trans isomers)	µg/l	0.01	NONE	-	-	To follow	
Delta-HCH (Delta-BHC)	µg/l	0.01	NONE	-	-	To follow	
Dieldrin	µg/l	0.01	NONE	-	-	To follow	
Endosulphan A	µg/l	0.01	NONE	-	-	To follow	
Endosulphan B	µg/l	0.01	NONE	-	-	To follow	
Endrin	µg/l	0.01	NONE	-	-	To follow	
Gamma-HCH (Lindane) (Gamma-BHC)	µg/l	0.01	NONE	-	-	To follow	
HCB (Hexachlorobenzene)	µg/l	0.01	NONE	-	-	To follow	
Heptachlor Epoxide	µg/l	0.01	NONE	-	-	To follow	
Heptachlor	µg/l	0.01	NONE	-	-	To follow	
Isodrin	µg/l	0.01	NONE	-	-	To follow	
o,p-DDE	µg/l	0.01	NONE	-	-	To follow	
o,p-DDT	µg/l	0.01	NONE	-	-	To follow	
o,p-TDE (o,p-DDD)	µg/l	0.01	NONE	-	-	To follow	
p,p-DDE	µg/l	0.01	NONE	-	-	To follow	
p,p-DDT	µg/l	0.01	NONE	-	-	To follow	
pp-Methoxychlor	µg/l	0.01	NONE	-	-	To follow	
p,p-TDE (p,p-DDD)	µg/l	0.01	NONE	-	-	To follow	
Trifluralin	ua/l	0.01	NONE	-	-	To follow	

Organophosphorus Pesticides (OPP)

Azinphos-methyl	µg/l	0.01	NONE	-	-	To follow	
Chlorfenvinphos I (cis)	µg/l	0.01	NONE	-	-	To follow	
Chlorfenvinphos II (trans)	µg/l	0.01	NONE	-	-	To follow	
Chlorfenvinphos-methyl	µg/l	0.01	NONE	-	-	To follow	
Diazinon	µg/l	0.01	NONE	-	-	To follow	
Dichlorvos	µg/l	0.01	NONE	-	-	To follow	
Dimethoate	µg/l	0.01	NONE	-	-	To follow	
Fenitrothion	µg/l	0.01	NONE	-	-	To follow	
Fenthion	µg/l	0.01	NONE	-	-	To follow	
Malathion	µg/l	0.01	NONE	-	-	To follow	
E-mevinphos	µg/l	0.01	NONE	-	-	To follow	
Z-mevinphos	µg/l	0.01	NONE	-	-	To follow	
Parathion-ethyl	µg/l	0.01	NONE	-	-	To follow	
Parathion-methyl	µg/l	0.01	NONE	-	-	To follow	
Phorate	µg/l	0.01	NONE	-	-	To follow	





Preliminary Report Number : 16-27480

Project / Site name: Cosmeston

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
627679	TP06	None Supplied	0.00-0.25	Brown loam and clay with gravel.
627680	TP06	None Supplied	1.00-1.90	Brown sand with gravel and rubble.
627681	TP05	None Supplied	0.00-0.30	Brown clay and loam with gravel.
627682	TP05	None Supplied	0.60-2.10	Brown clay and sand with gravel.
627683	TP04	None Supplied	0.00-0.30	Brown loam and clay with gravel.
627684	TP04	None Supplied	0.30-1.00	Brown loam and sand with gravel.
627685	TP02	None Supplied	0.00-0.40	Brown loam and clay with gravel.
627686	TP02	None Supplied	0.60-1.20	Brown loam and clay with gravel.
627687	TP03	None Supplied	0.00-0.30	Brown loam and clay with gravel.
627688	WS02	None Supplied	0.00-0.10	Brown loam and sand with gravel.





Preliminary Report Number : 16-27480

Project / Site name: Cosmeston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Alkalinity in Leachate	Determination of Alkalinity by discreet analyser (colorimetry).	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	w	ISO 17025
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	w	NONE
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	NONE
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	w	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Phenols, speciated, in leachate, by HPLC	Determination of speciated phenols by HPLC.	In house method based on Blue Book Method.	L030-PL	w	NONE

Iss No 16-27480-0 Cosmeston UA008386

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Preliminary Report Number : 16-27480

Project / Site name: Cosmeston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status	
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE	
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS	
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE	
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025	
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP- OES.	L038-PL	D	MCERTS	
TO - Organochlorine pesticides in leachate	Determination of organochlorine pesticides in leachate by GC-MS	In-house method Determination of organochlorine pesticides in leachate by GC- MS		W	NONE	
TO - Organochlorine pesticides in soil	Determination of OCPs by extraction with hexane followed by GC-MS.	In-house method		W	NONE	
TO - Organophosphorous pesticides in leachate	Determination of organophosphorous pesticides in leachate by GC-MS	In-house method		W	NONE	
TO - Organophosphorous pesticides in soil	Determination of OPPs by extraction with DCM followed by GC-MS.	In-house method		W	NONE	
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	w	ISO 17025	
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS	
TPH6 (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method	L076-PL	D	ISO 17025	

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Sian Carter Arcadis Consulting (UK) Ltd **HCL** House St Mellon's Business Park Cardiff CF3 OEY

Environmental Science

i2 Analytical Ltd. 7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com

t: 029 2092 6873

e: Sian.Carter@arcadis.com

Analytical Report Number : 16-27480

Project / Site name:	Cosmeston	Samples received on:	12/09/2016
Your job number:	UA008386	Samples instructed on:	12/09/2016
Your order number:	PO0062396-1	Analysis completed by:	22/09/2016
Report Issue Number:	1	Report issued on:	22/09/2016
Samples Analysed:	3 leachate samples - 10 soil samples		

Signed:

Rexona Rahman **Reporting Manager** For & on behalf of i2 Analytical Ltd.

111-Signed:

Emma Winter Assistant Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number			627679	627680	627681	627682	627683			
Sample Reference				TP06	TP06	TP05	TP05	TP04		
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Depth (m)				0.00-0.25	1.00-1.90	0.00-0.30	0.60-2.10	0.00-0.30		
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016		
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
			<u>,</u>							
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status							
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	17	14	16	12	18		
Total mass of sample received	ka	0.001	NONE	1.5	1.5	1.4	1.5	1.5		
Asbestos in Soil Screen / Identification Name	Туре	N/A	ISO 17025	-	Chrysotile- Loose fibres	-	-	-		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-detected	Not-detected		
		- '								
General Inorganics										
pH - Automated	pH Units	N/A	MCERTS	8.3	8.5	8.3	8.7	8.3		
Total Cyanide	ma/ka	1	MCERTS	< 1	< 1	< 1	< 1	< 1		
Free Cyanide	ma/ka	1	MCERTS	< 1	< 1	< 1	< 1	< 1		
Water Soluble SO4 16hr extraction (2:1 Leachate	5,5	_				-				
Equivalent)	g/l	0.00125	MCERTS	0.012	0.059	0.0093	0.071	0.023		
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	0.026	0.018	0.025	-	-		
Total Phenois										
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
Speciated PAHs										
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Total PAH										
Speciated Total EPA-16 PAHs	ma/ka	1.6	MCERTS	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60		
	5, 5									
Heavy Metals / Metalloids										
Arsenic (agua regia extractable)	mg/kg	1	MCERTS	53	11	110	15	37		
Boron (water soluble)	ma/ka	0.2	MCERTS	2.3	0.8	2.4	1.3	2.0		
Cadmium (agua regia extractable)	ma/ka	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.3	0.6		
Chromium (hexavalent)	ma/ka	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0		
Chromium (agua regia extractable)	ma/ka	1	MCERTS	31	15	37	18	29		
Copper (agua regia extractable)	ma/ka	1	MCERTS	46	33	49	33	44		
Lead (agua regia extractable)	ma/ka	1	MCERTS	51	10	69	15	51		
Mercury (agua regia extractable)	ma/ka	0.3	MCERTS	< 0.3	< 0.3	0,6	< 0.3	0,5		
Nickel (agua regia extractable)	ma/ka	1	MCERTS	43	29	55	33	42		
Selenium (aqua regia extractable)	ma/ka	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.9		
Zinc (agua regia extractable)	ma/ka	1	MCERTS	100	64	160	64	110		
· · · · · · · · · · · · · · · · · · ·		-								





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627679	627680	627681	627682	627683
Sample Reference				TP06	TP06	TP05	TP05	TP04
Sample Number		None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Depth (m)				0.00-0.25	1.00-1.90	0.00-0.30	0.60-2.10	0.00-0.30
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	< 1.0	2.6	< 1.0	-	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	< 2.0	8.1	< 2.0	-	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	< 8.0	< 8.0	< 8.0	-	< 8.0
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	< 8.0	< 8.0	< 8.0	-	< 8.0
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	< 10	11	< 10	-	< 10
					-			
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	< 2.0	< 2.0	< 2.0	-	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	< 10	< 10	< 10	-	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	< 10	< 10	< 10	-	< 10
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	< 10	< 10	< 10	-	< 10

Environmental Forensics Organochlorine Pesticides

Aldrin	µg/kg	10	NONE	-	-	-	-	-
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	-	-	-	-	-
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	-	-	-	-	-
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	-	-	-	-	-
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	-	-	-	-	-
Dieldrin	µg/kg	10	NONE	-	-	-	-	-
Endosulphan A	µg/kg	10	NONE	-	-	-	-	-
Endosulphan B	µg/kg	10	NONE	-	-	-	-	-
Endrin	µg/kg	10	NONE	-	-	-	-	-
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	-	-	-	-	-
HCB (Hexachlorobenzene)	µg/kg	10	NONE	-	-	-	-	-
Heptachlor	µg/kg	10	NONE	-	-	-	-	-
Heptachlor Epoxide	µg/kg	10	NONE	-	-	-	-	-
Isodrin	µg/kg	10	NONE	-	-	-	-	-
pp-Methoxychlor	µg/kg	10	NONE	-	-	-	-	-
o,p-DDE	µg/kg	10	NONE	-	-	-	-	-
o,p-DDT	µg/kg	10	NONE	-	-	-	-	-
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	-	-	-	-	-
p,p-DDE	µg/kg	10	NONE	-	-	-	-	-
p,p-DDT	µg/kg	10	NONE	-	-	-	-	-
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	-	-	-	-	-
Trifluralin	µg/kg	10	NONE	-	-	-	-	-





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627679	627680	627681	627682	627683
Sample Reference				TP06	TP06	TP05	TP05	TP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.25	1.00-1.90	0.00-0.30	0.60-2.10	0.00-0.30
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016
Time Taken			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Organophosphorous pesticides	-		•					
Azinphos-methyl	µg/kg	10	NONE	-	-	-	-	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	-	-	-	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	-	-	-	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	-	-	-	-
Diazinon	µg/kg	10	NONE	-	-	-	-	-
Dichlorvos	µg/kg	10	NONE	-	-	-	-	-
Dimethoate	µg/kg	10	NONE	-	-	-	-	-
E-mevinphos	µg/kg	10	NONE	-	-	-	-	-
Z-mevinphos	µg/kg	10	NONE	-	-	-	-	-
Fenitrothion	µg/kg	10	NONE	-	-	-	-	-
Fenthion	µg/kg	10	NONE	-	-	-	-	-
Malathion	µg/kg	10	NONE	-	-	-	-	-
Parathion-ethyl	µg/kg	10	NONE	-	-	-	-	-
Parathion-methyl	µg/kg	10	NONE	-	-	-	-	-
Phorate	µg/kg	10	NONE	-	-	-	-	-





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627684	627685	627686	627687	627688			
Sample Reference				TD04	TP02	TP02	TP03	WS02			
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Denth (m)				0.30-1.00	0.00-0.40	0.60-1.20					
Date Sampled				0.30-1.00	0.00-0.40	0.00-1.20	0.00-0.30	08/09/2016			
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
	1	1		None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status								
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	9.4	23	16	19	15			
Total mass of sample received	kg	0.001	NONE	1.4	1.4	1.4	1.5	1.4			
L		•									
Asbestos in Soil Screen / Identification Name	Туре	N/A	ISO 17025	-	-	-	-	-			
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected			
General Inorganics											
pH - Automated	pH Units	N/A	MCERTS	8.7	8.1	8.5	8.1	8.8			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1			
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1			
Water Soluble SO4 16hr extraction (2:1 Leachate											
Equivalent)	g/l	0.00125	MCERTS	0.13	0.015	0.023	0.018	0.066			
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	-	0.044	0.012	-	-			
Total Phenois											
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0			
Speciated PAHs	-										
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	0.48	< 0.10	< 0.10	< 0.10			
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	0.64	< 0.10	< 0.10	< 0.10			
Pyrene	mg/kg	0.1	MCERTS	< 0.10	0.49	< 0.10	< 0.10	< 0.10			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	0.32	< 0.10	< 0.10	< 0.10			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.52	< 0.05	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	0.44	< 0.10	< 0.10	< 0.10			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	0.25	< 0.10	< 0.10	< 0.10			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	0.29	< 0.10	< 0.10	< 0.10			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			
Total PAH											
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	3.43	< 1.60	< 1.60	< 1.60			
Heavy Metals / Metalloids											
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	23	9.5	20	25			
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	2.3	1.5	2.3	1.8			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	< 0.2	< 0.2	0.5			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	32	25	33	30			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	51	30	41	38			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	9.9	180	23	34	40			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.0	< 0.3	< 0.3	1.0			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21	42	29	34	35			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2.0	3.7	< 1.0	< 1.0	2.7			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	38	180	75	97	96			





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Commits Defenses		027004	02/005	027000	62/68/	627688		
Sample Reference				TP04	TP02	TP02	TP03	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-1.00	0.00-0.40	0.60-1.20	0.00-0.30	0.00-0.10
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Petroleum Hydrocarbons								
TPH6 - Aliphatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	-	< 0.1
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	-	< 0.1
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	-	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	-	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	ISO 17025	-	< 8.0	-	-	< 8.0
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	ISO 17025	-	< 8.0	-	-	< 8.0
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	-	< 10
	-							
TPH6 - Aromatic (C6 - C8)	mg/kg	0.1	NONE	-	< 0.1	-	-	< 0.1
TPH6 - Aromatic (C8 - C10)	mg/kg	0.1	NONE	-	< 0.1	-	-	< 0.1
TPH6 - Aromatic (C10 - C12)	mg/kg	1	ISO 17025	-	< 1.0	-	-	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	ISO 17025	-	< 2.0	-	-	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	ISO 17025	-	< 10	-	-	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	ISO 17025	-	< 10	-	-	< 10
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	-	< 10

Environmental Forensics Organochlorine Pesticides

Aldrin	110/1/0	10	NONE		< 10		-	
	µу/ку	10	NONE	-	< 10	-	-	-
Alpha-HCH (Alpha BHC)	µg/kg	10	NONE	-	< 10	-	-	-
Beta-HCH (Beta-BHC)	µg/kg	10	NONE	-	< 10	-	-	-
Chlordane (sum of cis & trans isomers)	µg/kg	10	NONE	-	< 10	-	-	-
Delta-HCH (Delta-BHC)	µg/kg	10	NONE	-	< 10	-	-	-
Dieldrin	µg/kg	10	NONE	-	< 10	-	-	-
Endosulphan A	µg/kg	10	NONE	-	< 10	-	-	-
Endosulphan B	µg/kg	10	NONE	-	< 10	-	-	-
Endrin	µg/kg	10	NONE	-	< 10	-	-	-
Gamma-HCH (Lindane) (Gamma-BHC)	µg/kg	10	NONE	-	< 10	-	-	-
HCB (Hexachlorobenzene)	µg/kg	10	NONE	-	< 10	-	-	-
Heptachlor	µg/kg	10	NONE	-	< 10	-	-	-
Heptachlor Epoxide	µg/kg	10	NONE	-	< 10	-	-	-
Isodrin	µg/kg	10	NONE	-	< 10	-	-	-
pp-Methoxychlor	µg/kg	10	NONE	-	< 10	-	-	-
o,p-DDE	µg/kg	10	NONE	-	< 10	-	-	-
o,p-DDT	µg/kg	10	NONE	-	< 10	-	-	-
o,p-TDE (o,p-DDD)	µg/kg	10	NONE	-	< 10	-	-	-
p,p-DDE	µg/kg	10	NONE	-	< 10	-	-	-
p,p-DDT	µg/kg	10	NONE	-	< 10	-	-	-
p,p-TDE (p,p-DDD)	µg/kg	10	NONE	-	< 10	-	-	-
Trifluralin	µg/kg	10	NONE	-	< 10	-	-	-





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627684	627685	627686	627687	627688
Sample Reference				TP04	TP02	TP02	TP03	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-1.00	0.00-0.40	0.60-1.20	0.00-0.30	0.00-0.10
Date Sampled				08/09/2016	08/09/2016	08/09/2016	08/09/2016	08/09/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Organophosphorous pesticides								
Azinphos-methyl	µg/kg	10	NONE	-	< 10	-	-	-
Chlorfenvinphos I (cis)	µg/kg	10	NONE	-	< 10	-	-	-
Chlorfenvinphos II (trans)	µg/kg	10	NONE	-	< 10	-	-	-
Chlorfenvinphos-methyl	µg/kg	10	NONE	-	< 10	-	-	-
Diazinon	µg/kg	10	NONE	-	< 10	-	-	-
Dichlorvos	µg/kg	10	NONE	-	< 10	-	-	-
Dimethoate	µg/kg	10	NONE	-	< 10	-	-	-
E-mevinphos	µg/kg	10	NONE	-	< 10	-	-	-
Z-mevinphos	µg/kg	10	NONE	-	< 10	-	-	-
Fenitrothion	µg/kg	10	NONE	-	< 10	-	-	-
Fenthion	µg/kg	10	NONE	-	< 10	-	-	-
Malathion	µg/kg	10	NONE	-	< 10	-	-	-
Parathion-ethyl	µg/kg	10	NONE	-	< 10	-	-	-
Parathion-methyl	µg/kg	10	NONE	-	< 10	-	-	-
Phorate	µg/kg	10	NONE	-	< 10	-	-	-





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627689	627690	627691	
Sample Reference				TP06	TP04	TP02	
Sample Number				None Supplied	None Supplied	None Supplied	
Depth (m)				1.00-1.90	0.00-0.30	0.00-0.40	
Date Sampled				08/09/2016	08/09/2016	08/09/2016	
Time Taken				None Supplied	None Supplied	None Supplied	
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status				

General Inorganics

рН	pH Units	N/A	ISO 17025	7.7	8.1	8.1	
Total Cyanide	mg/l	0.01	ISO 17025	< 0.010	< 0.010	< 0.010	
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	
Sulphate as SO ₄	mg/l	0.1	ISO 17025	4.4	12	4.3	
Alkalinity	mgCaCO3/I	3	ISO 17025	36	110	98	

Phenois by HPLC

Catechol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Resorcinol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Ethylphenol & Dimethylphenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Cresols	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Naphthols	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Isopropylphenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Phenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	
Trimethylphenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	

< 3.5

< 3.5

< 3.5

µg/l 3.5 NONE

Total Phenols Total Phenols (HPLC)

Speciated PAHs							
Naphthalene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Acenaphthylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Acenaphthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	< 1.1	2.6	3.2	
Boron (dissolved)	µg/l	10	ISO 17025	< 10	28	29	
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.4	< 0.4	0.4	
Copper (dissolved)	µg/l	0.7	ISO 17025	6.4	< 0.7	16	
Lead (dissolved)	µg/l	1	ISO 17025	1.4	1.5	2.7	
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	
Nickel (dissolved)	µg/l	0.3	ISO 17025	2.3	2.4	1.5	
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	
Zinc (dissolved)	ua/l	0.4	ISO 17025	7.4	7.5	7.8	





Project / Site name: Cosmeston

Your Order No: PO0062396-1

Lab Sample Number				627689	627690	627691	
Sample Reference			TP06	TP04	TP02		
Sample Number			None Supplied	None Supplied	None Supplied		
Depth (m)			1.00-1.90	0.00-0.30	0.00-0.40		
Date Sampled			08/09/2016	08/09/2016	08/09/2016		
Time Taken				None Supplied	None Supplied	None Supplied	
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status				

Environmental Forensics

Organochlorine Pesticides							
Alpha-HCH (Alpha BHC)	µg/l	0.01	NONE	-	-	< 0.01	
Aldrin	µg/l	0.01	NONE	-	-	< 0.01	
Beta-HCH (Beta-BHC)	µg/l	0.01	NONE	-	-	< 0.01	
Chlordane (sum of cis & trans isomers)	µg/l	0.01	NONE	-	-	< 0.01	
Delta-HCH (Delta-BHC)	µg/l	0.01	NONE	-	-	< 0.01	
Dieldrin	µg/l	0.01	NONE	-	-	< 0.01	
Endosulphan A	µg/l	0.01	NONE	-	-	< 0.01	
Endosulphan B	µg/l	0.01	NONE	-	-	< 0.01	
Endrin	µg/l	0.01	NONE	-	-	< 0.01	
Gamma-HCH (Lindane) (Gamma-BHC)	µg/l	0.01	NONE	-	-	< 0.01	
HCB (Hexachlorobenzene)	µg/l	0.01	NONE	-	-	< 0.01	
Heptachlor Epoxide	µg/l	0.01	NONE	-	-	< 0.01	
Heptachlor	µg/l	0.01	NONE	-	-	< 0.01	
Isodrin	µg/l	0.01	NONE	-	-	< 0.01	
o,p-DDE	µg/l	0.01	NONE	-	-	< 0.01	
o,p-DDT	µg/l	0.01	NONE	-	-	< 0.01	
o,p-TDE (o,p-DDD)	µg/l	0.01	NONE	-	-	< 0.01	
p,p-DDE	µg/l	0.01	NONE	-	-	< 0.01	
p,p-DDT	µg/l	0.01	NONE	-	-	< 0.01	
pp-Methoxychlor	µg/l	0.01	NONE	-	-	< 0.01	
p,p-TDE (p,p-DDD)	µg/l	0.01	NONE	-	-	< 0.01	
Trifluralin	ua/l	0.01	NONE	-	-	< 0.01	

Organophosphorus Pesticides (OPP)

Azinphos-methyl	µg/l	0.01	NONE	-	-	< 0.01	
Chlorfenvinphos I (cis)	µg/l	0.01	NONE	-	-	< 0.01	
Chlorfenvinphos II (trans)	µg/l	0.01	NONE	-	-	< 0.01	
Chlorfenvinphos-methyl	µg/l	0.01	NONE	-	-	< 0.01	
Diazinon	µg/l	0.01	NONE	-	-	< 0.01	
Dichlorvos	µg/l	0.01	NONE	-	-	< 0.01	
Dimethoate	µg/l	0.01	NONE	-	-	< 0.01	
Fenitrothion	µg/l	0.01	NONE	-	-	< 0.01	
Fenthion	µg/l	0.01	NONE	-	-	< 0.01	
Malathion	µg/l	0.01	NONE	-	-	< 0.01	
E-mevinphos	µg/l	0.01	NONE	-	-	< 0.01	
Z-mevinphos	µg/l	0.01	NONE	-	-	< 0.01	
Parathion-ethyl	µg/l	0.01	NONE	-	-	< 0.01	
Parathion-methyl	µg/l	0.01	NONE	-	-	< 0.01	
Phorate	µg/l	0.01	NONE	-	-	0.02	





Project / Site name: Cosmeston

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
627679	TP06	None Supplied	0.00-0.25	Brown loam and clay with gravel.
627680	TP06	None Supplied	1.00-1.90	Brown sand with gravel and rubble.
627681	TP05	None Supplied	0.00-0.30	Brown clay and loam with gravel.
627682	TP05	None Supplied	0.60-2.10	Brown clay and sand with gravel.
627683	TP04	None Supplied	0.00-0.30	Brown loam and clay with gravel.
627684	TP04	None Supplied	0.30-1.00	Brown loam and sand with gravel.
627685	TP02	None Supplied	0.00-0.40	Brown loam and clay with gravel.
627686	TP02	None Supplied	0.60-1.20	Brown loam and clay with gravel.
627687	TP03	None Supplied	0.00-0.30	Brown loam and clay with gravel.
627688	WS02	None Supplied	0.00-0.10	Brown loam and sand with gravel.





Project / Site name: Cosmeston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Alkalinity in Leachate	Determination of Alkalinity by discreet analyser (colorimetry).	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	w	ISO 17025
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	w	NONE
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	NONE
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	w	ISO 17025
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	w	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	w	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	w	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Phenols, speciated, in leachate, by HPLC	Determination of speciated phenols by HPLC.	In house method based on Blue Book Method.	L030-PL	w	NONE

Iss No 16-27480-1 Cosmeston UA008386

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Project / Site name: Cosmeston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP- OES.	L038-PL	D	MCERTS
TO - Organochlorine pesticides in leachate	Determination of organochlorine pesticides in leachate by GC-MS	In-house method Determination of organochlorine pesticides in leachate by GC- MS		W	NONE
TO - Organochlorine pesticides in soil	Determination of OCPs by extraction with hexane followed by GC-MS.	In-house method		W	NONE
TO - Organophosphorous pesticides in leachate	Determination of organophosphorous pesticides in leachate by GC-MS	In-house method		W	NONE
TO - Organophosphorous pesticides in soil	Determination of OPPs by extraction with DCM followed by GC-MS.	In-house method		W	NONE
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
TPH6 (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method	L076-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Amy Mayer Arcadis Consulting (UK) Ltd Warehouse 2 Avonbank Ind. Estate BS11 9DE



i2 Analytical Ltd. 7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com

e: amy.mayer@arcadis.com

Analytical Report Number : 18-72599

Project / Site name:	Cosmeston Phase 2	Samples received on:	11/01/2018
Your job number:	UA008386-02	Samples instructed on:	11/01/2018
Your order number:	14004066	Analysis completed by:	22/01/2018
Report Issue Number:	1	Report issued on:	22/01/2018
Samples Analysed:	2 water samples		

hat Signed:

Jordan Hill Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.





Analytical Report Number: 18-72599

Project / Site name: Cosmeston Phase 2

Your Order No: 14004066								
Lab Sample Number				887159	887160			
Sample Reference				WS104	WS111			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.90	1.05			
Date Sampled				09/01/2018	09/01/2018			
Time Taken	Time Taken							
			•	FF				
		승드						
Analytical Parameter	U ni	tec	edi					
(Water Analysis)	ស	tion	us					
		-	9					
	-				1			
General Inorganics								
pH	pH Units	N/A	ISO 17025	7.2	6.7			
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10			
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10			
Sulphate as SO ₄	µg/l	45	ISO 17025	55500	190000			
Sulphate as SO ₄	mg/l	0.045	ISO 17025	55.5	190			
Alkalinity	mgCaCO3/I	3	ISO 17025	230	640			
Phenois by HPLC	-							
Catechol	µg/l	0.5	NONE	< 0.5	< 0.5			
Resorcinol	µg/l	0.5	NONE	< 0.5	< 0.5			
Ethylphenol & Dimethylphenol	µg/l	0.5	NONE	< 0.5	< 0.5			
Cresols	µg/l	0.5	NONE	< 0.5	< 0.5			
Naphthols	µg/l	0.5	NONE	< 0.5	< 0.5			
Isopropyipnenoi	µg/I	0.5	NONE	< 0.5	< 0.5			
Phenoi Trimethulahanal	µg/I	0.5	NONE	< 0.5	< 0.5			
Ппецурнено	µg/i	0.5	NONE	< 0.5	< 0.5			
Total Phenois								
Total Phenois (HPI C)	ug/l	35	NONE	< 35	< 3.5			
	P9/1	515	Hone					
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	0.45			
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	0.81			
Fluorene	µg/l	0.01	ISO 17025	< 0.01	0.19			
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01		L	
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Tabal DAU								
		0.10	100 17005	× 0.1C	1 45		1	1
IULAI LPA-10 PARS	µg/I	0.10	150 17025	< 0.10	1.45	1		





Project / Site name: Cosmeston Phase 2

Your Order No: 14004066								
Lab Sample Number				887159	887160			
Sample Reference				WS104	WS111			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.90	1.05			
Date Sampled				09/01/2018	09/01/2018			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids						-		
Arsenic (dissolved)	µg/l	1	ISO 17025	1.5	4.9			
Boron (dissolved)	µg/l	10	ISO 17025	21	57			
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08			
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0			
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.6	1.0			
Copper (dissolved)	µg/l	0.7	ISO 17025	8.2	7.3			
Lead (dissolved)	µg/l	1	ISO 17025	< 1.0	14			
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5			
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.5	13			
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0			
Zinc (dissolved)	µg/l	0.4	ISO 17025	6.2	19			
Monoaromatics		-						
Benzene	µg/l	1	ISO 17025	< 1.0	-			
Toluene	µg/l	1	ISO 17025	< 1.0	-			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	-			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	-			
o-xylene	µg/l	1	ISO 17025	< 1.0	-			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	-			
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >C5 - C6	µq/l	1	ISO 17025	< 1.0	-			
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	-			
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	-			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	-			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	-			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	-			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	-			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	-			
					-		-	-
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	-			
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	-			
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	-			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	-			
IPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	-			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C21 - C35	µg/I	10	NONE	< 10	-			
LIPH-CWG - AFOMATIC (CS - C35)	U0/1	10	NONE	< 10				





Project / Site name: Cosmeston Phase 2

Your Order No: 14004066											
Lab Sample Number				887159	887160						
Sample Reference											
				WS104	WS111						
Sample Number											
Depth (m)	0.90	1.05									
Time Taken				None Supplied	None Supplied						
				None Supplied	None Supplied						
		유드									
Analytical Parameter	Uni	tec	edi								
(Water Analysis)	s	tion	us								
		-	9								
VOCs											
Chloromethane	µg/l	1	ISO 17025	< 1.0	-						
Chloroethane	µg/l	1	ISO 17025	< 1.0	-						
Bromomethane	µg/l	1	ISO 17025	< 1.0	-						
Vinyl Chloride	µg/l	1	NONE	< 1.0	-						
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	-						
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	-						
1,1,2-I richloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	-						
MTRE (Mothul Tartiany Rutul Ethan)	µg/1	1	ISO 17025	< 1.0	-						
1 1-Dichloroethane	μg/1 μα/Ι	1	ISO 17025	< 1.0	-						
2,2-Dichloropropane	μα/l	1	ISO 17025	< 1.0	-						
Trichloromethane	µg/l	1	ISO 17025	< 1.0	-						
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	-						
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	-						
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	-						
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	-						
Benzene	µg/l	1	ISO 17025	< 1.0	-						
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	-						
1,2-Dichloropropane	µg/I	1	150 17025	< 1.0	-						
Dibromomothano	µg/1	1	ISO 17025	< 1.0	-						
Bromodichloromethane	ug/l	1	ISO 17025	< 1.0	-						
Cis-1.3-dichloropropene	µg/l	1	ISO 17025	< 1.0	-						
Trans-1,3-dichloropropene	μg/l	1	ISO 17025	< 1.0	-						
Toluene	µg/l	1	ISO 17025	< 1.0	-						
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	-						
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	-						
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	-						
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	-						
1,2-Dibromoethane	µg/I	1	150 17025	< 1.0	-						
	µg/1	1	150 17025	< 1.0	-						
Fthylbenzene	µg/1	1	ISO 17025	< 1.0	-						
p & m-Xvlene	μg/1 μα/Ι	1	ISO 17025	< 1.0	-						
Styrene	ua/l	1	ISO 17025	< 1.0	-						
Tribromomethane	µg/l	1	ISO 17025	< 1.0	-						
o-Xylene	µg/l	1	ISO 17025	< 1.0	-						
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	-						
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	-						
Bromobenzene	µg/l	1	ISO 17025	< 1.0	-						
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	-						
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	-						
4-Chiorotoluene	µg/1	1	150 17025	< 1.0	-						
tert-Butylbenzene	µg/i	1	ISO 17025	< 1.0	-						
1,2,4-Trimethylbenzene	μα/l	1	ISO 17025	< 1.0	-						
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	-						
1,3-Dichlorobenzene	μg/l	1	ISO 17025	< 1.0	-						
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	-						
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	-						
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	-						
Butylbenzene	µg/l	1	ISO 17025	< 1.0	-						
1,2-Dibromo-3-chloropropane	µg/I	1	150 17025	< 1.0	-						
	µg/1	1	ISO 17025	< 1.0	-						
1.2.3-Trichlorobenzene	ua/l	1	ISO 17025	< 1.0	-						





Project / Site name: Cosmeston Phase 2

Your Order No: 14004066							
Lab Sample Number				887159	887160		
Sample Reference							
Complex Number				WS104	WS111		
Sample Number				None Supplied	None Supplied		
Depth (m)				0.90	1.05		
Date Sampled				09/01/2018	09/01/2018		
Time Taken				None Supplied	None Supplied		
		<u>م</u>	Acc				
Analytical Parameter	<u> </u>	et lin	St				
(Water Analysis)	nits	ĝ.≓	dita				
	•	g st	s s				
			3				
SVOCs							
Aniline	µg/l	0.05	NONE	< 0.05	-		
Phenol	µg/l	0.05	NONE	< 0.05	-		
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	-		
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	-		
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	-		
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	-		
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	-		
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	-		
2-Methylphenol	µg/l	0.05	NONE	< 0.05	-		
Hexachloroethane	µg/l	0.05	NONE	< 0.05	-		
Nitrobenzene	µg/l	0.05	NONE	< 0.05	-		
4-Methylphenol	µg/l	0.05	NONE	< 0.05	-		
Isophorone	µg/l	0.05	NONE	< 0.05	-		
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	-		
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	-		
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	-		
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	-		
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	-		
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	-		
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	-		
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	-		
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	-		
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	-		
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	-		
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	-		
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	-		
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	-		
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	-		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	-		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	-		
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	-		
Dibenzofuran	µg/l	0.05	NONE	< 0.05	-		
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	-		
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	-		
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	-		
Huorene	µg/l	0.01	ISO 17025	< 0.01	-		
Azobenzene	µg/l	0.05	NONE	< 0.05	-		
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	-		
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	-		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	-		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	-		
Carbazole	µg/l	0.05	NONE	< 0.05	-		
Dibutyi phthalate	µg/l	0.05	NONE	< 0.05	-		
Anthraquinone	µg/l	0.05	NONE	< 0.05	-		
riuoranutiene	µg/I	0.01	150 17025	< 0.01	-		
ryrene Dut d baard abthalata	µg/I	0.01	150 1/025	< 0.01	-		
Butyl benzyl phthalate	µg/I	0.05	NONE	< 0.05	-		
benzu(a)antnracene	µg/I	0.01	150 17025	< 0.01	-		
Unrysene Ronzo(h)fluoronthono	µg/l	0.01	150 17025	< 0.01	-		
Denzo(D)FIUOrantnene	µg/I	0.01	150 17025	< 0.01	-		
benzo(k)riuorantnene	µg/I	0.01	150 17025	< 0.01	-		
Benzo(a)pyrene	µg/l	0.01	150 17025	< 0.01	-		
Dihona(1,2,3-CO)pyrefie	µg/I	0.01	150 17025	< 0.01	-		
	µg/I	0.01	150 17025	< 0.01	-		
Derizo(qriff)Derviene	ua/i	0.01	150 1/025	I < 0.01	-	1	1

U/S = Unsuitable Sample I/S = Insufficient Sample




Project / Site name: Cosmeston Phase 2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

		Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Alkalinity in Water	Determination of Alkalinity by discreet analyser (colorimetry). Accredited matrices: SW, PW, GW.	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	w	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	w	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	w	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry.Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	w	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	w	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	w	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	w	ISO 17025
Phenols, speciated, in water, by HPLC	Determination of speciated phenols by HPLC.	In house method based on Blue Book Method.	L030-PL	w	NONE
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	w	NONE
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	w	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	w	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	w	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	w	ISO 17025

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland. Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS104		W	18-72599	887159	d	BTEX and MTBE in water (Monoaromatics)	L073B-PL	d
WS104		W	18-72599	887159	d	TPHCWG (Waters)	L070-PL	d
WS104		W	18-72599	887159	d	Volatile organic compounds in water	L073B-PL	d



Sian Carter Arcadis Consulting (UK) Ltd HCL House St Mellon's Business Park Cardiff CF3 OEY

t: 029 2092 6873

e: Sian.Carter@arcadis.com

Analytical Report Number : 18-73227

Project / Site name:	Cosmeston Phase 2	Samples received on:	18/01/2018
Your job number:	UA008386-02	Samples instructed on:	18/01/2018
Your order number:	14002979	Analysis completed by:	25/01/2018
Report Issue Number:	1	Report issued on:	25/01/2018
Samples Analysed:	1 water sample		

LAS Signed:

Jordan Hill Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

s le

Excel copies of reports are only valid when accompanied by this PDF certificate.





7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

i2 Analytical Ltd.

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com





Your Order No: 14002979								
Lab Sample Number				891045				
Sample Reference				WS111				
Sample Number	Sample Number							
Depth (m)	Depth (m)							
Date Sampled				16/01/2018				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					
General Inorganics								
Chloride	ma/l	0.15	ISO 17025	21				
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	4600				
			•			•	•	
Monoaromatics	-	-						
Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >C5 - C6	ug/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic > C6 - C8	ug/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic > C8 - C10	ua/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C10 - C12	ua/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10				





Your Order No: 14002979							
Lab Sample Number				891045			
Sample Reference				WS111			
Sample Number				None Supplied			
Depth (m)				1.10			
Date Sampled	16/01/2018						
Time Taken		-	-	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				
VOCs						I	
Chloromethane	ua/l	1	ISO 17025	< 1.0			
Chloroethane	µg/l	1	ISO 17025	< 1.0			
Bromomethane	µg/l	1	ISO 17025	< 1.0			
Vinyl Chloride	µg/l	1	NONE	< 1.0			
Trichlorofluoromethane	µg/l	1	NONE	< 1.0			
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0			
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0			
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	150 17025	< 1.0			
1,1-Dichloroethane	µg/I	1	150 17025	< 1.0			
z,z-Dicilioropropane	µg/1	1	150 17025	< 1.0			
1.1.1-Trichloroethane	110/I	1	ISO 17025	< 1.0			
1.2-Dichloroethane	µg/l	1	ISO 17025	< 1.0			
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0			
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0			
Benzene	µg/l	1	ISO 17025	< 1.0			
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0			
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0			
Trichloroethene	µg/l	1	ISO 17025	< 1.0			
Dibromomethane	µg/l	1	ISO 17025	< 1.0			
Bromodichloromethane	µg/I	1	150 17025	< 1.0			
CIS-1,3-dichloropropene	µg/1		150 17025	< 1.0			
Toluene	µg/i	1	ISO 17025	< 1.0			
1 1 2-Trichloroethane	μg/1 μα/l	1	ISO 17025	< 1.0			
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0			
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0			
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0			
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0			
Chlorobenzene	µg/l	1	ISO 17025	< 1.0			
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0			
p & m-Xylene	µg/l	1	ISO 17025	< 1.0			
Styrene	µg/I		150 17025	< 1.0			
	µg/1	1	150 17025	< 1.0			
1 1 2 2-Tetrachloroethane	µg/i	1	ISO 17025	< 1.0			
Isopropylbenzene	μg/1 μα/Ι	1	ISO 17025	< 1.0			
Bromobenzene	µg/l	1	ISO 17025	< 1.0			
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0			
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0			
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0			
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0			
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0			
1,2,4- I rimethylbenzene	µg/l	1	ISO 17025	< 1.0			
SEC-BUTYIDENZENE	µg/l		150 17025	< 1.0			
	μg/I		150 17025	< 1.0			
1 2-Dichlorobenzene	μg/1 μg/1	1	ISO 17025	< 1.0			
1.4-Dichlorobenzene	μα/I	1	ISO 17025	< 1.0			
Butylbenzene	μα/l	1	ISO 17025	< 1.0			
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	 		
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0			
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0			
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0		1	





Project / Site name: Cosmeston Phase 2

Your Order No: 14002979							
Lab Sample Number				891045			
Sample Reference				WS111			
Sample Number				None Supplied			
Depth (m)				1.10			
Date Sampled	16/01/2018						
Time Taken				None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				
SVOCs						1	
Aniline	ua/l	0.05	NONE	< 0.05			
Phenol	μg/1 μα/Ι	0.05	NONE	< 0.05			
2-Chlorophenol	ug/l	0.05	NONE	< 0.05			
Bis(2-chloroethyl)ether	ua/l	0.05	NONE	< 0.05			
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05			
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05			
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05			
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05			
2-Methylphenol	µg/l	0.05	NONE	< 0.05			
Hexachloroethane	µg/l	0.05	NONE	< 0.05			
Nitrobenzene	µg/l	0.05	NONE	< 0.05			
4-Methylphenol	µg/l	0.05	NONE	< 0.05			
2 Nitrophonol	µg/1	0.05	NONE	< 0.05			
2-Niu oprienoj 2.4-Dimethylphenoj	µg/1	0.05	NONE	< 0.05			
Bis(2-chloroethoxy)methane	μg/1 μα/Ι	0.05	NONE	< 0.05			
1.2.4-Trichlorobenzene	ua/l	0.05	NONE	< 0.05			
Naphthalene	µg/l	0.01	ISO 17025	< 0.01			
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05			
4-Chloroaniline	µg/l	0.05	NONE	< 0.05			
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05			
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05			
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05			
2,4,5-Irichlorophenol	µg/l	0.05	NONE	< 0.05			
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05			
2-Chioronaphunalene Dimethylphthalate	µg/1	0.05	NONE	< 0.05			
2 6-Dinitrotoluene	µg/i	0.05	NONE	< 0.05			
Acenaphthylene	ua/l	0.03	ISO 17025	< 0.01			
Acenaphthene	ua/l	0.01	ISO 17025	< 0.01			
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05			
Dibenzofuran	µg/l	0.05	NONE	< 0.05			
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05			
Diethyl phthalate	µg/l	0.05	NONE	< 0.05			
4-Nitroaniline	µg/l	0.05	NONE	< 0.05			
Huorene	µg/l	0.01	ISO 17025	< 0.01			
Azobenzene Promonhanul phonul other	µg/I	0.05	NONE	< 0.05			
Heyachlorobenzene	µg/1	0.05	NONE	< 0.05			
Phenanthrene	μ <u>α</u> /Ι	0.03	ISO 17025	< 0.05			
Anthracene	ua/l	0.01	ISO 17025	< 0.01			
Carbazole	µg/l	0.05	NONE	< 0.05			
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05			
Anthraquinone	µg/l	0.05	NONE	< 0.05			
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01			
Pyrene	µg/l	0.01	ISO 17025	< 0.01			
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01			
Unrysene	µg/l	0.01	150 17025	< 0.01			
Derizo(D)Huoranthene	µg/I	0.01	150 17025	< 0.01			
Benzo(a)nyrene	μg/1	0.01	150 17025	< 0.01			
Indeno(1,2,3-cd)pyrene	μg/1 μα/Ι	0.01	ISO 17025	< 0.01			
Dibenz(a,h)anthracene	μα/l	0.01	ISO 17025	< 0.01			
Benzo(ghi)perylene	μg/l	0.01	ISO 17025	< 0.01			

U/S = Unsuitable Sample I/S = Insufficient Sample





Project / Site name: Cosmeston Phase 2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS111		W	18-73227	891045	b	BTEX and MTBE in water (Monoaromatics)	L073B-PL	b
WS111		W	18-73227	891045	b	Volatile organic compounds in water	L073B-PL	b



Sian Carter Arcadis Consulting (UK) Ltd HCL House St Mellon's Business Park Cardiff CF3 OEY

t: 029 2092 6873

e: Sian.Carter@arcadis.com



i2 Analytical Ltd. 7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com

Analytical Report Number : 17-70771

Replaces Analytical Report Number : 17-70771, issue no. 1

Project / Site name:	Cosmeston Phase 2	Samples received on:	12/12/2017
Your job number:	UA008386-02	Samples instructed on:	14/12/2017
Your order number:		Analysis completed by:	27/12/2017
Report Issue Number:	2	Report issued on:	09/03/2018
Samples Analysed:	11 soil samples		

1st Signed:

Jordan Hill Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.





Lab Sample Number		875945	875946	875947	875948	875949		
Sample Reference				WS101	WS102	WS103	WS104	WS105
Sample Number				5	2	4	2	4
Depth (m)				0.10-0.20	0.05-0.15	0.35-0.45	0.00-0.20	0.40-0.60
Date Sampled				11/12/2017	08/12/2017	08/12/2017	08/12/2017	08/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
			×					
		응 드	ω ^Ω Ω					
Analytical Parameter	Uni	te mi	tat					
(Soil Analysis)	5	ti of	us					
			<u>o</u>					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	33	28	26	27	24
Total mass of sample received	ka	0.001	NONE	1.7	1.6	1.6	1.4	1.6
	Ng	0.001	HONE	117	110	110		110
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
		• · ·						
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.0	7.6	7.7	7.3	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate								
Equivalent)	g/l	0.00125	MCERTS	0.040	0.020	0.022	0.030	0.021
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	3.3	-	-
				1.0	1.0	1.0	1.0	1.0
Total Phenois (mononydric)	mg/kg		MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated DAHe								
Nexthelene		0.05	MOEDTO	1 0 0F	< 0.0F	< 0.0F	10.05	10.05
	mg/кg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERIS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene Disease these s	mg/кg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthropping	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Flueranthana	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Durono	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pylelle Bonzo(a)anthracono	mg/kg	0.05	MCEDITC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Christopa	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chirysene	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthono	mg/kg	0.05	MCEDITS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyropo	mg/kg	0.05	MCEDTC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indono(1,2,2,cd)pyrono	mg/kg	0.05	MCEDTC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a b)anthracene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(abi)pen/ene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Penzo(gn)penyrene	mg/kg	0.05	PICENTJ	~ 0.05	< 0.05	< 0.05	10.05	× 0.05
Total PAH								
Speciated Total EPA-16 PAHs	ma/ka	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	13	15	15	15
Boron (water soluble)	mg/kg	0.2	MCERTS	2.5	2.2	2.9	2.8	2.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.4	0.7	0.7	0.6	0.5
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	37	41	41	39	35
Copper (aqua regia extractable)	mg/kg	1	MCERTS	36	40	41	39	35
Lead (aqua regia extractable)	mg/kg	1	MCERTS	61	35	33	60	29
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.8	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	37	41	42	33	38
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (agua regia extractable)	ma/ka	1	MCERTS	140	100	110	100	76





Project / Site name: Cosmeston Phase 2

Lab Sample Number				875945	875946	875947	875948	875949
Sample Reference				WS101	WS102	WS103	WS104	WS105
Sample Number	5	2	4	2	4			
Depth (m)				0.10-0.20	0.05-0.15	0.35-0.45	0.00-0.20	0.40-0.60
Date Sampled				11/12/2017	08/12/2017	08/12/2017	08/12/2017	08/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics								
Benzene	ug/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

TPH6 - Aliphatic (C6 - C8)	mg/kg	0.001	MCERTS	< 0.001	-	< 0.001	< 0.001	-
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.001	MCERTS	< 0.001	-	< 0.001	< 0.001	-
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	MCERTS	< 2.0	-	< 2.0	< 2.0	-
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	MCERTS	< 8.0	-	< 8.0	< 8.0	-
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	MCERTS	39	-	< 8.0	32	-
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	39	-	< 10	32	-
TPH6 - Aromatic (C6 - C8)	mg/kg	0.001	NONE	< 0.001	-	< 0.001	< 0.001	-
TPH6 - Aromatic (C8 - C10)	mg/kg	0.001	MCERTS	< 0.001	-	< 0.001	< 0.001	-
TPH6 - Aromatic (C10 - C12)	mg/kg	1	MCERTS	1.8	-	< 1.0	1.7	-
TPH6 - Aromatic (C12 - C16)	mg/kg	2	MCERTS	< 2.0	-	< 2.0	< 2.0	-
TPH6 - Aromatic (C16 - C21)	mg/kg	10	MCERTS	< 10	-	< 10	< 10	-
TPH6 - Aromatic (C21 - C35)	mg/kg	10	MCERTS	12	-	< 10	19	-
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	14	-	< 10	21	-
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-





Lab Sample Number				875950	875951	875952	875953	875954
Sample Reference				WS106	WS107	WS108	WS109	WS110
Sample Number				2	2	2	4	2
Depth (m)				0.00-0.20	0.00-0.10	0.10-0.30	0.30-0.50	0.10
Date Sampled				08/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	28	< 0.1	30	< 0.1
Moisture Content	%	N/A	NONE	28	5.7	23	16	24
Total mass of sample received	ka	0.001	NONE	1.7	1.3	1.1	1.1	1.1
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	8.5	7.2	8.1	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.015	0.019	0.018	0.057	0.042
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	-
Total Phenols	_							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.29	0.44	< 0.05	0.32	0.26
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.48	0.96	< 0.05	0.43	0.78
Pyrene	mg/kg	0.05	MCERTS	0.38	0.80	< 0.05	0.37	0.58
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.21	0.51	< 0.05	0.26	0.44
Chrysene	mg/kg	0.05	MCERTS	0.30	0.73	< 0.05	0.32	0.55
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.32	0.90	< 0.05	0.39	0.62
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.18	0.45	< 0.05	0.18	0.33
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.29	0.55	< 0.05	0.25	0.39
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.17	0.4/	< 0.05	0.28	0.29
	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(gni)perviene	mg/kg	0.05	MCERTS	0.22	0.61	< 0.05	0.32	0.31
Total PAH	-					a		
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	2.84	6.42	< 0.80	3.12	4.55
Heavy Metals / Metalloids	-							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	3.3	9.4	12	8.4
Boron (water soluble)	mg/kg	0.2	MCERTS	3.4	0.6	1.3	0.7	1.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7	0.3	0.4	0.8	0.4
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	38	11	17	21	18
Copper (aqua regia extractable)	mg/kg	1	MCERTS	45	9.7	19	22	28
Lead (aqua regia extractable)	mg/kg		MCERTS	48	18	35	220	44
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
INICKEI (aqua regia extractable)	mg/kg		MCERTS	41	6.1	16	21	18
Zinc (aqua regia extractable)	mg/kg	1	MCEDIC	< 1.U 87	< 1.U 20	< 1.U 60	< 1.U 04	< 1.U go
בוווב (מקוום ובקום בגנו מנומטול)	IIIQ/KQ	L 1	PICEKIS	0/	29	09	54	00





Project / Site name: Cosmeston Phase 2

Lab Sample Number				875950	875951	875952	875953	875954
Sample Reference				WS106	WS107	WS108	WS109	WS110
Sample Number				2	2	2	4	2
Depth (m)	0.00-0.20	0.00-0.10	0.10-0.30	0.30-0.50	0.10			
Date Sampled	08/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017			
Time Taken		None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Accreditation Status (Soil Analysis)								
Monoaromatics								
Benzene	ug/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
p & m-xylene µg/kg 1 MCERTS				-	-	-	< 1.0	< 1.0
o-xylene	Do-xylene µg/kg 1 MCERTS						< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0

TPH6 - Aliphatic (C6 - C8)	mg/kg	0.001	MCERTS	-	< 0.001	< 0.001	-	-
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.001	MCERTS	-	< 0.001	< 0.001	-	-
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	MCERTS	-	2.9	< 2.0	-	-
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	MCERTS	-	8.5	< 8.0	-	-
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	MCERTS	-	47	< 8.0	-	-
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	59	< 10	-	-
TPH6 - Aromatic (C6 - C8)	mg/kg	0.001	NONE	-	< 0.001	< 0.001	-	-
TPH6 - Aromatic (C8 - C10)	mg/kg	0.001	MCERTS	-	< 0.001	< 0.001	-	-
TPH6 - Aromatic (C10 - C12)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
TPH6 - Aromatic (C12 - C16)	mg/kg	2	MCERTS	-	< 2.0	< 2.0	-	-
TPH6 - Aromatic (C16 - C21)	mg/kg	10	MCERTS	-	< 10	< 10	-	-
TPH6 - Aromatic (C21 - C35)	mg/kg	10	MCERTS	-	76	17	-	-
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	76	17	-	-
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	27	13
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	35	18
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	2.4	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	23	27
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	32	33





Lab Canuala Number				075055		
Lab Sample Number				8/5955		
Sample Reference				WS111		
Sample Number				2 0.10.0.20		
Depth (m)				0.10-0.20		
Date Sampled				Nono Supplied		
				None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1		
Moisture Content	%	N/A	NONE	31		
Total mass of sample received	kg	0.001	NONE	0.97		
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected		
General Inorganics					 	
pH - Automated	pH Units	N/A	MCERTS	6.9		
Total Cyanide	mg/kg	1	MCERTS	< 1		
Free Cyanide	mg/kg	1	MCERTS	< 1		
Water Soluble SO4 16hr extraction (2:1 Leachate		0 00105		0.044		
Equivalent)	g/l	0.00125	MCERTS	0.041		
Total Organic Carbon (TOC)	%	0.1	MCERTS	6.6		
Total Phenols						
Total Phenois	mallia	1	MCEDIC	< 1.0		
	тід/ку	1	MUCERTS	< 1.0		
Speciated PAHs						
Nanhthalene	ma/ka	0.05	MCEDTS	< 0.05	1	
Acenanthylene	mg/kg	0.05	MCEDTS	< 0.05		
	mg/kg	0.05	MCEDTS	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05		
Dhenanthrene	mg/kg	0.05	MCEDTS	0.05		
Anthracene	mg/kg	0.05	MCERTS	< 0.05		
Fluoranthene	ma/ka	0.05	MCERTS	0.87		
Pyrene	mg/kg	0.05	MCERTS	0.67		
Benzo(a)anthracene	ma/ka	0.05	MCERTS	0.54		
	mg/kg	0.05	MCERTS	0.51		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.07		
Benzo(k)fluoranthene	ma/ka	0.05	MCERTS	0.55		
Benzo(a)nvrene	ma/ka	0.05	MCERTS	0.61		
Indeno(1,2,3-cd)pyrene	ma/ka	0.05	MCERTS	0.49		
Dibenz(a,h)anthracene	ma/ka	0.05	MCERTS	< 0.05		
Benzo(ahi)pervlene	ma/ka	0.05	MCERTS	0.52		
	,					
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	6.17		
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13		
Boron (water soluble)	mg/kg	0.2	MCERTS	1.6		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	29		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	65		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.2		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100		





Project / Site name: Cosmeston Phase 2

Lab Sample Number		875955				
Sample Reference				WS111		
Sample Number	2					
Depth (m)				0.10-0.20		
Date Sampled				07/12/2017		
Time Taken				None Supplied		
Analytical Parameter (Soil Analysis)						
Monoaromatics						
Benzene	uq/kq	1	MCERTS	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0		
p & m-xylene	MCERTS	< 1.0				
o-xylene	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0		

TPH6 - Aliphatic (C6 - C8)	mg/kg	0.001	MCERTS	-		
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.001	MCERTS	-		
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	MCERTS	-		
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	MCERTS	-		
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	MCERTS	-		
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	MCERTS	-		
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-		
TPH6 - Aromatic (C6 - C8)	mg/kg	0.001	NONE	-		
TPH6 - Aromatic (C8 - C10)	mg/kg	0.001	MCERTS	-		
TPH6 - Aromatic (C10 - C12)	mg/kg	1	MCERTS	-		
TPH6 - Aromatic (C12 - C16)	mg/kg	2	MCERTS	-		
TPH6 - Aromatic (C16 - C21)	mg/kg	10	MCERTS	-		
TPH6 - Aromatic (C21 - C35)	mg/kg	10	MCERTS	-		
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-		
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	2.9		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	22		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	30		
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	1.3		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	21		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	27		





Project / Site name: Cosmeston Phase 2

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
875945	WS101	5	0.10-0.20	Brown clay and loam with vegetation.
875946	WS102	2	0.05-0.15	Brown clay and loam with gravel and vegetation.
875947	WS103	4	0.35-0.45	Brown clay and loam with vegetation.
875948	WS104	2	0.00-0.20	Brown clay and loam with vegetation.
875949	WS105	4	0.40-0.60	Light brown clay and sand with gravel and vegetation.
875950	WS106	2	0.00-0.20	Brown clay and loam with gravel and vegetation.
875951	WS107	2	0.00-0.10	Brown loam and clay with stones and vegetation.
875952	WS108	2	0.10-0.30	Brown loam and clay with gravel and vegetation.
875953	WS109	4	0.30-0.50	Brown clay and sand with stones and vegetation.
875954	WS110	2	0.10	Brown loam and clay with gravel and vegetation.
875955	WS111	2	0.10-0.20	Brown loam and clay with vegetation.





Project / Site name: Cosmeston Phase 2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC- MS.	In-house method based on USEPA8260	L073B-PL	w	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	w	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	w	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	w	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP- OES.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
TPH6 (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method	L076-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	w	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Iss No 17-70771-2 Cosmeston Phase 2 UA008386-02

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS107	2	S	17-70771	875951	С	Total cyanide in soil	L080-PL	С
WS108	2	S	17-70771	875952	с	Total cyanide in soil	L080-PL	С
WS109	4	S	17-70771	875953	С	Total cyanide in soil	L080-PL	с
WS110	2	S	17-70771	875954	С	Total cyanide in soil	L080-PL	С
WS111	2	S	17-70771	875955	с	Total cyanide in soil	L080-PL	с



Alison Pugh Arcadis Consulting (UK) Ltd 5th Floor The Pithay Bristol BS1 2NL Environmental Science

i2 Analytical Ltd. 7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com

t: 01173721360

e: Alison.Pugh@arcadis.com

Analytical Report Number : 17-70975

Project / Site name:	Cosmeston Phase 2	Samples received on:	18/12/2017
Your job number:	UA008386-02	Samples instructed on:	18/12/2017
Your order number:		Analysis completed by:	28/12/2017
Report Issue Number:	1	Report issued on:	28/12/2017
Samples Analysed:	10 soil samples		

It Signed:

Jordan Hill Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.





Lab Sample Number		877402	877403	877404	877405	877406		
Sample Reference				TP101	TP102	TP103	TP104	TP105
Sample Number				2	4	2	2	2
Depth (m)				0.05-0.15	0.30-0.40	0.05-0.15	0.05-0.15	0.05-0.15
Date Sampled				13/12/2017	13/12/2017	13/12/2017	13/12/2017	13/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
			A					
	_	승 드	s ^Q					
Analytical Parameter	Uni	tec mi	tat					
(Soil Analysis)	C,	të o	us					
			ion i					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	35	22	24	39	25
Total mass of sample received	ka	0.001	NONE	2.0	1.7	1.8	1.6	1.2
	Ng	0.001	Hone	210	217	110	110	
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
		•/						
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.8	7.9	8.8	7.7	8.0
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate								
Equivalent)	g/l	0.00125	MCERTS	0.024	0.021	0.056	0.021	0.027
Total Organic Carbon (TOC)	%	0.1	MCERTS	4.2	-	-	-	-
Iotal Phenois	1							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Encipted DAMe								
Specialeu PARS		0.05	MCEDIC	< 0.0F	< 0.0F	< 0.0F	10.05	10.05
	mg/kg	0.05	MOERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MOERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthropone	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.23	< 0.05
Anurracene	mg/kg	0.05	MCEDITC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Puorano	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	0.25	0.29	< 0.05
Pyrelle Bonzo(a)anthracono	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	0.21	0.23	< 0.05
Christopa	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyropo	mg/kg	0.05	MCEDTC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indono(1,2,2,cd)pyrono	mg/kg	0.05	MCEDTC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a b)anthracene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)pen/ene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Denzo(gni)per yiene	iiig/kg	0.05	PICENTS	< 0.05	< 0.05	< 0.05	0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	ma/ka	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	18	11	14	17
Boron (water soluble)	mg/kg	0.2	MCERTS	3.8	1.2	3.2	4.4	2.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	0.8	0.5	0.7	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	59	48	62	52	63
Copper (aqua regia extractable)	mg/kg	1	MCERTS	55	53	62	52	65
Lead (aqua regia extractable)	mg/kg	1	MCERTS	41	23	25	44	46
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	36	79	29	30	41
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (agua regia extractable)	ma/ka	1	MCERTS	91	430	100	110	140





Project / Site name: Cosmeston Phase 2

				0.77 10.0	0 == 100		0	0000
Lab Sample Number				877402	877403	87/404	87/405	87/406
Sample Reference				TP101	TP102	TP103	TP104	TP105
Sample Number	2	4	2	2	2			
Depth (m)	0.05-0.15	0.30-0.40	0.05-0.15	0.05-0.15	0.05-0.15			
Date Sampled	13/12/2017	13/12/2017	13/12/2017	13/12/2017	13/12/2017			
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics									
Benzene	ug/kg	1	MCERTS	-	-	-	-	-	
Toluene	µg/kg	1	MCERTS	-	-	-	-	-	
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-	
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-	
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-	

TPH6 - Aliphatic (C6 - C8)	mg/kg	0.001	MCERTS	-	-	< 0.001	-	< 0.001
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.001	MCERTS	-	-	< 0.001	-	< 0.001
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	MCERTS	-	-	< 2.0	-	< 2.0
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	MCERTS	-	-	< 8.0	-	< 8.0
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	MCERTS	-	-	< 8.0	-	< 8.0
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	-	< 10	-	< 10
TPH6 - Aromatic (C6 - C8)	mg/kg	0.001	NONE	-	-	< 0.001	-	< 0.001
TPH6 - Aromatic (C8 - C10)	mg/kg	0.001	MCERTS	-	-	< 0.001	-	< 0.001
TPH6 - Aromatic (C10 - C12)	mg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
TPH6 - Aromatic (C12 - C16)	mg/kg	2	MCERTS	-	-	< 2.0	-	< 2.0
TPH6 - Aromatic (C16 - C21)	mg/kg	10	MCERTS	-	-	< 10	-	< 10
TPH6 - Aromatic (C21 - C35)	mg/kg	10	MCERTS	-	-	< 10	-	< 10
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	-	< 10	-	< 10
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
							-	
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-





Lab Sample Number		877407	877408	877409	877410	877411		
Sample Reference				TP106	TP107	TP109	TP110	TP111
Sample Number				4	2	4	2	2
Depth (m)				0.30-0.40	0.10-0.20	0.30-0.30	0.10-0.20	0.05-0.15
Date Sampled				13/12/2017	12/12/2017	12/12/2017	12/12/2017	12/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
			Þ					
	_	승 드	ω ^Ω					
Analytical Parameter	Uni	tec mi	tatied					
(Soil Analysis)	5	të o	us tat					
			<u>io</u>					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	20	29	24	29	26
Total mass of sample received	ka	0.001	NONE	1.0	1.5	1.6	1.7	1.4
	Ng	0.001	Home	110	2.0	110		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
	_ /I	•/						
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.1	7.2	7.9	7.5	7.1
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate								
Equivalent)	g/l	0.00125	MCERTS	0.018	0.023	0.064	0.024	0.030
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	-
I otal Phenois	<u> </u>							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Encipted DAMe								
Specialeu PARS		0.05	MOEDTO	< 0.0F	< 0.0F	< 0.0F	10.05	10.05
	mg/кg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERIS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/кg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthra con c	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anurracene	mg/kg	0.05	MCEDITC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pirona	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	0.37	0.29
Pyrelle Bonzo(a)anthracono	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	0.27	0.29
Christopa	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene Bonzo(h)fluoranthono	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthono	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(x)huoranunene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)nyrene	mg/kg	0.05	MCEDTC	< 0.05				< 0.05
Dibenz(a b)anthracene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)pen/lene	mg/kg	0.05	MCEDTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Denzo(gni)peryiene	ilig/kg	0.05	PICERTS	< 0.05	0.05	1 0.05	0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	ma/ka	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.4	13	12	15	13
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	4.7	0.8	5.6	4.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.8	0.3	1.2	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	30	77	72	60	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	31	82	68	50	34
Lead (aqua regia extractable)	mg/kg	1	MCERTS	12	37	20	54	51
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	32	39	52	39	33
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	ma/ka	1	MCERTS	35	210	78	110	120





Project / Site name: Cosmeston Phase 2

Lah Camula Number				077407	077400	977400	077410	077/11
				077407	077400	077409	077410	0//411
Sample Reference		TP106	TP107	TP109	TP110	TP111		
Sample Number				4	2	4	2	2
Depth (m)				0.30-0.40	0.10-0.20	0.30-0.30	0.10-0.20	0.05-0.15
Date Sampled				13/12/2017	12/12/2017	12/12/2017	12/12/2017	12/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	-	-	-	-	< 1.0
Toluene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
o-xylene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	< 1.0

TPH6 - Aliphatic (C6 - C8)	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
TPH6 - Aliphatic (C8 - C10)	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
TPH6 - Aliphatic (C10 - C12)	mg/kg	1	MCERTS	-	< 1.0	-	-	-
TPH6 - Aliphatic (C12 - C16)	mg/kg	2	MCERTS	-	< 2.0	-	-	-
TPH6 - Aliphatic (C16 - C21)	mg/kg	8	MCERTS	-	< 8.0	-	-	-
TPH6 - Aliphatic (C21 - C35)	mg/kg	8	MCERTS	-	43	-	-	-
TPH6 - Aliphatic (C6 - C35)	mg/kg	10	NONE	-	43	-	-	-
TPH6 - Aromatic (C6 - C8)	mg/kg	0.001	NONE	-	< 0.001	-	-	-
TPH6 - Aromatic (C8 - C10)	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
TPH6 - Aromatic (C10 - C12)	mg/kg	1	MCERTS	-	< 1.0	-	-	-
TPH6 - Aromatic (C12 - C16)	mg/kg	2	MCERTS	-	< 2.0	-	-	-
TPH6 - Aromatic (C16 - C21)	mg/kg	10	MCERTS	-	< 10	-	-	-
TPH6 - Aromatic (C21 - C35)	mg/kg	10	MCERTS	-	< 10	-	-	-
TPH6 - Aromatic (C6 - C35)	mg/kg	10	NONE	-	< 10	-	-	-
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	44
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	50
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	29
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	35





Project / Site name: Cosmeston Phase 2

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
877402	TP101	2	0.05-0.15	Brown clay and loam with vegetation and gravel
877403	TP102	4	0.30-0.40	Brown clay.
877404	TP103	2	0.05-0.15	Brown loam and clay with vegetation and gravel
877405	TP104	2	0.05-0.15	Brown clay and loam with vegetation.
877406	TP105	2	0.05-0.15	Brown clay and loam with gravel and vegetation.
877407	TP106	4	0.30-0.40	Brown clay with vegetation.
877408	TP107	2	0.10-0.20	Brown clay and loam with vegetation.
877409	TP109	4	0.30-0.30	Brown clay with gravel and vegetation.
877410	TP110	2	0.10-0.20	Brown clay and loam with gravel and vegetation.
877411	TP111	2	0.05-0.15	Brown clay and loam with gravel and vegetation.





Project / Site name: Cosmeston Phase 2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	alytical Test Name Analytical Method Description		Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC- MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	w	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP- OES.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
TPH6 (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method	L076-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	w	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Iss No 17-70975-1 Cosmeston Phase 2 UA008386-02

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.



Alison Pugh Arcadis Consulting (UK) Ltd 5th Floor The Pithay Bristol BS1 2NL

t: 01173721360

e: Alison.Pugh@arcadis.com



i2 Analytical Ltd. 7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com

Analytical Report Number : 17-71271

Replaces Analytical Report Number : 17-71271, issue no. 1

Project / Site name:	Cosmeston Phase 2	Samples received on:	18/12/2017
Your job number:	UA008386-02	Samples instructed on:	19/12/2017
Your order number:		Analysis completed by:	09/03/2018
Report Issue Number:	2	Report issued on:	12/03/2018
Samples Analysed:	4 leachate samples - 6 soil samples		

At Signed:

Jordan Hill Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.





Lab Sample Number		879502	879503	879504	879505	879506		
Sample Reference				TP108	TP112	TP112	TP113	TP114
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.05-0.15	0.00-0.10	0.30-0.40	0.10-0.20	0.10-0.20
Date Sampled				15/12/2017	14/12/2017	14/12/2017	14/12/2017	14/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
			•					
		8 =	رم ⁶					
Analytical Parameter	S.	te ini	ëdi					
(Soil Analysis)	t,		us					
			<u>Ö</u>					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	31	32	26	31	25
Total mass of sample received	ka	0.001	NONE	1.1	1.2	1.3	1.1	1.2
	itg	0.001	Hone			110		112
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
		• · ·						
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.4	7.2	7.4	7.0	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate								
Equivalent)	g/l	0.00125	MCERTS	0.023	0.029	0.034	0.029	0.018
				1.0	1.0	1.0		1.0
Total Phenois (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated DAMe								
Speciated PARS		0.05		0.05	. 0.05	. 0.05	0.05	. 0.05
	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	mg/kg	0.05	MCEDIC	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Eluoropo	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrone	mg/kg	0.05	MCEDTS	< 0.05	0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCEDTS	< 0.05	< 0.10	< 0.05	< 0.05	< 0.05
Fluoranthene	ma/ka	0.05	MCERTS	< 0.05	0.05	< 0.05	< 0.05	< 0.05
Pyrene	ma/ka	0.05	MCERTS	< 0.05	0.26	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	ma/ka	0.05	MCERTS	< 0.05	0.18	< 0.05	< 0.05	< 0.05
Chrysene	ma/ka	0.05	MCERTS	< 0.05	0.20	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	ma/ka	0.05	MCERTS	< 0.05	0.24	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.12	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.17	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH						-		
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	1.60	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids	_							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	16	11	12	14
Boron (water soluble)	mg/kg	0.2	MCERTS	3.6	4.4	1.1	1.2	3.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	0.6	0.4	0.7	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg		MCERTS	41	40	23	33	33
Loopper (aqua regia extractable)	mg/kg		MCERTS	50	46	36	50	44
Leau (aqua regia extractable)	mg/kg		MCERTS	43	44	81	34	35
Mickel (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< U.3	< 0.3	< 0.3	< 0.3
Nickei (aqua regia extractable)	mg/kg		MCEDIC	42	35	<u>31</u>	49	33
Zinc (aqua regia extractable)	mg/kg		MCEDIC	< 1.U 120	< 1.U 1/0	<u>د ۲.0</u>	< 1.U 160	< 1.0 100
בוויב (מקום וכקום כאו מנומטול)	i iiy/ky	I ⊥	PICERIO	1.20	140	00	100	100





Project / Site name: Cosmeston Phase 2

Lab Sample Number	Lab Sample Number					879504	879505	879506
Sample Reference				TP108	TP112	TP112	TP113	TP114
Sample Number			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.05-0.15	0.00-0.10	0.30-0.40	0.10-0.20	0.10-0.20
Date Sampled				15/12/2017	14/12/2017	14/12/2017	14/12/2017	14/12/2017
Time Taken			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	-
mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	-
mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
mg/kg	2	MCERTS	< 2.0	-	-	2.0	-
mg/kg	8	MCERTS	< 8.0	-	-	< 8.0	-
mg/kg	8	MCERTS	13	-	-	36	-
mg/kg	10	NONE	13	-	-	38	-
mg/kg	0.001	NONE	< 0.001	-	-	< 0.001	-
mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	-
mg/kg	1	MCERTS	< 1.0	-	-	1.4	-
mg/kg	2	MCERTS	< 2.0	-	-	3.2	-
mg/kg	10	MCERTS	< 10	-	-	< 10	-
mg/kg	10	MCERTS	< 10	-	-	20	-
mg/kg	10	NONE	< 10	-	-	24	-
	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	mg/kg 0.001 mg/kg 0.001 mg/kg 1 mg/kg 2 mg/kg 8 mg/kg 8 mg/kg 10 mg/kg 0.001 mg/kg 0.001 mg/kg 10 mg/kg 1 mg/kg 1 mg/kg 10 mg/kg 10	mg/kg 0.001 MCERTS mg/kg 0.001 MCERTS mg/kg 1 MCERTS mg/kg 2 MCERTS mg/kg 8 MCERTS mg/kg 8 MCERTS mg/kg 10 NONE mg/kg 0.001 MCERTS mg/kg 0.001 MCERTS mg/kg 0.001 MCERTS mg/kg 10 MCERTS mg/kg 10 MCERTS mg/kg 10 MCERTS	mg/kg 0.001 MCERTS < 0.001 mg/kg 0.001 MCERTS < 0.001	mg/kg 0.001 MCERTS < 0.001 - mg/kg 0.001 MCERTS < 0.001	mg/kg 0.001 MCERTS < 0.001 - - mg/kg 0.001 MCERTS < 0.001	$\begin{array}{c c c c c c c c c c c c c c c c c c c $





				070507			
Lab Sample Number				879507		 	
Sample Reference				TP115			
Sample Number				None Supplied			
Depth (m)				0.30-0.40			
Date Sampled				14/12/2017			
Time Taken				None Supplied			
			⊳				
		de 드	رم ق م				
Analytical Parameter	Un .	itec	tat				
(Soil Analysis)	ts	tio	ius tat				
			<u> </u>				
Stone Contont	0/	0.1	NONE	< 0.1			
Stone Content	%	0.1	NONE	< 0.1			
Moisture Content	%	N/A	NONE	1/			
	кд	0.001	NONE	1.1			I
Ashastas in Cail	T	NI/A	100 17025	Nat data da			
Aspestos In Soli	туре	N/A	150 17025	Not-detected			<u> </u>
Concern Incorganica							
	w1111-26-	NI/A	MCEDIC	0.0			[]
pri - Automateu Total Ovanida		IN/A 1		0.0	L	 	
	mg/kg			<u>< 1</u>			
Free Cyanide Water Soluble SO4 16br extraction (2:1 Leachate	mg/kg	1	MCERTS	< 1		 	
Fourivalent)	a/l	0.00125	MCERTS	0.016			
Equivalency	9/1	0.00125	TICERTS	0.010			
Total Phenols							
Total Phenols (monohydric)	ma/ka	1	MCERTS	< 1.0			
	iiig/kg	-	TICERTS	1.0			
Speciated PAHs							
Naphthalene	ma/ka	0.05	MCERTS	< 0.05			
Acenaphthylene	ma/ka	0.05	MCERTS	< 0.05			
	ma/ka	0.05	MCERTS	< 0.05			
Eluorene	ma/ka	0.05	MCERTS	< 0.05			
Phenanthrene	ma/ka	0.05	MCERTS	< 0.05			
Anthracene	ma/ka	0.05	MCERTS	< 0.05			
Fluoranthene	ma/ka	0.05	MCERTS	< 0.05			
Pyrene	ma/ka	0.05	MCERTS	< 0.05			
Benzo(a)anthracene	ma/ka	0.05	MCERTS	< 0.05			
Chrysene	ma/ka	0.05	MCERTS	< 0.05			
Benzo(b)fluoranthene	ma/ka	0.05	MCERTS	< 0.05			
Benzo(k)fluoranthene	ma/ka	0.05	MCERTS	< 0.05			
Benzo(a)pyrene	ma/ka	0.05	MCERTS	< 0.05			
Indeno(1 2 3-cd)pyrene	ma/ka	0.05	MCERTS	< 0.05			
Dibenz(a h)anthracene	ma/ka	0.05	MCERTS	< 0.05			
Benzo(ghi)pervlene	ma/ka	0.05	MCERTS	< 0.05			
benzo(gn)perviene	iiig/itg	0.05	TICERTS	0.05			
Total PAH							
Speciated Total EPA-16 PAHs	ma/ka	0.8	MCERTS	< 0.80			
	iiig/itg	0.0	TICERTS	\$ 0.00			۰
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	ma/ka	1	MCERTS	6.6			
Boron (water soluble)	ma/ka	0.2	MCERTS	0.9			
Cadmium (agua regia extractable)	ma/ka	0.2	MCERTS	< 0.2			
Chromium (hexavalent)	ma/ka	4	MCERTS	< 4.0			
Chromium (agua regia extractable)	ma/ka	1	MCERTS	18			
Copper (agua regia extractable)	ma/ka	1	MCERTS	23			
Lead (agua regia extractable)	ma/ka	1	MCERTS	9,7			
Mercury (aqua regia extractable)	ma/ka	0.3	MCERTS	< 0.3			
Nickel (aqua regia extractable)	ma/ka	1	MCERTS	24			
Selenium (agua regia extractable)	mg/kg	1	MCERTS	< 1.0			
Zinc (aqua regia extractable)	mg/ka	1	MCERTS	22			





Project / Site name: Cosmeston Phase 2

Lab Sample Number	879507						
Sample Reference				TP115			
Sample Number				None Supplied			
Depth (m)	0.30-0.40						
Date Sampled	14/12/2017						
Time Taken				None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
						-	

mg/kg	0.001	MCERTS	< 0.001				
mg/kg	0.001	MCERTS	< 0.001				
mg/kg	1	MCERTS	< 1.0				
mg/kg	2	MCERTS	< 2.0				
mg/kg	8	MCERTS	< 8.0				
mg/kg	8	MCERTS	< 8.0				
mg/kg	10	NONE	< 10				
mg/kg	0.001	NONE	< 0.001				
mg/kg	0.001	MCERTS	< 0.001				
mg/kg	1	MCERTS	< 1.0				
mg/kg	2	MCERTS	< 2.0				
mg/kg	10	MCERTS	< 10				
mg/kg	10	MCERTS	< 10				
mg/kg	10	NONE	< 10				
	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	mg/kg 0.001 mg/kg 0.001 mg/kg 1 mg/kg 2 mg/kg 8 mg/kg 8 mg/kg 10 mg/kg 0.001 mg/kg 0.001 mg/kg 10 mg/kg 1 mg/kg 1 mg/kg 1 mg/kg 10 mg/kg 10 mg/kg 10 mg/kg 10 mg/kg 10	mg/kg 0.001 MCERTS mg/kg 0.001 MCERTS mg/kg 1 MCERTS mg/kg 2 MCERTS mg/kg 8 MCERTS mg/kg 8 MCERTS mg/kg 10 NONE mg/kg 0.001 MCERTS mg/kg 10 MCERTS mg/kg 0.001 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS mg/kg 1.0 MCERTS	mg/kg 0.001 MCERTS < 0.001 mg/kg 0.001 MCERTS < 0.001	mg/kg 0.001 MCERTS < 0.001 mg/kg 0.001 MCERTS < 0.001	mg/kg 0.001 MCERTS < 0.001 mg/kg 0.001 MCERTS < 0.001	mg/kg 0.001 MCERTS < 0.001 mg/kg 0.001 MCERTS < 0.001





Lab Sample Number		879508	879509	879510	879511			
Sample Reference				TD101	TD107	TD112	TD11E	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Denth (m)				0.05-0.15	0 10-0 20	0.00-0.10	0 30-0 40	
Date Sampled				12/12/2017	15/12/2017	14/12/2017	14/12/2017	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					
General Inorganics	-							
pH	pH Units	N/A	ISO 17025	8.1	7.7	7.8	7.9	
Total Cyanide	mg/l	0.01	ISO 17025	< 0.010	< 0.010	< 0.010	< 0.010	
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
	mg/i	0.1	150 17025	3.9	2.8	5.2	5.2	
Aikalinity	mgCaCO3/I	3	150 1/025	150	29	/5	11	
Phenols by HPLC								
Catechol	ua/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
Resorcinol	μα/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
Ethylphenol & Dimethylphenol	ug/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
Cresols	μα/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
Naphthols	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
Isopropylphenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
Phenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
Trimethylphenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
Total Phenols			1		1			
Total Phenols (HPLC)	µg/l	3.5	NONE	< 3.5	< 3.5	< 3.5	< 3.5	
Creatisted DAUs								
Speciated PAHS		0.01	100 17005	. 0.01	. 0.01	. 0.01	. 0.01	
Naphthalene	µg/I	0.01	150 17025	< 0.01	< 0.01	< 0.01	< 0.01	
	µg/i	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Eluorene	µg/i	0.01	150 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Phenanthrene	μg/1 μα/Ι	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Anthracene	ug/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Fluoranthene	ug/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Total PAH	110/1	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	
	P9/'	0.2	HUNL	- Vi2	- 0.2	- 0.2	- 0.2	L
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	1.1	ISO 17025	3.3	< 1.1	3.6	3.6	
Boron (dissolved)	μg/l	10	ISO 17025	61	72	50	10	
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.4	1.0	0.5	0.9	
Copper (dissolved)	µg/l	0.7	ISO 17025	22	38	24	11	
Lead (dissolved)	µg/l	1	ISO 17025	14	1.1	8.2	5.4	
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.5	3.8	1.6	1.7	
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	
Zinc (dissolved)	µg/l	0.4	ISO 17025	8.2	10	6.4	5.1	





Project / Site name: Cosmeston Phase 2

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
879502	TP108	None Supplied	0.05-0.15	Brown clay and loam with vegetation.
879503	TP112	None Supplied	0.00-0.10	Brown clay and loam with gravel and vegetation.
879504	TP112	None Supplied	0.30-0.40	Light brown clay and sand.
879505	TP113	None Supplied	0.10-0.20	Brown clay and loam with vegetation.
879506	TP114	None Supplied	0.10-0.20	Brown clay and loam with vegetation and gravel
879507	TP115	None Supplied	0.30-0.40	Brown clay.





Project / Site name: Cosmeston Phase 2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Alkalinity in Leachate	Determination of Alkalinity by discreet analyser (colorimetry).	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	W	ISO 17025
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Phenols, speciated, in leachate, by HPLC	Determination of speciated phenols by HPLC.	In house method based on Blue Book Method.	L030-PL	W	NONE
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE

Iss No 17-71271-2 Cosmeston Phase 2 UA008386-02

This certificate should not be reproduced, except in full, without the express permission of the laboratory. The results included within the report are representative of the samples submitted for analysis.





Project / Site name: Cosmeston Phase 2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP- OES.	L038-PL	D	MCERTS
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPH6 (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method	L076-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Alison Pugh Arcadis Consulting (UK) Ltd 5th Floor The Pithay Bristol BS1 2NL Environmental Science

i2 Analytical Ltd. 7 Woodshots Meadow, Croxley Green Business Park, Watford, Herts, WD18 8YS

t: 01923 225404 f: 01923 237404 e: reception@i2analytical.com

t: 01173721360

e: Alison.Pugh@arcadis.com

Analytical Report Number : 17-71746

Project / Site name:	Cosmeston Phase 2	Samples received on:	28/12/2017
Your job number:	UA008366-02	Samples instructed on:	28/12/2017
Your order number:		Analysis completed by:	08/01/2018
Report Issue Number:	1	Report issued on:	08/01/2018
Samples Analysed:	1 soil sample		

At Signed:

Jordan Hill Reporting Manager For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.





Lab Sample Number				882702						
Sample Reference				WCTD116						
Sample Number				2						
Depth (m)				0.00-0.20						
Date Sampled				08/12/2017						
Time Taken				None Supplied						
			A							
Annal March Province Anna	_	de Li	S							
Analytical Parameter	Jnit	mit	edit							
(Soli Analysis)	ŝ	ion of	us							
		-	9							
Stone Content	%	0.1	NONE	< 0.1						
Moisture Content	%	N/A	NONE	46						
Total mass of sample received	kg	0.001	NONE	1.5						
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected						
General Inorganics		N/4								
pri - Automated	pH Units	N/A	MCERTS	/./						
	mg/kg		MCEDIC	< 1	L					
Water Soluble SO4 16hr extraction (2:1 Leachate	mg/kg		PILERIS	<u> </u>						
Equivalent)	g/l	0.00125	MCERTS	0.37						
Total Organic Carbon (TOC)	%	0.1	MCERTS	8.4						
Total Phenois	-									
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0						
Speciated PAHs					1	1				
Naphthalene	mg/kg	0.05	MCERTS	< 0.05						
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05						
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05						
Phononthrono	mg/kg	0.05	MCEDIC	< 0.05						
Anthracene	mg/kg	0.05	MCEDTS	0.05						
Fluoranthene	ma/ka	0.05	MCERTS	0.89						
Pyrene	ma/ka	0.05	MCERTS	0.78						
Benzo(a)anthracene	ma/ka	0.05	MCERTS	0.65						
Chrysene	mg/kg	0.05	MCERTS	1.2						
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.5						
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.53						
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.91						
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.75						
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05						
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.88						
IOTAI PAH		0.0	MCEDIC	0.27						
Specialeu Tolai EPA-16 PARS	mg/kg	0.8	MCERTS	8.37						
Hoovy Motols / Motolloids										
Arsenic (aqua regia extractable)	ma/ka	1	MCERTS	13						
Boron (water soluble)	ma/ka	0.2	MCERTS	3.6						
Cadmium (agua regia extractable)	ma/ka	0.2	MCERTS	0.4						
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0						
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21						
Copper (aqua regia extractable)	mg/kg	1	MCERTS	81						
Lead (aqua regia extractable)	mg/kg	1	MCERTS	48						
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3						
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27						
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0						
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120						




Analytical Report Number: 17-71746

Project / Site name: Cosmeston Phase 2

Lab Sample Number		882702					
Sample Reference	WSTP116						
Sample Number	2						
Depth (m)	0.00-0.20						
Date Sampled	Date Sampled						
Time Taken	None Supplied						
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	3.6			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	11			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	110			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	120			
						-	
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	1.2			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	72			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	84			





Analytical Report Number : 17-71746

Project / Site name: Cosmeston Phase 2

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
882702	WSTP116	2	0.00-0.20	Black loam with vegetation and gravel





Analytical Report Number : 17-71746

Project / Site name: Cosmeston Phase 2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC- MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	w	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	w	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP- OES.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland. Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WSTP116	2	S	17-71746	882702	с	Free cyanide in soil	L080-PL	С
WSTP116	2	S	17-71746	882702	с	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	с
WSTP116	2	S	17-71746	882702	с	Total cyanide in soil	L080-PL	С
WSTP116	2	S	17-71746	882702	с	Total organic carbon (Automated) in soil	L009-PL	с



Arcadis Consulting (UK) Limited

Arcadis Cymru House St Mellons Business Park St Mellons Cardiff CF3 0EY United Kingdom

T: +44 029 20926873

arcadis.com