From: Gemma Keenan
To: Tracey Williams

Cc: Norfolk Vanguard; Sian Evans; rebecca.sherwood@vattenfall.com; "ruari.lean@vattenfall.com"; Josh Taylor

(josh.taylor@wbd-uk.com)

Subject: Norfolk Vanguard - Email 11 of 18 Deadline 1 Submissions

Date: 16 January 2019 15:11:18

Attachments: ExA; WQApp16.5; 10.D1.3 Norfolk Vanguard WQ Appendix 16.5 Crossing 4-5 GI.pdf

Dear Tracey

This is email 11 of 18 of the Applicant's submission for Norfolk Vanguard Examination Deadline 1.

We enclose the following documents:

Appendices to Written Questions:

Appendix 16.5 Terra Consult Crossing 4 & 5

Please could you kindly confirm receipt.

Best Regards

Gemma Keenan BSc, MIEMA, CEnv Senior Environmental Consultant

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Norfolk Vanguard Offshore Wind Farm

The Applicant Responses to First Written Questions

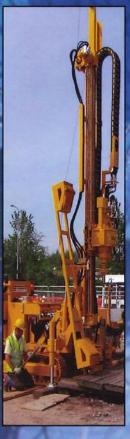
Appendix 16.5 – TerraConsult 2017 Ground Investigations Report: Crossing 4&5 (Q16.8)

Applicant: Norfolk Vanguard Limited
Document Reference: ExA;WQApp16.5;10.D1.3
Deadline 1

Date: January 2019

Photo: Kentish Flats Offshore Wind Farm











DRAINAGE STONE

ipping Area

November 2017 Report No 3318-R004-2

East Anglia (North) Offshore Wind Farm Crossings 4 & 5 Site Investigation

Carried out for:

Gutteridge, Haskins and Davey Ltd (GHD)

TerraConsult

East Anglia (North) Offshore Wind Farm

Crossings 4 & 5 Site Investigation

Date: November 2017

Report No 3318-R004-2

Prepared for:



Gutteridge, Haskins & Davey Ltd The Studio, 51 Brookfield Road, Cheadle, SK8 1ES **Engineer:**



Gutteridge, Haskins & Davey Ltd The Studio, 51 Brookfield Road, Cheadle, SK8 1ES By:

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DOCUMENT INFORMATION AND CONTROL SHEET

Document Status and Approval Schedule

Report No.	Title
3318-R004-2	East Anglia (North) Offshore Wind Farm
	Crossings 4 & 5 Site Investigation

Prepared by:	Victoria Smith	Victoria Smith	Engineering Geologist
Approved by:	Derek Daniels		Operations Manager
Date:	01/11/17		

Issue:	Date:	Description:	Prepared by:				
1	11/10/17	Draft for Approval	VS				
2	01/11/17	Final	DD				

DISCLAIMER

This site investigation contract was completed by TerraConsult Ltd on the basis of a specification and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, the degree of manpower and resources allocated to the project as agreed.

TerraConsult Ltd cannot accept responsibility to any parties whatsoever, following the issue of this report, for any matters arising which may be considered outwith the agreed scope of works.

This report is issued solely to the client and TerraConsult cannot accept any responsibility to any third parties to whom this report may be circulated, in part or in full, and any such parties rely on the contents at their own risk.





East Anglia (North) Offshore Wind Farm

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3318(C4)D001-1 Site Location Plan

3318(C5)D001-1 Site Location Plan

3318(C4)D002-1 Exploratory Hole Location Plan

3318(C5)D002-1 Exploratory Hole Location Plan

APPENDICES

APPENDIX A Exploratory Hole Records

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APPENDIX C In Situ Testing Results

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East Anglia (North) Offshore Wind Farm

Crossings 4 & 5 Site Investigation

1 INTRODUCTION

TerraConsult Limited (TCL) was commissioned by Gutteridge, Haskins and Davey Ltd (GHD) to carry out a ground investigation for the proposed cable route crossing the River Bure (Crossing 4) and the A140 (Crossing 5) near Aylsham, Norfolk.

This report presents the factual records of the fieldwork and laboratory testing. The data is also presented separately in digital format following AGS4 (2011).

The scope of the investigation, which was specified by GHD, comprised:

- o Boreholes formed by cable percussive techniques;
- o In situ testing comprising of;
 - Standard penetration tests in boreholes;
 - Variable head permeability testing;
- o Post fieldwork monitoring and sampling;
- o Geotechnical laboratory testing;
- o Geoenvironmental laboratory testing;
- Factual report (GIR) and AGS data.

The investigation was carried out in accordance with the contract specification and relevant standards (see References). The fieldwork was carried out between 31/07/17 and 11/08/17.

Whilst every attempt is made to record full details of the strata encountered in the exploratory holes, techniques of exploratory hole formation and sampling will inevitably lead to disturbance, mixing or loss of material in some soils and rocks.

All information given in this report is based on the ground conditions encountered during the site work and on the results of laboratory and field tests performed during the investigation. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations and water conditions between or below exploratory holes. It should be noted that groundwater levels, gas concentrations and gas flows usually vary due to seasonal, atmospheric and/or other effects and may at times differ to those measured during the investigation.

2 SITE DESCRIPTION

2.1 Location and Topography

Crossing 4 is located approximately 2.0 km north east of the centre of Aylsham, Norfolk. The approximate location of Crossing 4 is located between Ordnance Survey National Grid Reference TG 196 286 and TG 200 288.

Crossing 5 is located approximately 2.3 km north-east of the centre of Aylsham, Norfolk. The approximate location of Crossing 5 is located between Ordnance Survey National Grid Reference TG 208 289 and TG 205 290.

Site location plans are presented as drawings reference 3318(C4)D001-1 and 3318(C5)D001-1.

2.2 Published Geology

The online British Geological Survey (BGS) 1:50,000 scale map shows Crossing 4 to be underlain by clay, silt, sand, and gravel Alluvium deposits, and Crossing 5 to be underlain by glaciofluvial sand and gravel from the Happisburgh Glacigenic Formation and Briton's Lane Formation.

Beneath these lies the Wroxham Crag Formation bedrock comprising of sand and gravel.

3 FIELDWORK

3.1 General

Fieldwork was undertaken between 31/07/17 and 11/08/17. The scope of the works, as provided by GHD comprised:

Table 1: Scope of Intrusive Works and In Situ Testing	•												
Exploratory Hole/In Situ Test Type	Proposed number												
Cable percussion, SPTs, variable head permeability test, install	BH17-C4-01												
Cable percussion, SPTs, variable head permeability test	BH17-C4-02												
Cable percussion, SPTs, variable head permeability test, install	BH17-C4-03												
Cable percussion, SPTs, variable head permeability test	BH17-C4-04												
Cable percussion, SPTs, variable head permeability test, install	BH17-C5-01												
Cable percussion, SPTs, variable head permeability test	BH17-C5-02												
Cable percussion, variable head permeability test, SPTs, install	BH17-C5-03												
Cable percussion, SPTs, variable head permeability test	BH17-C5-04												

The exploratory hole locations were selected by GHD. The locations were set out by the GHD site representative prior to commencement.

3.2 Exploratory Holes

The exploratory holes were logged by an engineer in accordance with the recommendations of BS5930:2015, which incorporates the requirements of BS EN ISO 14688-1, 14688-2 and 14689-1. Methods of formation and geological descriptions, together with sample records, in situ test results and observations made during formation of the exploratory hole are given in the logs presented in Appendix A and should be read in conjunction with the Key included therein. Sample photographs are presented in Appendix B.

A summary of the exploratory holes formed is listed in the following table.

Table 2: Summ	Table 2: Summary of Exploratory Positions														
Exploratory position:	Type:	Final depth (m):	Easting (mE):	Northing (mN):	Level (mAOD):	Start date:	End date:								
BH17-C4-01	CP	20.00	619687.49	328656.77	12.81	09/08/2017	10/08/2017								
BH17-C4-02	CP	20.00	619734.74	328684.81	12.55	10/08/2017	11/08/2017								
BH17-C4-03	CP	20.00	620032.35	328829.95	12.58	04/08/2017	07/08/2017								
BH17-C4-04	CP	20.00	620061.55	328848.17	12.71	07/08/2017	08/08/2017								
BH17-C5-01	CP	15.00	620536.65	329029.86	20.32	02/08/2017	02/08/2017								
BH17-C5-02	CP	15.00	620598.48	329046.06	20.65	03/08/2017	03/08/2017								
BH17-C5-03	CP	15.00	620770.38	329039.70	20.70	31/07/2017	31/07/2017								
BH17-C5-04	CP	15.00	620807.28	329057.98	20.98	01/08/2017	01/08/2017								

Type: CP – cable percussion;

Prior to commencement, all exploratory positions were checked for services by reference to available plans, visual inspection and CAT/Genny survey. Inspection pits were excavated by hand and rechecked with a CAT at all borehole locations.

Exploratory hole location plans are presented as drawings 3318(C4)D002-1 and 3318(C5)D002-1.

3.3 Sampling

Samples for geotechnical and geoenvironmental testing and strata description were taken during the formation of the exploratory holes in general accordance with the specification, BS5930:2015, BS10175:2011 and BS EN ISO 22475-1:2006. Soil and water samples for geochemical analysis were taken in accordance with the specification and stored in cool boxes for despatch directly to Concept Life Sciences (Formerly Scientific Analysis Laboratories, SAL) in Braintree, Essex.

A summary of water samples taken from monitoring installations is presented in Appendix D.

3.4 In Situ Testing

In situ testing was carried in accordance with BS 5930:2015, BS 1377-9 (1990), BS EN ISO 22282-1:2012 and BS EN ISO 22282-2:2012 unless otherwise stated. SPT results are presented on individual exploratory hole logs. Information relating to the identification and calibration of SPT hammers can also be found on the individual borehole logs. Hammer calibration certificates are presented in Appendix G.

Falling head tests were carried out in suitable strata in the boreholes upon instruction from GHD. Results are presented in Appendix C.

3.5 Instrumentation and Monitoring

Details of instrumentation installed is presented on the exploratory hole logs. A summary of the installed instrumentation is listed in the following table.

Table 3: Sumr	Table 3: Summary of Instrumentation														
Exploratory position:	Instrument type:	Instrument reference:	Internal diameter (mm):	Installed depth (m bgl):	Depth (m AOD):	Top of response zone (m bgl):	Base of response zone (m bgl):								
BH17-C4-01	Standpipe	BH17-C4-01	50	20.00	-7.19	4.50	20.00								
BH17-C4-03	Standpipe	BH17-C4-03	50	20.00	-7.42	4.20	20.00								
BH17-C5-01	Standpipe	BH17-C5-01	50	15.00	5.32	1.00	12.00								
BH17-C5-03	Standpipe	BH17-C5-03	50	15.00	5.70	1.00	15.00								

Records of monitoring and gas/groundwater sampling carried out by TerraConsult during and after the fieldwork period to the date of issue of this report are presented in Appendix D. Calibration certificates are presented in Appendix G.

3.6 **Surveying**

On completion of the fieldworks, all exploratory positions were surveyed by use of GPS. Coordinates and reduced levels to Ordnance Survey are provided on the exploratory hole logs.

4 LABORATORY TESTING

4.1 **Geotechnical Testing**

The testing was scheduled by GHD and was carried out by GEO Site Testing Services Ltd (GSTL), Llanelli, Camarthenshire, in accordance with BS 1377 (1990) and BRE SD1 unless otherwise stated. The testing is summarised below and the results are presented in Appendix <E>.

Table 4: Summary of Geotechnical Laboratory Testing												
Lab test:	Number	Method:	Remarks:									
	undertaken:											
Atterburg Limit 4 Point	4	BS1377: Part 2: 4.3 & 5.3										
Method												
Particle size distribution	8	BS1377: Part 2: 9.2										
BRE SD1 Suite	2	BRE SD1										

4.2 **Geoenvironmental Testing**

The testing was scheduled by GHD and carried out by Concept Life Sciences. The results are presented in Appendix F.

5 REFERENCES

AGS: 2010: Electronic transfer of geotechnical and geoenvironmental data (Edition 4 including addendum 3, 2011). Association of Geotechnical and Geoenvironmental Specialists.

BRE Special Digest 1: 2005 Concrete in aggressive ground.

BS 1377: 1990: Methods of test for soils for civil engineering purposes. Published in nine parts. British Standards Institution.

BS 5930: 2015: Code of practice for site investigation. British Standards Institution.

BS 10175: 2011: Investigation of potentially contaminated sites - Code of Practice. British Standards Institution

BS EN 1997-1: 2004 : Eurocode 7 – Geotechnical Design – Part 1: General rules. Including UK National Appendix of November 2007.

British Standards Institution.

BS EN ISO 14688-1 : 2002 : Geotechnical investigation and testing – Identification and classification of soil – Part 1: Identification and description. British Standards Institution.

BS EN ISO 14688-2 : 2004 : Geotechnical investigation and testing – Identification and classification of soil – Part 2: Principles for a classification. British Standards Institution.

BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing – Identification and classification of rock – Part 1: Identification and description. British Standards Institution.

BS EN ISO 22282-1: 2012 Geotechnical investigation and testing. Geohydraulic testing Part1: General Rules

BS EN ISO 22282-2 : 2012 Geotechnical investigation and testing. Geohydraulic testing Part 2: Water Permeability Tests in a borehole using open systems

BS EN ISO 22475-1 : 2006 : Geotechnical investigation and testing – Sampling methods and groundwater measurements – Part 1: Technical principals for execution (July 2011 reprint). British Standards Institution.

BS EN ISO 22476-3: 2005: Geotechnical investigation and testing - Field Testing - Part 3: Standard penetration test

6 LICENCES

British Geological Survey Reproduction Licence Number: IPR/187-68CF CO8/053-CSL

Ordnance Survey Reproduction Licence Number. 100035365

DRAWINGS

3318(C4)D001-1 Site Location Plan

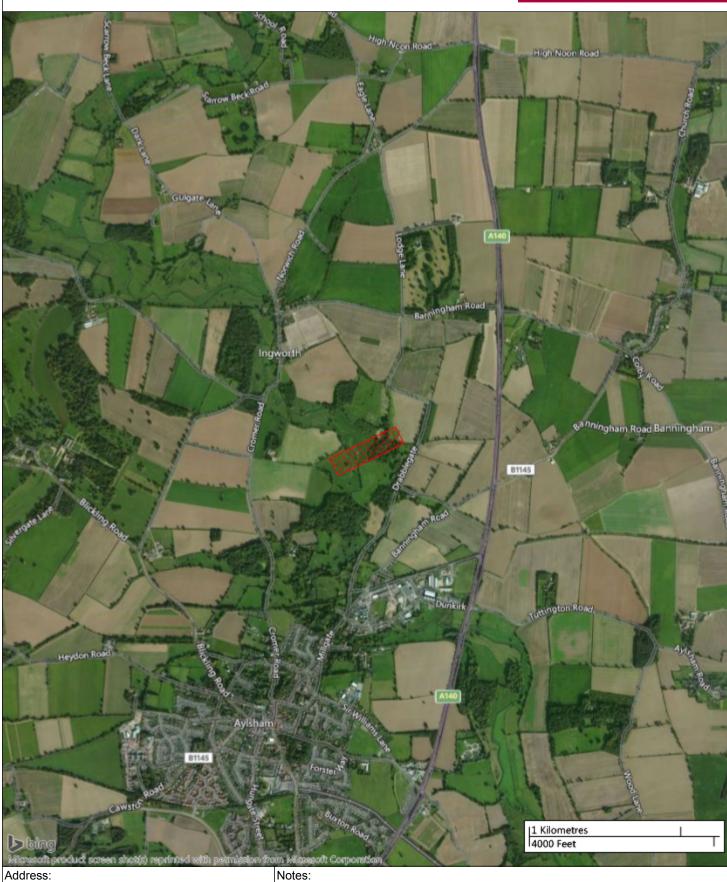
3318(C5)D001-1 Site Location Plan

3318(C4)D002-1 Exploratory Hole Location Plan

3318(C5)D002-1 Exploratory Hole Location Plan

Site Location Plan

TerraConsult



Address: East Anglia

AGS FINAL Issue: 1:25000 Scale:

East Anglia (North) Offshore Wind Farm Project:

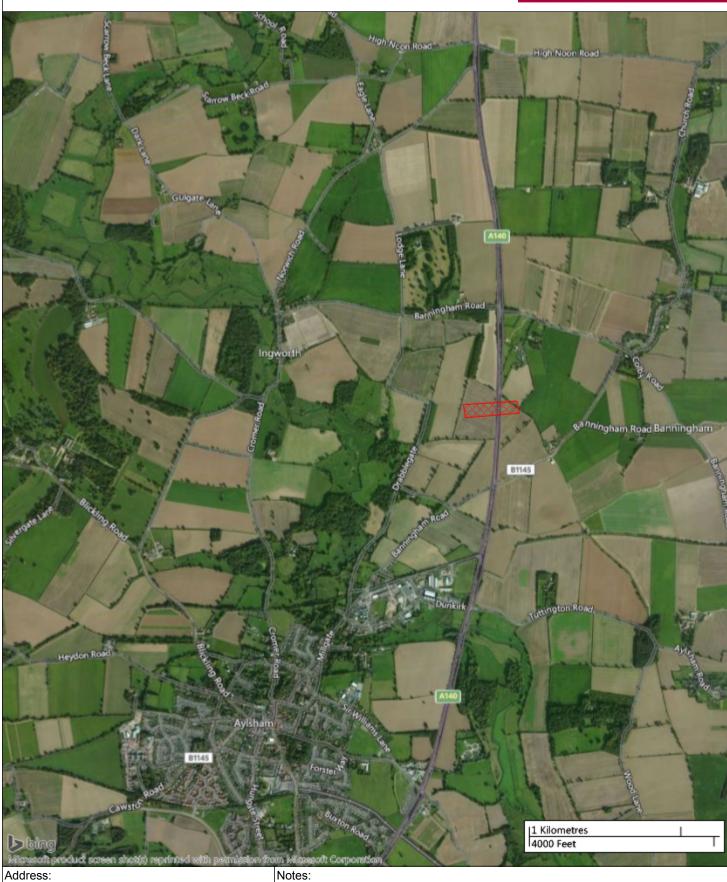
Project No: 3318 GHD Ltd Client:

Drawing No:

3318(C4)D001-1

Site Location Plan

TerraConsult



Address: East Anglia

AGS FINAL Issue: 1:25000 Scale:

East Anglia (North) Offshore Wind Farm Project:

Project No: 3318 GHD Ltd Client:

Drawing No:

3318(C5)D001-1

Exploratory Hole Location Plan





Legend Ke

Locations By Type - CP

Project: East Anglia (North) Offshore Wind Farm
Issue: FINAL Project No: 3318
Scale: 1:3000 Client: GHD Ltd

Drawing No:

3318(C4)D002-1

Exploratory Hole Location Plan





Legend Ke

Scale:

Locations By Type - CP

1:3000

Project: East Anglia (North) Offshore Wind Farm Issue: FINAL Project No: 3318

GHD Ltd

Drawing No:

3318(C5)D002-1

APPENDICES

APPENDIX A Exploratory Hole Records

APPENDIX B Photographs

APPENDIX C In Situ Testing Results

APPENDIX D Instrumentation Sampling and Monitoring Records

APPENDIX E Geotechnical Laboratory Test Results

APPENDIX F Geoenvironmental Laboratory Test Results

APPENDIX G Calibration Certificates

November 2017 Report No 3318-R004

APPENDIX A Exploratory Hole Records

Key sheet

Boreholes

November 2017 Report No 3318-R004

Exploratory Hole Key Sheet

TerraConsult

SAMPLES:

Undisturbed:

U Driven tube sample
UT Thin wall driven tube sample
TW Pushed thin wall tube sample
P Pushed piston sample

Liner sample (from windowless or similar sampler), full recovery unless otherwise stated

CBR CBR mould sample BLK Block sample

C Core sample (from rotary core) taken for laboratory testing

Disturbed:

D Small sample
B Bulk sample
AMAL Amalgamated sample

Environmental:

ES Environmental soil sample
EW Environmental water sample

Comments: Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that an attempt was made

to take a tube sample; however, there was no recovery. Sample recovery is given as a percentage.

TESTS:

SPT S or SPT C Standard Penetration Test, open shoe (S) or solid cone (C)

The Standard Penetration Test is defined in BS EN ISO 22476-3 (2005). The incremental blow counts are given in the Field Records column; each increment is 75mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 (either in total or for a single

increment) the total blow count beyond the seating drive is given (without the N = prefix).

ICBR In situ CBR

IV In situ vane shear strength, peak (p) and remoulded (r), kPa
HV Hand vane shear strength, peak (p) and remoulded (r), kPa
PP Pocket penetrometer test, converted to shear strength, kPa

KFH, KRH, KPI Variable head permeability tests (KFH = falling head test, KRH = rising head test, KPI = packer test), permeability value

PID/FID Photo-ionisation detector/Flame-ionisation detector

Test results provided in Field Records column

DRILLING RECORDS:

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930: 2015 and BS EN ISO 22575-1 (2006)

TCR Total Core Recovery, % SCR Solid Core Recovery, % RQD Rock Quality Designation, %

If Fracture spacing, mm. Minimum, typical and maximum spacings are presented.

NI Non intact is used where the core is fragmented.

CRF Core recovered (length in m) in the following run

AZCL Assessed zone of core loss

NR Not recovered

GROUNDWATER:	DEPTH REMARKS:

Groundwate

Groundwater strike

EoS End of Shift
SoS Start of Shift
EoBH End of Borehole

Groundwater level after standing period

INSTRUMENTATION:

Details of installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill. The type of instrument installed is indicated by a code adjacent to the Legend column at the base of the instrument.

dicated by a code adjacent to the Legend column at the base of the instrument.

Hydraulic piezometer

SP Standpipe
SPIE Standpipe piezometer
PPIE Pneumatic piezometer
EPIE Electronic piezometer

GMP Gas monitoring standpipe (xx) Internal diameter

. ,

ICE Biaxial inclinometer

ICM Inclinometer tubing for use with probe

SLIP Slip indicator

HPIE

ESET Electronic settlement cell/gauge
ETM Magnetic extensometer settlement point

ETR Rod extensometer

EXPLORATORY HOLE TYPE: CP Cable percussion

DP Dynamic probe
DCP Dynamic cone penetrometer

HA Hand auger
IP Inspection pit

OP Observation pit/trench
PC Pavement core
RC Rotary core
RO Rotary open hole

SH Shaft

SNC Sonic (resonance)
TP Trial pit/trench
TRAV Traverse

WLS Windowless (dynamic) sample WS Window (dynamic) sample

Project: East Anglia (North) Offshore Wind Farm Reference

Project No: **3318**Client: **GHD Ltd**

KEY SHEET

TerraConsult

Bor	orehole formation details: Location details: Location details:																
Typ IP CF	ı	From: 0.00 0.00	To: 1.20 20.00	Start da 09-08- 09-08-	17 09-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type: n/a n/a	Drill Bit: n/a n/a	Logged: 09-08-17 10-08-17	Logger: VS VS	Remark SPT ha	ks: ammer ID: SI 3 E(r)% 75	mE: 619687.49 mN: 328656.77 mAOD: 12.81 Grid: OSGB		
<u></u>	ا يا	, P		Depth									Samples	Samples & In Situ Testing			
Backfill/ Instal'n	Water-	Legend	Level	(thick- ness)			Stratum	Description			Wat	er Casin	· ·	Type & No	Results/Remarks		
			12.41	0.40	slightly sandy flint. (TOPSOIL) Soft dark oran	CLAY.	own mottled lig Gravel of subar	ngular to subro	ounded fine	e to mediun	n]		0.50 0.50	D1 ES1			
					flint. Occasion (ALLUVIUM)			ngular to Subro			T.		1.00 1.00	D2 ES2			
				- - - - -							Dr	y	1.50 1.50 1.50 - 1.95	S ES3 D3	N=14 (2,2/3,3,4,4)		
		7	10.71	+	Soft dark grey subrounded fi (ALLUVIUM)		/ gravelly sandy edium flint.	y CLAY. Grave	l of subang	gular to		y 2.40	2.00	ES4	N=15 (2,3/3,4,4,4)		
				(1.40)									2.50 - 2.95	D4			
			9.31	f	to medium SA	e dark (ND. Gr	greyish brown s avel of subang	slightly gravelly ular to subrou	/ slightly clanded fine to	ayey silty fi o medium	ne Dr	y 3.40	3.50 3.50 - 3.95	S D5	N=16 (3,3/4,4,4,4)		
			8.31		flint. (ALLUVIUM)							y 4.50	4.50	C	N=21 /1 2/4 5 5 7)		
]			greyish brown s Inded fine to co			SAND and	i] Di	y 4.50	4.50 - 4.95	B1	N=21 (1,3/4,5,5,7)		
			7.01	5.80							- Dr	y 5.50	5.50	С	N=24 (2,4/5,6,7,6)		
						ravel of	Trecovered as I f very weak to varse flint.				k. =		6.00	D6			
			5.81	+	the gravel slig	htly gra	recovered as ovelly sandy SIL chalk. Occasio	T. Gravel of v	ery weak to		Dr	y 7.00	7.00 7.00 - 7.45	S D7	N=9 (1,1/2,2,2,3)		
					(CHALK)	ii wiiie	CHAIR. OCCASIO	mai mie to coa	nse iliit.		-						
				- - - - - -							- Dr	y 8.40	8.50 8.50 - 8.95	S D8	N=11 (2,3/2,2,3,4)		
				-													
				-]						
П	Ins			-							Dr Wat	v 10.00 er Casin	10.00 g Depth	Type & No	N=12 (3,2/2,3,4,3) Resulfs		
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	ıck: .00	Rose to 2.20	o: Casing 4.00		ed: Dia (mm) 15		n: Casing: 0.00 19.00	From: To	:	Rema	ırks:		From: to:	Duratio	on: Tool:		
AG	S A	bbreviations se Il depths and r	anation of symbole Key Sheet. educed levels and	ols and e in metres.	Project: Project No		Anglia (North)	Offshore Wind	I Farm				Exploratory pos		ence: C4-01		
Log Sca			1:50		Client:	GHD	Ltd								Sheet 1 of 2		



Bor	eho	orehole formation details: Location details: Location details:													
Type IP CP		From: 0.00 0.00	To: 1.20 20.00	Start date 09-08-1 09-08-1	7 09-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type: n/a n/a	Drill Bit: n/a n/a	Logged: 09-08-17 10-08-17	Logger: VS VS	Remarks SPT har	s: mmer ID: SI 3 E(r)	% 75	mE: 619687.49 mN: 328656.77 mAOD: 12.81 Grid: OSGB
ji li	i e	pu		Depth									Samples 8	& In Situ Te	
Backfill/ Instal'n	Water- strike	Legend	Level	(thick- ness)				Description			Water	r Casing	Depth	Results/Remarks	
				_t	he gravel slig	htly gra	Crecovered as avelly sandy SII chalk. Occasio	T. Gravel of	very weak to	ges around o weak, low			10.00 - 10.45	D9	
											- Dry	11.40	11.50 11.50 - 11.95	S D10	N=19 (3,4/4,6,5,4)
				(13.00)							Dry	13.00	13.00 13.00 - 13.45	S D11	N=20 (2,4/5,5,6,4)
				-							Dry	14.00	14.00 14.50 - 14.95	S D12	N=23 (3,4/5,6,6,6)
				1							- Dry	16.00	16.00 16.00 - 16.45	S D13	N=27 (2,4/6,6,7,8)
											- Dry	17.50	17.50 17.50 - 17.95	S D14	N=25 (4,5/7,7,6,5)
	SP		-7.19			D		00 00 v /T			- Dry	19.00	19.00 19.00 - 19.45	S D15	N=30 (2,4/5,7,8,10)
Gro	undv	vater e	ntries:		Diameter		orehole ends at 2 ng:	20.00m (Targe Depth relate		<u> </u>	Water		Depth Chiselling deta	Type & No	Results
Stru	■ No	es: For expl	anation of symbols to the Expression of symbols between the Expression of Symbols and Symb	g: Seale	Project:	East	Anglia (North)		īo: nd Farm	Rema	rks:		From: to: Exploratory pos		ence:
	issue	e :	FINAL 1:50	eu e5.	Project No Client:	3318 GHD							BH	17-	C4-01 Sheet 2 of 2



Bore	hole	e for	mation	details	s·									_			Location details:	
Type:	F	rom:	To:	Start d	ate: End	date:	Crew:	Plant:	Barrel type:	Drill Bit:	Logged:	Logg		Remarks	:		mE: 619734.74	
IP CP		.00	1.20 20.00	10-08- 10-08-)8-17)8-17	MJ MJ	Hand tools Dando 2000	n/a n/a	n/a n/a	10-08-17 11-08-17	VS VS		SPT har	nmer ID: SI 3 E(r)% 75	mN: 328684.81	
																,	mAOD: 12.55	
L																	Grid: OSGB	
Backfill/ Instal'n	ke Te	Legend	Level	Depth				Stratum	Description						Samples	ples & In Situ Testing		
Bac	Water- strike	Leg	Level	(thick- ness)				Stratum	Description			,	Water	Casing	Depth	Type & No	Results/Remarks	
				(0.30)				gravelly clayed										
		V//X	12.25	0.30	TOPSC	IL)												
				(0.70)				gravelly fine to coarse flint. G							0.50 0.50	D1 ES1		
				. ,	brown s		CLAY.		•		Ü	-						
			11.55	1.00 -	Medium	dense		prown gravelly			rse SAND.				1.00 1.00	D2 ES2		
				(0.50)	Gravel of	of suba IUM)	angular	to subrounded	d fine to coarse	e flint.		-						
	▼		11.05	1.50 -	Medium	dense		orangish brown					Dry		1.50 1.50	C ES3	N=15 (2,2/3,4,4,4)	
	_	× ×			coarse S (ALLUV		Grave	l of subangula	r to subrounde	ed fine to co	oarse flint.	-			1.50 - 1.95	B1		
		× ×.		-	1	- /						-			2.00	ES4		
					-							1						
	\Box	× ×		(2.00) -								-	Dry	2.50	2.50 2.50 - 2.95	C B2	N=18 (2,3/3,4,5,6)	
		1.×			-										2.50 - 2.95	DZ		
				-	-							-						
]						
		××	9.05	3.50 -	Modium	donce	a light o	rey slightly silt	y fine to coars	o SAND ar	nd eubangu	lar	Dry	3.50	3.50	С	N=22 (2,3/4,5,6,7)	
					to subro	unded		coarse flint Gl		e SAND ai	iu subarigu				3.50 - 3.95	B3		
				(1.00) –	(ALLUV	IUM)						4						
				(/	_							1						
			8.05	4.50 -									Dry	4.50	4.50	С	N=19 (2,2/4,4,5,6)	
		× ×	0.00	4.50				orangish grey v angular to sub				se -	Diy	7.50	4.50 - 4.95	B4	14-13 (2,2/4,4,5,0)	
		(X)			(ALLUV		or oub	arigalar to oab	roundou iino t	o coarco in		1						
		(X		(1.00) –]						
		`x			_													
			7.05	5.50 -				rownish grey s				ı	Dry	5.50	5.50 5.50 - 5.95	C B5	N=26 (3,5/6,6,7,7)	
					size poo	kets o		nded fine to co chalky CLAY.	parse flint GRA	AVEL. Occa	isional cobi	ble]						
				(1.10)	(ALLUV	IUM)						7						
					-							1						
			5.95	6.60								_}			6.60	D3		
				(0.40)				recovered as of weak, low d				nal 🖁						
		<u> </u>	5.55	7.00 -	fine to c		flint.					1	Dry	7.00	7.00 7.00 - 7.45	S D4	N=13 (2,2/3,3,3,4)	
					Structur	éless (recovered as							7.00 - 7.45	D4		
				-				y sandy gravel k. Occasional f			medium	-						
					(CHAĽK							-						
				_	1							4						
]]						
				-	1								Dry	8.40	8.50	s	N=15 (1,2/3,4,4,4)	
]								•		8.50 - 8.95	D5		
				_	1]						
					-							‡						
				_]]						
					-													
													D=·	10.00	10.00		N=40 (2.4/2.4.5.7)	
Gra	Inst	ator	ntries:		Dia	note-	& casiı		Depth relate	d romente		١	Dry Water	 	10.00 Depth	Type & No	Results	
			o: Casin	ıg: Seal			Casii Depth		From: To		Rema	arks:			From: to:	Duratio	on: Tool:	
2.60		1.70		•	150 19.00 19.00								-					
Notes: For explanation of symbols and abbreviations see Key Sheet Project: East Anglia (North) Offshore Wind Farm										Exploratory pos	sition refer	ance.						
AGS	abbre All de	viations se pths and re	ee Key Sheet. educed levels a	are in metres.	1 -		: 3318	• ,	OUSHOLE MILL	u i allii				5			C4-02	
Log is Scale:			FINAL 1:50		Clie		GHD								רום	ı ı <i>I</i> =	Sheet 1 of 2	



Bor	ehol	e fori	mation	details:											Location details:
Type IP CP		From: 0.00 0.00	To: 1.20 20.00	Start dat 10-08-1 10-08-1	7 10-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel typ n/a n/a	e: Drill Bit: n/a n/a	Logged: 10-08-17 11-08-17	Logger: VS VS	Remarks	s: mmer ID: SI 3 E(r)% 75	mE: 619734.74 mN: 328684.81 mAOD: 12.55 Grid: OSGB
Backfill/ Instal'n	Water- strike	Legend	Level	Depth (thick-			Stratum	Description	,				Samples	& In Situ To	esting
Bac	Wa	Feg	Level	ness)							Water	r Casing		Type & No	Results/Remarks
				t	orown staining	g slightl	(recovered as ly sandy gravel lk. Occasional f)	ly SILT. Gra	vel of weak,				10.00 - 10.45	D6	
				-							- Dry	11.50	11.50 11.50 - 11.95	S D7	N=23 (4,4/5,5,7,6)
				(13.00)							Dry	13.00	13.00 13.00 - 13.45	S D8	N=24 (2,3/5,6,6,7)
											- Dry	14.50	14.50 14.50 - 14.95	S D9	N=17 (1,3/4,6,4,3)
											- Dry	16.00	16.00 16.00 - 16.45	S D10	N=30 (4,5/6,8,8,8)
											- Dry	17.40	17.50 17.50 - 17.95	S D11	N=22 (2,3/3,5,6,8)
											- Dry	19.00	19.00 19.00 - 19.45	S D12	N=29 (3,5/6,6,8,9)
	Inst		-7.45	20.00		Bo	orehole ends at 2	20.00m (Taro	get depth)		Water	r Casing	Depth	Type & No	Results
	ındv		ntries:		Diameter	& casi	ng:	Depth rela	ted remarks		,		Chiselling deta	ails:	
AGS	Note abb	es: For expl reviations se lepths and r	anation of symt ee Key Sheet. educed levels a	g: Seale	d: Dia (mm) Project: Project No	East	: Anglia (North)	From: Offshore W	To: /ind Farm	Rema	ırks:		From: to: Exploratory pos		
Log		! .	FINAL 1:50		Client:	GHE							וום	ı ı <i>ı</i> =	Sheet 2 of 2

TerraConsult

Bor	eho	le fori	mation	details	s:											Location details:
Туре	e: F	rom:	To:	Start d	ate:	End date:	Crew:	Plant:	Barrel type:	Drill Bit:	Logged:	Logger:	Remark	ks:		mE: 620032.35
IP CP		0.00 0.00	1.20 20.00	04-08- 04-08-		04-08-17 07-08-17	MJ MJ	Hand tools Dando 2000	n/a n/a	n/a n/a	04-08-17 07-08-17	VS VS	SPT ha	ammer ID: SI 3 E(r)% 75	mN: 328829.95
																mAOD: 12.58
																Grid: OSGB
#In	-F	pu		Depth										Samples	& In Situ Te	esting
Backfill/ Instal'n	Water- strike	Legend	Level	(thick- ness)				Stratum	Description			Wate	er Casin	1	Type & No	Results/Remarks
		N/A			Sof	t dark brow	n mott	tled light grey s	andv CLAY. Fr	eauent roc	otlets and pl	1	EI Casiii	у Бериі	Type & No	results/remarks
				(0.50)	mat	tter.		0 0 7	,	•		1				
			12.08	0.50 -		PSOIL)								0.50	D1	
		× ×			Sof	t dark brow naish brow	n mott n Occ	tled light grey s asional rootlets	andy CLAY. O	ccasionally tter	mottled lig	nt -		0.50	ES1	
		××		(0.90)_		LUVIUM)	000		o ana pianema			1				
		××		(0.00)_	-							7		1.00 1.00	D2 ES2	
			11.18	1.40	-							1				
		××	11.10	1.40			e dark	grey slightly sil	ty clayey SANI	D.		Dry	/	1.50	S	N=15 (2,3/3,4,4,4)
		× × × × × × × × × × × × × × × × × × ×			(AL	LUVIUM)								1.50 1.50 - 1.95	ES3 D3	
		× ×		_										2.00	ES4	
		× ×		(1.40)								1				
					-							1				
	ϫ	×		-								- Dry	2.40	2.50 2.50 - 2.95	S D4	N=15 (2,2/3,4,4,4)
		× × ×	9.78	2.80	Mar	dium done	dark	greyish brown	cliabtly clayey	eliabtly eilt	v veny sand	1				
		×		-	GR.	AVEL. Gra	vel of s	subangular to s	subrounded fin	e to coarse	flint.	^{'y} –				
		×				casional co LUVIUM)	arse g	ravel and cobb	le sized pocke	ts of chalky	y CLAY.	}				
		×		(1.40) -	(AL	LUVIUIVI)						- Dry	, 3.50	3.50	С	N=25 (3,5/5,6,7,7)
		* ×: *		(1.40)] 51,	0.50	3.50 - 3.95	B1	14-23 (3,3/3,0,7,7)
		- × -			-							1				
		× × •		-	-							7				
			8.38	4.20				K recovered as								
	$\ $			-				htly sandy SILT with occasional				- Dry	4.50		S	N=9 (1,1/2,2,2,3)
ŀH:					Occ	casional fin		arse black flint		2.01 0.0	9.	}		4.50 - 4.95	D5	
ŀΗ:				_	_(CF	HALK)										
		<u> </u>										1				
												1				
: :				-								1		5.50 - 5.95 5.50 - 5.95	B2 UNR	30 (0%)
ŀH:					-							1				
ŀH:				-	-							4				
		1]							}				
		1		_	1											
ŀH:																
ŀH:		世										1				
ŀΉ				_	1							Dry	6.00	7.00 7.00 - 7.45	S D6	N=12 (1,2/3,4,3,2)
ľД°		<u> </u>			-							1				
				-								4				
:H:	1]]				
ĿH:				_	1]				
\mathbb{H}					1							1				
H	1				1							1				
	-			-	1				<u>8.50 - 8</u>	3.90 m: Becom	es silty GRAVE	Dry	8.50	8.50 8.50 - 8.95	S D7	N=16 (2,3/3,3,4,6)
:H:	-				1							Ħ				
LH:				_	}							-]				
FA:					1							}				
ľД		<u> </u>		_												
					-							1				
: :	1											1				
	Inst			_	L,				ı			Dry Wate	r 10.00 er Casin		Type & No	N=19 (3,3/4,6,5,4) Results
			ntries:		_	Diameter			Depth related					Chiselling det		
1	ick: I 00	Rose to 2.60	o: Casin 7.50	-	ied:	Dia (mm) 15		h: Casing: 9.00 19.00	From: To):	Rema	arks:		From: to:	Duratio	on: Tool:
0.	00	2.00	7.0	J		10		0.00 10.00								
		es: For expl	anation of symb	ools and		Project:	East	t Anglia (North)	Offshore Wind	d Farm				Exploratory pos	sition refere	ence:
AG			ee Key Sheet. educed levels a	re in metres.		Project No										C4-03
1 -	issue	: :	FINAL			Client:		D Ltd						DI	<i>/</i> –	
Scal	ਦ .		1:50													Sheet 1 of 2



Bor	ehc	le for	mation	details:											Location details:
Type IP CP		From: 0.00 0.00	To: 1.20 20.00	Start date 04-08-17 04-08-17	End date: 04-08-17 07-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel typ n/a n/a	pe: Drill Bit: n/a n/a	Logged: 04-08-17 07-08-17	Logger: VS VS	Remarks	s: mmer ID: SI 3 E(r)% 75	mE: 620032.35 mN: 328829.95 mAOD: 12.58 Grid: OSGB
Backfill/ Instal'n	Water-	Legend	Level	Depth (thick-	•		Stratum	Description	n				Samples	& In Situ Te	esting
Bacl	Wat	Legi	Levei	ness)			Stratum				Wate	r Casing		Type & No	Results/Remarks
				-				_	10.00 - 20.00 m:	Silt matrix stiffen	s -		10.00 - 10.45	D8	
											- - - - - -				
				-							Dry	11.40	11.50 11.50 - 11.95	S D9	N=13 (1,1/3,2,3,5)
				(15.80)							- - - - - - - -				
				-	13	.00 - 20.0	00 m: Chalk gravel b	ecomes we <u>ak</u>	to medium stron	g, medium densit	Dry	13.00	13.00 13.00 - 13.45	S D10	N=26 (2,3/5,6,8,7)
							14.00 - 2	20.00 m: Ch <u>all</u>	k gravel has occa	asional black spot	- - - - -				
											Dry	14.50	14.50 14.50 - 14.95	S D11	N=27 (3,5/6,6,7,8)
											-				
				-							- Dry	16.00	16.00 16.00 - 16.45	S D12	N=30 (2,4/5,7,9,9)
											- - - - -				
								17. <u>50</u>) - 17.90 m: Beco	mes silty GRAVE	Dry	17.00	17.50 17.50 - 17.95	S D13	N=34 (4,6/7,8,9,10)
				-							- - - - -				
				-							Dry	19.00	19.00	S	N=32 (3,5/6,8,9,9)
			7.40	20.00							- - - - -				
Grov	Ind	water e	-7.42	20.00	Diameter		orehole ends at 2		rget depth) ated remark	s:	Wate		Depth Chiselling deta	Type & No	Results
				g: Sealed				From:	To:	Rema	rks:		From: to:	Duratio	on: Tool:
AGS Log	ab Al issu	breviations se depths and re	anation of symble Key Sheet. educed levels a FINAL 1:50	pols and are in metres.	Project: Project No Client:			Offshore V	Vind Farm			E	Exploratory pos		ence: C4-03 Sheet 2 of 2



Bor	eho	e for	nation	details	s:										Location details:
Type IP CP	İ	From: 0.00 0.00	To: 1.20 20.00	Start d 07-08 07-08	-17 07-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type: n/a n/a	Drill Bit: n/a n/a	Logged: 07-08-17 08-08-17	Logger: VS VS	Remark SPT ha	s: mmer ID: SI 3 E(r)% 75	mE: 620061.55 mN: 328848.17 mAOD: 12.71 Grid: OSGB
Backfill/ Instal'n	Water- strike	Legend	Level	Depth (thick-			Stratum	Description					Samples	& In Situ Te	esting
Pac Inst	st Wa	Leg	Level	ness)							Wat	er Casing	Depth	Type & No	Results/Remarks
			12.21	(0.50) 0.50 -	rootlets and p (TOPSOIL) Soft to firm lig	lant ma	tled light grey sl atter. vnish grey mottl angular to subro	ed light orang	gish brown :	slightly sand	dy -		0.50 0.50	D1 ES1	
			11.71	1.00 -	Occasionally gravelly CLAY (ALLUVIUM)	layered '.	l with soft dark b	orown silty slig	ghtly sandy	slightly			1.00 1.00	D2 ES2	
			10.91	(0.80)	of subangular plant matter. (ALLUVIUM)	to sub	k brown slightly rounded fine to	medium flint.	Frequent r	CLAY. Grave ootlets and	el - - Dry	<i>'</i>	1.50 1.50 1.50 - 1.95	S ES3 D3	N=11 (1,2/2,3,3,3)
		× × × × × × × × × × × × × × × × × × ×	10.91	-	Firm locally ve (ALLUVIUM)	ery soft	dark grey sligh	tly sandy CLA	AY.				2.00	ES4	
		× × × × × × × × × × × × × × × × × × ×		(1.50)	-						- Dry	2.40	2.50 2.50 - 2.95	S D4	N=17 (2,3/3,4,5,5)
			9.41	3.30	Firm dark gre to subrounded chalky CLAY. (ALLUVIUM)	y slightl d fine to	ly sandy slightly o coarse flint. O	gravelly CLA ccasional gra	AY. Gravel ovel sized po	of subangula ockets of wh	ar nite Dry	3.50	3.50 3.50 - 3.95	C B1	N=27 (4,5/6,6,7,8)
	_		8.41	4.30	Structureless	of weak	Crecovered as I	density, light	t creamy ch	y gravelly nalk with		, 4.50	4.50	s	N=8 (1,1/2,2,2,2)
				-	occasional lig (CHALK)	ht oran	gish brown staiı	ning. Occasio	onal flint.				4.50 - 4.95	D5	
				-							- Dry	5.50	5.50 5.50 - 5.95	S D6	N=6 (1,0/1,1,2,2)
				(5.70)							- - - - - - -	7.00	7.00 7.00 - 7.45	S D7	N=7 (2,2/1,2,2,2)
				-											
				-							- Dry	8.40	8.50 8.50 - 8.95	S D8	N=11 (1,3/4,3,2,2)
				_10_00	- - -							40.00	40.00		N=92 (2.2/4 6.9.5)
Gro	Inst undv	rater e	ntries:	10.00	Diameter	& casi	ng:	Depth relate	d remarks	:	Wat		10.00 Depth Chiselling deta	Type & No	N=23 (3,3/4,6,8,5) Results
Stru			o: Casin			: Dept		From: To		Rema	ırks:		From: to:	Duratio	on: Tool:
AG Log	s abb All d	reviations se lepths and re	enation of symble Key Sheet. educed levels a FINAL 1:50	ools and re in metres.	Project: Project No Client:	o: 3318	t Anglia (North) 3 D Ltd	Offshore Wind	d Farm				Exploratory pos		C4-04 Sheet 1 of 2



Bor	ehol	e for	nation	details	:										Location details:
Type IP CP		From: 0.00 0.00	To: 1.20 20.00	Start da 07-08-1 07-08-1	17 07-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type n/a n/a	: Drill Bit: n/a n/a	Logged: 07-08-17 08-08-17	Logger: VS VS	Remark	s: mmer ID: SI 3 E(r)	% 75	mE: 620061.55 mN: 328848.17 mAOD: 12.71 Grid: OSGB
Backfill/ Instal'n	Water- strike	Legend	Level	Depth (thick-			Stratum	Description	•	'			Samples	& In Situ Te	esting
Bac Inst	Wa	Leg	Level	ness)				•			Wate	er Casing	1	Type & No	Results/Remarks
				-		gravelly	recovered as y SILT. Gravel of tt.						10.00 - 10.45	D9	
											Dry	11.30	11.50 11.50 - 11.95	S D10	N=19 (2,2/3,5,5,6)
				-							Dry	13.00	13.00 13.00 - 13.45	S D11	N=19 (1,3/3,4,5,7)
				(10.00)			14.00 r	n: Dark bro <u>wn cc</u>	olouration surrou	inding flint grav	- Dry	14.30	14.50 14.50 - 14.95	S D12	N=25 (4,4/5,6,7,7)
				-				=		16.00 m: Softer	s Dry	16.00	16.00 16.00 - 16.45	S D13	N=30 (2,4/6,7,8,9)
											- Dry	17.40	17.50 17.50 - 17.95	S D14	N=32 (3,5/6,8,9,9)
				-							Dry	19.00	19.00 19.00 - 19.45	S D15	N=30 (4,4/4,8,8,10)
Y/)\\\\	Inst		-7.29	20.00			rehole ends at 2				Wate			Type & No	Results
			ntries:	a. Scal	Diameter				ed remarks		rke:	•	Chiselling deta		no. Tool:
otru ■ II	Note	es. For expl	anation of symbol	g: Seale	Project:		h: Casing: Anglia (North)		To:	Rema	irks:		From: to: Exploratory pos	Duration refere	
AGS Log i	All d	reviations se lepths and re	e Key Sheet. educed levels a FINAL 1:50	re in metres.	Project No Client:		3	Onstitute WI	inu i aiiil						C4-04 Sheet 2 of 2



Bor	ehol	e forn	nation	details):										Location details:
Type IP CP		From: 0.00 0.00	To: 1.20 15.00	Start da 02-08- 02-08-	17 02-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type: n/a n/a	Drill Bit: n/a n/a	Logged: 02-08-17 02-08-17	Logger: VS VS	Remarks	s: mmer ID: SI 3 E(r)% 75	mE: 620536.65 mN: 329029.86 mAOD: 20.32 Grid: OSGB
Backfill/ Instal'n	Water- strike	Legend	Level	Depth (thick-			Stratum	Description					Samples	& In Situ Te	esting
Bac	S ±S	<u>ğ</u>		ness)	Dank ananaiah	h				ille. Eine ka	Wat	er Casing	Depth	Type & No	Results/Remarks
			19.92	(0.40) - 0.40 - (0.60) -	medium SANI (TOPSOIL) Dark orangish). Grav brown	slightly gravelly el of subangula slightly gravelly angular to subr	er to subround	ded fine to r	to medium			0.50 0.50	D1 ES1	
		*	19.32	1.00	(BRICKEARTI	dark o	orangish brown	slightly silty f	îne to medi	um SAND.			1.00 1.00	D2 ES2	
				-							Dry	y 1.40	1.50 1.50 1.50 - 1.95 2.00	S ES3 D3 ES4	N=14 (2,2/3,3,4,4)
				(3.00) -							- Dr	y 2.40	2.50 2.50 - 2.95	S D4	N=18 (3,4/5,4,5,4)
				 - - - - -							- Dr	y 3.50	3.50 3.50 - 3.95	S D5	N=23 (3,4/5,6,6,6)
		* X * * * * * * * * * * * * * * * * * *	16.32	4.00 -	clayey slightly	silty su ockets	ming dense dar ubangular to sul of brown sandy FORMATION)	brounded fine	own very sa	andy slightly flint GRAVE	/ :L - Dr	y 4.50	4.50 4.50 - 4.95	C B1	N=25 (4,5/5,6,6,8)
		X		(3.00) -							- Dr	y 5.50	5.50 5.50 - 5.95	C B2	N=35 (5,7/8,8,9,10)
			13.32	7.00		to subr	brown gravelly ounded fine to FORMATION)		to coarse \$	SAND. Grav	Dry	y 7.00	7.00 7.00 - 7.45	S D6	50 (4,6/50 for 240mm)
		*		(3.00)							- Dr	y 8.50	8.50 8.50 - 8.95	S D7	N=29 (2,3/5,6,7,11)
		× × × × × × × × × × × × × × × × × × ×	10.32	- - - - - - - - -								. 10.00	10.00	c	N=42 (4 6/7 0 42 14)
Gro	Inst undw	ater e	ntries:	10.00	Diameter	& casi	ng:	Depth relate	d remarks:	<u> </u>	Wat		10.00 Depth Chiselling deta	Type & No	Results, 13, 14)
Stru			6.00			Deptl		From: To		Rema	rks:		From: to:	Duratio	on: Tool:
AG Log Scal	All d	reviations see epths and re	nation of symble Key Sheet. duced levels at FINAL 1:50		Project: Project No Client:			Offshore Wind	d Farm			E	Exploratory pos		C5-01 Sheet 1 of 2



Bor	ehol	e fori	nation	details	:							_			Location details:
Type IP CP		From: 0.00 0.00	To: 1.20 15.00	Start da 02-08-1 02-08-1	7 02-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type: n/a n/a	Drill Bit: n/a n/a	Logged: 02-08-17 02-08-17	Logger: VS VS	Remarks SPT har	s: mmer ID: SI 3 E(r)% 75	mE: 620536.65 mN: 329029.86 mAOD: 20.32 Grid: OSGB
Backfill/ Instal'n	Water- strike	Legend	Level	Depth (thick-			Stratum	Description					Samples	& In Situ To	esting
Bac	Wa	Leg.	ECVCI	ness)				·	<u></u>	D A) (E)	Wate	r Casing		Type & No	Results/Remarks
		× × × × × × × × × × × × × × × × × × ×	9.72	10.60	Dense dark groupsubangular to Occasional co	rey gravesubrou	brown slightly s FORMATION) velly silty mediu unded fine to co of flint. FORMATION)	m to coarse	SAND. Gra	vel of			10.00 - 10.45	D8	
	SP		8.32	12.00	sandy SILT. G	ravel o	Crecovered as v	nedium densi	ity, subangı	ılar to	- Dry	11.50	11.50 11.50 - 11.95	C B3	N=37 (5,6/8,9,10,10)
					subrounded w (CHALK)	hite gr	ey CHALK. Ran	e medium to	coarse blac	ck flint.	- Dry	11.50	13.00 13.00 - 13.45	S D9	N=20 (2,3/3,4,6,7)
				(3.00) -							- - - Dry	14.40	14.50	S	N=20 (2,3/3,4,6,7)
				1									14.50 - 14.95	D10	
			5.32	15.00		Вс	orehole ends at 1	5.00m (Targe	t depth)						
												r Coning	Donth	Time 8 No.	Positie
			ntries:	g: Seale	Diameter ed: Dia (mm)			Depth relate	d remarks		Wate	Ċ	Depth Chiselling deta		Results
Notes: For explanation of symbols and abtreviations see Key Sheet. Project: East Anglia (North) Offshore Wind Farm											rks:		From: to: Exploratory pos		ence:
	issue		FINAL 1:50	ые инпеце́.	Project No Client:		3 O Ltd						BH	17-	C5-01 Sheet 2 of 2



Bor	ehol	e forı	nation	details	s:										Location details:
Type IP CP	(rom: 0.00 0.00	To: 1.20 15.00	Start d 03-08- 03-08-	-17 03-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type: n/a n/a	Drill Bit: n/a n/a	Logged: 03-08-17 03-08-17	Logger: VS VS	Remarks SPT har	s: nmer ID: SI 3 E(r)% 75	mE: 620598.48 mN: 329046.06 mAOD: 20.65 Grid: OSGB
Backfill/ Instal'n	Water- strike	Legend	Level	Depth (thick-			Stratum	Description					Samples	& In Situ Te	esting
8 E	≥ <u>p</u>			ness)	Dark brown sl	iahtly a	ravelly sandy C	I AV Gravel o	of subangu	lar to	Water	r Casing	Depth	Type & No	Results/Remarks
			20.25	(0.40) 0.40 (0.60)	subrounded fi	ne to m	nedium flint. Fre	equent rootlets		idi to			0.50 0.50	D1 ES1	
			19.65	1.00 - (0.50)	Dark orangish		slightly clayey	fine to mediur	m SAND.				1.00 1.00	D2 ES2	
			19.15	1.50 -	-	e dark	orangish brown	fine to coarse	e SAND.		Dry		1.50 1.50 1.50 - 1.95	S ES3 D3	N=18 (2,4/4,5,4,5)
				(1.00) -	- - - - -								2.00	ES4	
		× × × × × × × × × × × × × × × × × × ×	18.15	2.50 -		angular	orangish brown to subrounded			rse SAND.	Dry	2.50	2.50 2.50 - 2.95	S D4	N=22 (3,4/5,5,6,6)
		*. * .* *	17.15	3.50 -	Medium dens (BRICKEART		orangish brown	fine to coarse	e SAND.		Dry	3.50	3.50 3.50 - 3.95	S D5	N=27 (2,4/6,6,7,8)
	•		16.15	4.50 -	-Dense dark o	rangish	brown gravelly	slightly clave	v fine to co	arse SAND	Dry	4.50	4.50	C	N=30 (4,5/7,7,8,8)
				(1.00)		angular	to subrounded						4.50 - 4.95	B1	
	\Box	×× ×× ×× ××	15.15	5.50 -	subangular to	subrou	brown gravelly unded fine to co FORMATION)		oarse SAN	D. Gravel of	Dry	5.50	5.50 5.50 - 5.95	C B2	N=35 (4,6/7,8,10,10)
		* * * * * * * * * * * * * * * * * * *	13.65	(1.50) - 7.00 -						O AND	Dry	7.00	7.00	S	N=47 (3,5/7,10,12,18)
		× · · · · · · · · · · · · · · · · · · ·		-	Gravel of sub	angular	brown slightly to subrounded FORMATION)			se sand.			7.00 - 7.45	D6	
		× × × × × × × × × × × × × × × × × × ×		(3.80)							- Dry	8.50	8.50 8.50 - 8.95	S D7	N=40 (4,6/7,9,10,14)
		X, X X, X X, X X, X X, X		-	-						- - - - - - - - - - - - - - - - - - -	10.00	10.00	s	N=48 (3.5/9.10.14.15)
Gro	Inst Indw	ater e	ntries:		Diameter	& casi	ng:	Depth relate	d remarks	<u> </u>	Water		10.00 Depth Chiselling deta	Type & No	Results
Stru 6.		Rose to 4.40	o: Casin 6.0	•	led: Dia (mm) 15		h: Casing: 4.80 14.80	From: To):	Rema	rks:		From: to:	Duratio	on: Tool:
AG Log Scal	abbr All de	eviations se epths and r	anation of symi te Key Sheet. educed levels a FINAL 1:50	pols and are in metres.	Project: Project No Client:	o: 3318	Anglia (North) 3) Ltd	Offshore Wind	d Farm			E	Exploratory pos		C5-02 Sheet 1 of 2



Bor	ehol	e for	mation	details	s:								_			Location details:
Type IP CP		rom: 0.00 0.00	To: 1.20 15.00	Start di 03-08- 03-08-	-17	End date: 03-08-17 03-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type n/a n/a	e: Drill Bit: n/a n/a	Logged: 03-08-17 03-08-17	Logger: VS VS	Remarks SPT har	s: mmer ID: SI 3 E(r)% 75	mE: 620598.48 mN: 329046.06 mAOD: 20.65 Grid: OSGB
kfil/ al'n	ke r	pua	Lovel	Depth				Stratum	Description					Samples	& In Situ Te	
Bacl	Wal	Leg .	Level	ness)								Wate	er Casing		Type & No	Results/Remarks
Backfill Install	Water-strike and the strike and the		9.85	Depth (thick-	Den: Grav (WR	se dark or vel of suba OXHAM (se dark br to mediun OXHAM (ctureless ty SILT. G	cangish angular CRAG I cownish in flint. CRAG I		Description gravelly silty fine to coan ravelly fine t	lightly grave sity, subango coarse blad	se SAND. ND. Gravel	Wate	er Casing	Samples	& In Situ Te	mAOD: 20.65 Grid: OSGB
												1				
				-	-											
]]				
				-	-							-				
]]				
Gra	Inst	later o	entries:		1	Diameter	& caci	na.	Denth roles	ted remarks		Wate		Depth Chiselling deta	Type & No	Results
			o: Casin	ıg: Seal	_	Dia (mm)				To:	Rema	arks:		From: to:	Duratio	on: Tool:
	■ Note	es: For exp	lanation of symbol	hols and			·		Offshore Mar	ind Form			F	Evolorotor: 2	sition refer-	once.
AG Log Scal	All d	reviations se lepths and r	ee Key Sheet. educed levels a FINAL 1:50	are in metres.	F	Project: Project No Client:			Olishore Wi	ınu ram				Exploratory pos BH		C5-02 Sheet 2 of 2

TerraConsult

Во	reh	ole for	mation				Plant:	Barrel type:	Drill Bit:						Location details:
Typ IF CF	·	From: 0.00 0.00	To: 1.20 15.00	Start da 31-07- 31-07-	17 31-07-17	Remarks	s: mmer ID: SI 3 E(r	75 75	mE: 620770.38 mN: 329039.70 mAOD: 20.70 Grid: OSGB						
Backfill/ Instal'n	Water-	strike	Level	Depth (thick-			Stratum	Description	•				Samples	& In Situ Te	esting
Bac	Wa	St. St.	Level	ness)				•			Water	Casing	Depth	Type & No	Results/Remarks
			20.30	(0.40) 0.40 (0.50) 0.90	subangular to (TOPSOIL) Soft dark brown to subrounder (BRICKEART Soft dark oran	vn sligh d fine to H)	tly gravelly slig inded fine to co tly gravelly slig o coarse flint an own slightly silt	htly sandy CL d chalk.	quent rootle	ets. is subangu	-		0.50 0.50	D1 ES1	
				(0.90)	is subangular (BRICKEART		ounded fine to	coarse flint.			- Dry		1.00 1.50 1.50	C ES3	N=14 (3,3/4,4,3,3)
			18.90	1.80	Firm dark ora brown fine to (BRICKEART	medium	rown CLAY. Oc 1 SAND.	casional lense	es of dark o	rangish			1.50 - 1.95 2.00	B1 ES4	
			17.70	(1.20)	Madium dana	0.0000	- Dry	2.50	2.50 2.50 - 2.95	S D3	N=10 (1,2/2,2,3,3)				
		X X X X X X X X X X X X X X X X X X X		Medium dense orangish brown silty medium to coarse SAND. Rare gravel of subangular to subrounded fine to coarse flint. (BRICKEARTH) Dry 3.50 3.50 3.50 3.50 3.50											N=11 (1,1/2,3,3,3)
		X X X X X X X X X X		(3.50) Dry 4.50 4.50 4.50 4.50 -4.95										S D5	N=16 (2,2/3,4,4,5)
		X X X X X X X X X X X X X X X X X X X		- - - - -							- Dry	5.50	5.50 5.50 - 5.95	S D6	N=18 (1,2/3,4,5,6)
			14.20	6.50 -	Firm locally so stained reddis (BRICKEART	sh brow	stiff orangish br n.	own very sand	dy CLAY. C	ocasionally	Dry	7.00	7.00 7.00 - 7.45	S D7	N=19 (1,3/3,4,5,7)
(4.80)										- Dry	8.50	8.50 8.50 - 8.95	S D8	N=14 (2,2/3,3,4,4)	
				- - - - -											
	In		m4v!		Diament	0'		Danth well-t	d uar		Dry Water		10.00 Depth	Type & No	N=23 (3,4/4,5,7,7) Results
Str	uck: .00	5.10	o: Casin)	Diameter ed: Dia (mm) 15	: Deptl 0 14	h: Casing: 4.50 14.50	Prom: To	i:	Rema	rks:		Chiselling deta From: to:	Duratio	
AC Log Sca	issi	bbreviations so Ill depths and r	lanation of symble Key Sheet. educed levels at FINAL 1:50		Project: Project No Client:			Offshore Wind	d Farm			E	Exploratory pos		C5-03 Sheet 1 of 2



Bor	ehol	e for	mation	details	:							_			Location details:
Type IP CP		rom: 0.00 0.00	To: 1.20 15.00	Start da 31-07- 31-07-	17 31-07-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type: n/a n/a	Drill Bit: n/a n/a	Logged: 31-07-17 31-07-17	Logger: VS VS	Remarks SPT har	s: mmer ID: SI 3 E(r)	% 75	mE: 620770.38 mN: 329039.70 mAOD: 20.70 Grid: OSGB
kfill/	ter- ike	end	Level	Depth (thick-	'		Stratum	Description	1			•	Samples	& In Situ To	esting
Bac	Wa	Leg	Level	ness)				-			Wate	er Casing		Type & No	Results/Remarks
Backfill install insta	Water-	Pue6e-1	9.40 8.50	(thick- ness)	stained reddis (BRICKEART) Dense dark of Gravel of sub- (WROXHAM) Structureless sandy SILT. G	rangish rangular CRAG CHALk ravel o	stiff orangish br	gravelly silty fine to medi white grey sli nedium dens e medium to	fine to coar um flint ghtly grave ity, subang coarse blac	se SAND.			•	ı	
	ck: F	Rose to	entries: D: Casin Bianation of symbol se Key Sheet. Excluded levels accuded levels according to the level according to	g: Seale	Project:	: Dept	h: Casing:		ō:	: Rema	Wate		Depth Chiselling deta From: to:	Duration	ence:
	issue		FINAL 1:50	re in metres.	Project No Client:	o: 3318							BH	17-	C5-03 Sheet 2 of 2



Bor	ehol	le for	mation	details	s:										Location details:
Type IP CP		From: 0.00 0.00	To: 1.20 15.00	Start d 01-08- 01-08-	-17 01-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type: n/a n/a	Drill Bit: n/a n/a	Logged: 01-08-17 01-08-17	Logger: VS VS	Remarks SPT har	s: mmer ID: SI 3 E(r)% 75	mE: 620807.28 mN: 329057.98 mAOD: 20.98 Grid: OSGB
Backfill/ Instal'n	Water- strike	Legend	Level	Depth (thick-			Stratum	Description					Samples	& In Situ Te	esting
& <u>≅</u> /i	S ts	2		ness)	Soft dark orar	naish br	own slightly gra	·	sandy silty	CLAY Grav	Wate	r Casing	Depth	Type & No	Results/Remarks
			20.58	(0.40) 0.40			ounded fine to				.]				
			20.50	(0.60)	Soft dark orar		own slightly sar		ravelly CLA	Y. Gravel is			0.50 0.50	D1 ES1	
			19.98	1.00 -	(GLAČIOFLU								1.00	D2	
		×.×	10.00	1.00	Medium dens (GLACIOFLU		ish brown silty EPOSITS)	fine to mediu	m SAND.				1.00	ES2	
		×××		-	- - -			1.50 -	2.50 m: Becom	es fine to coars	Dry		1.50 1.50	S ES3	N=15 (2,2/3,3,4,5)
		×××		(1.50)	1								1.50 - 1.95	D3	
		×.×		_	-						1		2.00	ES4	
		×××	18.48	2.50 -	Medium dens	e dark o	orangish brown	slightly silty	fine to coars	se SAND	Dry	2.50	2.50	S	N=21 (2,4/5,6,5,5)
		××				avel siz	zed pockets of o				1		2.50 - 2.95	D4	
		×.×.		(1.00) –	1		,				-				
		× × ×	17.48	3.50 -	Madium dana	o dork	arangiah brown	aliabth, aray	ally yamı ailt	v fine to	Dry	3.50	3.50	s	N=24 (2,3/4,6,7,7)
		××					orangish brown asional gravel s						3.50 - 3.95	D5	
		×××		-	(GLACIOFLU	VIAL D	EPOSITS)				-				
		×××		(2.00) -							Dry	4.50	4.50	S	N=19 (3,4/5,4,5,5)
	_	××		(2.00)]	4.50	4.50 - 4.95	D6	19 (3,4/3,4,5,5)
		×××		-	-						4				
		××			-										
		××	15.48	5.50 - (0.50)	Medium dens		orangish brown	silty fine to c	oarse SAN	D.	Dry	5.50	5.50 5.50 - 5.95	S D7	N=23 (2,33/4,6,6,7)
		××	14.98	6.00 -				voru gravalli	, ailty alayo	, fine to					
		× × ×				. Grave	orangish brown ll of subangular FPOSITS)				1				
		××		-		VII (L D	Li Gorio,				-				
		X		(1.70)							Dry	7.00	7.00	С	N=28 (4,4/5,7,7,9)
		× × × × × × × × × × × × × × × × × × ×			-						1 5.,	7.00	7.00 - 7.45	B1	10 20 (4,410,13,130)
		×		-	-						-				
		××	13.28	7.70	Medium dens (GLACIOFLU	e orang	ish brown sligh EPOSITS)	tly silty fine to	o coarse SA	ND.					
		× × ×		_	1		,				7				
		× ×		-							Dry	8.50	8.50	S	N=28 (2,4/5,6,8,9)
		××			-						1		8.50 - 8.95	D8	
		× × ×		-	- - -						-				
		××		-	- - -						1				
		××		(3.80)	- -						1				
·	Inst	x ×									Dry Water			Type & No	N=29 (3,5/6,7,7,9) Results
			ntries: o: Casin	g: Sea	Diameter led: Dia (mm)	: Deptl	h: Casing:	Depth relate From: T	o:	: Rema	rks:		Chiselling deta From: to:	ails: Duration	on: Tool:
6.0		4.90			15	0 14	4.50 14.50								
	Note	es: For expl	anation of symb	ools and	Project:	East	Anglia (North)	Offshore Win	d Farm			F	Exploratory pos	sition refere	ence:
AGS Log i			e Key Sheet. educed levels a	re in metres.	Project No	o: 3318	3								C5-04
Scal	۵.		1:50		Client:	GHE	LIU								Sheet 1 of 2



														Location details:	
Type: From: IP 0.00 CP 0.00		0.00	To: 1.20 15.00	Start da 01-08-1 01-08-1	17 01-08-17	Crew: MJ MJ	Plant: Hand tools Dando 2000	Barrel type: n/a n/a	Drill Bit: n/a n/a	Logged: 01-08-17 01-08-17	Logger: VS VS	Remarks: SPT hammer ID: SI 3 E(r)% 75			mE: 620807.28 mN: 329057.98 mAOD: 20.98 Grid: OSGB
Backfill/ Instal'n	Water- strike	Legend	Depth Level (thick- Stratum Description								Samples & In Situ Testing				
Ba Ins	WE							MID	Wate	r Casing		Type & No	Results/Remarks		
R8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			9.48 9.08	11.50 (0.40)	Dense dark gi subangular to (WROXHAM Structureless sandy SILT. G	reyish t subrou CRAG CHALk iravel o	jish brown sligh	silty fine to co arse flint. white grey slinedium dens e medium to	parse SAND ightly grave ity, subang coarse blac). Gravel of lly slightly ular to		11.50	11.50 11.50 - 11.95 12.00 - 12.50 13.00 13.00 - 13.45	Type & No D9 C B2 B3 S D10	N=35 (5,7/8,10,9,8) N=16 (1,3/4,5,4,3) N=18 (2,3/3,3,5,7)
	ck: F	Rose to	lanation of sym	g: Seale	Project:	: Dept	h: Casing:		ō:	: Rema	Wate		Depth Chiselling deta From: to:	Duration	ence:
abbreviations see Key Sheet. Log issue: FINAL Scale: 1:50 ABBREVIATION See Key Sheet. Log issue: FINAL Scale: 1:50													BH	17-	C5-04 Sheet 2 of 2

APPENDIX B Photographs

November 2017 Report No 3318-R004

BH17-C4-01



0.50 m



2.50 m



4.50 m



6.00 m



8.50 m



16.00 m

BH17-C4-02



0.50 m



2.50 m



3.50 m



6.60 m



11.50 m



19.00 m

BH17-C4-03



0.50 m



2.50 m



3.50 m



4.50 m



8.50 m



19.00 m

BH17-C4-04



0.50 m



1.00 m



2.50 m



4.50 m



14.50 m



19.00 m

<u>C5-01</u>



2.50 m



8.50 m



11.50 m



13.00 m

<u>C5-02</u>



1.50 m



4.50 m



11.50 m



13.00 m

C5-03



0.50 m



1.00 m and flint cobble



2.50 m



5.50 m



14.50 m

<u>C5-04</u>



1.00 m



5.50 m



10.00 m



12.00 m

APPENDIX C In Situ Testing Results

Variable head permeability test

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Variable Head Permeability Test Results

Bottom of Response Zone

TerraConsult

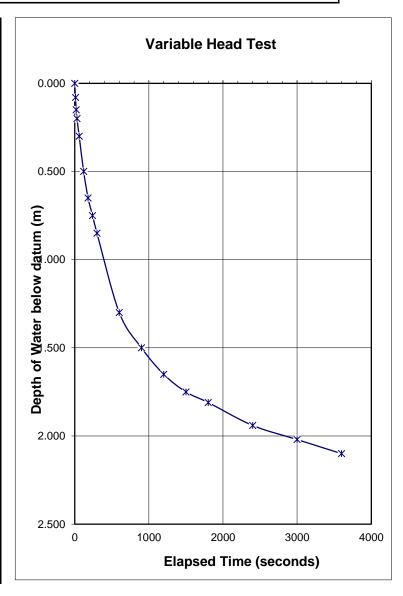
Static water level (m)
Internal Diameter (D)
Length of Standpipe below Ground Level (m)
Height of Water above Ground Level (m)
Length of Standpipe above Ground Level (m)
Water level at start of test (m)
Top of Response Zone

5.00	
0.15	
0.00	
0.00	
0.00	
0.00	
6.00	
7.00	

	Test 1
Time (t0)	0
Time (t)	3600
Head of Water	
Initial Head (h0) at (t0)	7.00
Final Head (h(t)) at (t)	4.90
Length of Response Zone (L)	1.00
Cross Sectional Area (S)	0.0177

Description

Description		
Elapsed	Water	Head of
Time	below	Water
(seconds)	Datum	vvalei
0	0.000	7.00
10	0.080	6.92
20	0.150	6.85
30	0.200	6.80
60	0.300	6.70
120	0.500	6.50
180	0.650	6.35
240	0.750	6.25
300	0.850	6.15
600	1.300	5.70
900	1.500	5.50
1200	1.650	5.35
1500	1.750	5.25
1800	1.810	5.19
2400	1.940	5.06
3000	2.020	4.98
3600	2.100	4.90



Shape Factor (F) calculated according to ISO 22282-1:2012

Equation for borehole permeability tests after BS EN ISO 22282-2:2012

$$F = \frac{2\pi L}{\ln\left\{ (L/D) + \sqrt{\left((L/D)^2 + 1 \right)} \right\}}$$
$$= \frac{6.28}{2.59}$$

2.43

$$k = \frac{S \ln \left(h_0/h(t)\right)}{F(t - t_0)}$$

k = 7.22E-07 m/s

Calculated by: JMT Project: East Anglia (North) Offshore Wind Farm Project No: 3318

Exploratory position reference:

Checked by: DD

Client:

Client: GHD

BH17-C5-04

APPENDIX D Instrumentation Sampling and Monitoring Records

November 2017 Report No 3318-R004

TerraConsult No: 3318 **GROUNDWATER AND GROUND GAS MONITORING East Anglia OWF** Site: GROUND GAS AND GROUNDWATER MONITORING DATA Well Details Groundwater Weather Monitored Water Water Atmospher Relative GSV GSV Ambient Standpipe Depth to Water Atmospher Location Date Flow CO_2 CO H2S VOC ic Pressure ic Pressure by diameter Depth Sample Odour Colour CH₄ CO₂ Conditions Temp Base Temp Pressure (% v/v) (% v/v) (% v/v) (ppm) (ppm) (ppm) (mm) (m bgl) (m bgl) Taken? (mbar) Comment (l/hr) (l/hr) °C 22/08/17 VS 51 14.05 1.52 1018 NM 0.0 0.0 0.0 0.0000 0.1 0.0000 20.9 0 NM Sunny, dry 20 BH17-C4-01 31/08/17 VS 51 13.77 1.55 Ν 1015 NM 0.0 0.0 0.0 0.0000 0.0 0.0000 21.1 NM 19 0 Sunny, dry Showers 14/09/17 VS 51 13.74 1.54 Ν 1004 NM 0.0 0.0 0.0 0.0000 0.3 0.0000 20.7 0 0 NM 15 22/08/17 VS 51 NM 0.0000 0.0000 20.7 NM 20 13.94 1.22 1019 0.0 0.0 0.0 0.1 0 Sunny, dry BH17-C4-03 31/08/17 NM NM VS 51 13.57 1.21 Ν 1016 0.0 0.0 0.0 0.0000 0.1 0.0000 20.6 0 0 Sunny, dry 19 14/09/17 VS 51 13.60 1.20 N 1004 NM 0.0 0.0 0.0 0.0000 0.1 0.0000 20.7 0 0 NM Showers 15 11/08/17 KW 51 11.01 5.72 1016 NM 0.0 0.0 0.0 0.0000 2.8 0.0000 17.8 0 0 NM Sunny, dry 21 22/08/17 VS 51 10.90 5.73 Ν 1017 NM 0.0 0.0 0.0 0.0000 2.3 0.0000 18.9 0 0 NM 20 Sunny, dry BH17-C5-01 31/08/17 VS 51 10.88 5.77 N 1015 NM 0.0 0.0 0.0 0.0000 1.0 0.0000 19.8 0 NM 18 0 Sunny, dry 14/09/17 VS 51 10.88 5.78 Ν 1005 NM 0.0 0.0 0.0 0.0000 1.4 0.0000 20.3 0 0 NM Showers 15 11/08/17 KW 5.30 1016 NM 0.0 0.0000 0.0000 NM 51 12.38 Υ 0.0 0.0 1.3 17.5 0 0 Sunny, dry 21 51 1017 NM 17.9 NM 20 22/08/17 VS 12.24 5.36 Ν 0.0 0.0 0.0 0.0000 1.6 0.0000 0 0 Sunny, dry BH17-C5-03 31/08/17 VS 51 12.09 5.38 N 1015 NM 0.0 0.3 20.6 NM 18 0.0 0.0 0.0000 0.0000 0 0 Sunny, dry 14/09/17 NM NM VS 51 9.91 5.42 N 1003 0.0 0.0 0.0 0.0000 0.1 0.0000 21 0 0 Showers 15

APPENDIX E Geotechnical Laboratory Test Results

Report References: GSTL 35625

CLS 684646

November 2017 Report No 3318-R004

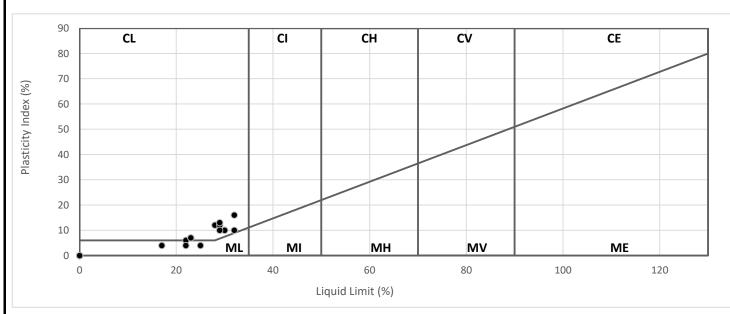
CSTI	LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX	
GOIL	(BS 1377 : Part 2 : 1990 Method 5)	
Contract Number	36525	
Site Name	E Anglia Wind Farm - Cable Route	

Hole Reference	Sample Number	Sample Type	D	epth (ı	m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing .425mm %	Remarks
BH17-C4-03	2	D	1.00	-		24	29	17	12	100	CL Low Plasticity
BH17-C4-04	4	D	2.50	-	2.95	24	30	20	10	100	CL Low Plasticity
BH17-C5-03	2	D	1.00	-		10	17	13	4	81	ML Low Plasticity
BH17-C5-03	7	D	7.00	-	7.45	17		NP		95	
				-							
				-							
				-							
				-							
				-							
				-							
Complete ND No. D		# - 1 ii-1 i		-							

Symbols: NP : Non Plastic

#: Liquid Limit and Plastic Limit Wet Sieved

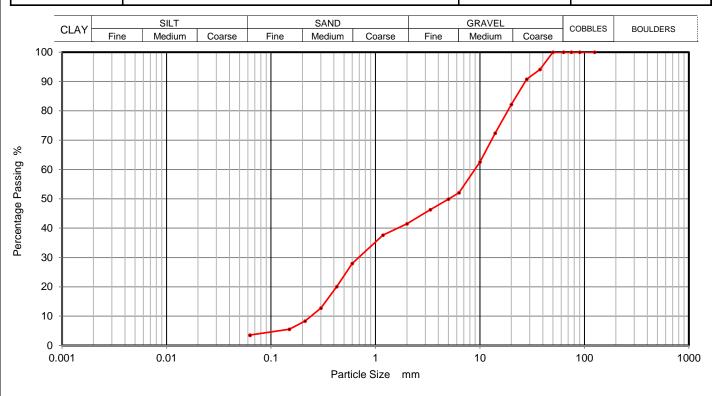
PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION BS 5930:1999+A2:2010



Operators	Checked	20/09/2017	Sean Penn
DB	Approved	21/09/2017	Ben Sharp



CCTI	PARTICLE SIZE DISTRIBUTION	Contract Number	36525
GOIL	BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Borehole/Pit No.	BH17-C4-01
Site Name	E Anglia Wind Farm - Cable Route	Sample No.	1
Soil Description	Brown slightly silty fine to coarse sandy fine to coarse GRAVEL	Depth Top	4.50
	Blown slightly slity line to coarse sailuy line to coarse GNAVLL	Depth Base	4.95
		Sample Type	В



Sie	ving	Sedime	entation
Particle Size	% Passing	Particle Size	% Passing
mm	% Fassing	mm	% Fassing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	94		
28	91		
20	82		
14	72		
10	63		
6.3	52		
5	50		
3.35	46		
2	41		
1.18	38		
0.6	28		
0.425	20		
0.3	13		
0.212	8		
0.15	6		
0.063	4		

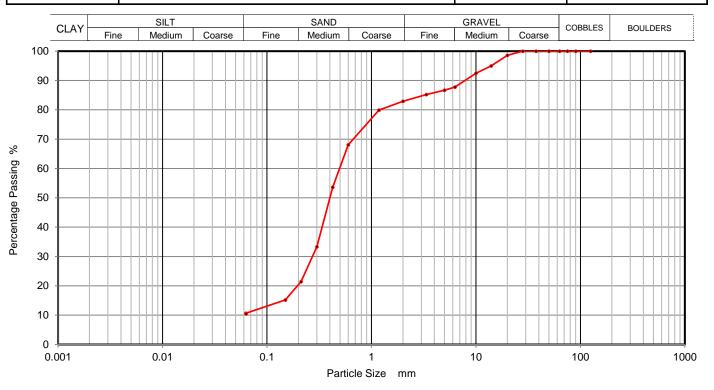
Sample Proportions	% dry mass
Cobbles	0
Gravel	59
Sand	37
Silt and Clay	4
·	

Grading Analysis	
Uniformity Coefficient	

Operators	Checked	20/09/2017	Sean Penn	
RO/MH	Approved	21/09/2017	Ben Sharp	



CCTI	PARTICLE SIZE DISTRIBUTION	Contract Number	36525
GOIL	BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Borehole/Pit No.	BH17-C4-02
Site Name	E Anglia Wind Farm - Cable Route	Sample No.	2
Soil Description	Day of the land of the Control of th	Depth Top	2.50
	Brown slightly clayey silty fine to coarse gravelly fine to coarse SAND	Depth Base	2.95
		Sample Type	В



Siev	ving	Sedime	entation
Particle Size	% Passing	Particle Size	% Passing
mm	70 Fassing	mm	/0 Fassing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	95		
10	92		
6.3	88		
5	87		
3.35	85		
2	83		
1.18	80		
0.6	68		
0.425	54		
0.3	33		
0.212	21		
0.15	15		
0.063	11		

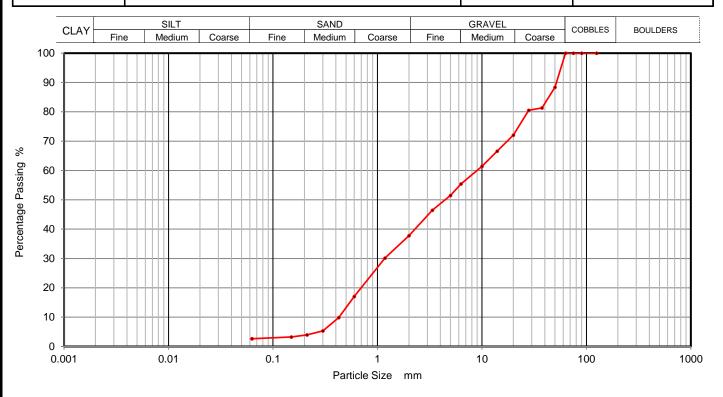
Sample Proportions	% dry mass
Cobbles	0
Gravel	17
Sand	72
Silt and Clay	11

Grading Analysis	
Uniformity Coefficient	

Operators	Checked	20/09/2017	Sean Penn	
RO/MH	Approved	21/09/2017	Ben Sharp	



CCTI	PARTICLE SIZE DISTRIBUTION	Contract Number	36525
GOIL	BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Borehole/Pit No.	BH17-C4-02
Site Name	E Anglia Wind Farm - Cable Route	Sample No.	5
Soil Description	Durante di abble a ille fina ta cassa cande fina ta cassa CDAVEL	Depth Top	5.50
	Brown slightly silty fine to coarse sandy fine to coarse GRAVEL	Depth Base	5.95
		Sample Type	В



Siev	ving	Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	88		
37.5	81		
28	81		
20	72		
14	67		
10	61		
6.3	55		
5	51		
3.35	46		
2	38		
1.18	30		
0.6	17		
0.425	10		
0.3	5		_
0.212	4		
0.15	3		
0.063	3		

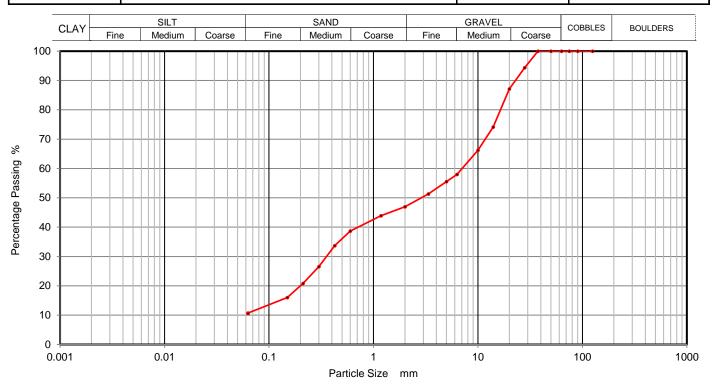
Sample Proportions	% dry mass
Cobbles	0
Gravel	62
Sand	35
Silt and Clay	3

Grading Analysis	
Uniformity Coefficient	

Operators	Checked	20/09/2017	Sean Penn	
RO/MH	Approved	21/09/2017	Ben Sharp	



CCTI	PARTICLE SIZE DISTRIBUTION	Contract Number	36525
GOIL	BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Borehole/Pit No.	BH17-C4-03
Site Name	E Anglia Wind Farm - Cable Route	Sample No.	1
Soil Description	Brown silty fine to coarse sandy fine to coarse GRAVEL	Depth Top	3.50
		Depth Base	3.95
		Sample Type	В



Siev	ving	Sedime	entation
Particle Size	% Passing	Particle Size	% Passing
mm	70 1 assing	mm	70 1 assing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	94		
20	87		
14	74		
10	66		
6.3	58		
5	56		
3.35	51		
2	47		
1.18	44		
0.6	39		
0.425	34		
0.3	27		
0.212	21		
0.15	16		
0.063	11		

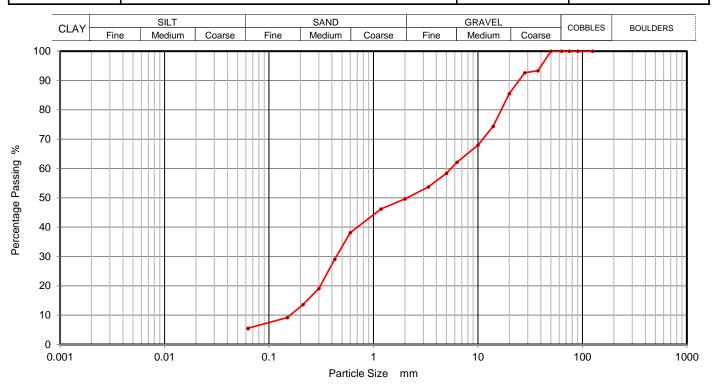
Sample Proportions	% dry mass
Cobbles	0
Gravel	53
Sand	36
Silt and Clay	11

Grading Analysis	
Uniformity Coefficient	

Operators	Checked	20/09/2017	Sean Penn
RO/MH	Approved	21/09/2017	Ben Sharp



CCTI	PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Contract Number	36525
GJIL		Borehole/Pit No.	BH17-C5-01
Site Name	E Anglia Wind Farm - Cable Route	Sample No.	1
Soil Description	Brown slightly silty fine to coarse sandy fine to coarse GRAVEL -	Depth Top	4.50
		Depth Base	4.95
		Sample Type	В



Sieving		Sedimentation	
Particle Size	% Passing	Particle Size	% Passing
mm	70 1 assing	mm	70 1 assing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	93		
28	93		
20	86		
14	74		
10	68		
6.3	62		
5	58		
3.35	54		
2	50		
1.18	46		
0.6	38		
0.425	29		
0.3	19		
0.212	14		
0.15	9		
0.063	6		

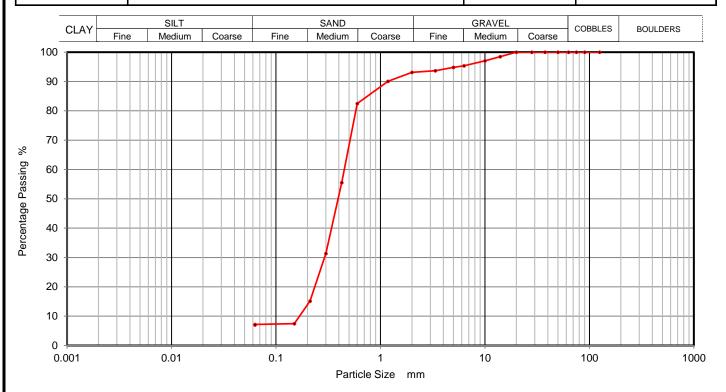
Sample Proportions	% dry mass	
Cobbles	0	
Gravel	50	
Sand	44	
Silt and Clay	6	

Grading Analysis	
Uniformity Coefficient	

Operators	Checked	20/09/2017	Sean Penn	
RO/MH	Approved	21/09/2017	Ben Sharp	



CCTI	PARTICLE SIZE DISTRIBUTION		36525
GJIL	BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Borehole/Pit No.	BH17-C5-02
Site Name	E Anglia Wind Farm - Cable Route		4
Soil Description	Brown slightly fine to medium gravelly slightly silty fine to coarse	Depth Top	2.50
	SAND		2.95
		Sample Type	D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	98		
10	97		
6.3	95		
5	95		
3.35	94		
2	93		
1.18	90		
0.6	82		
0.425	56		
0.3	31		
0.212	15		
0.15	7		
0.063	7		

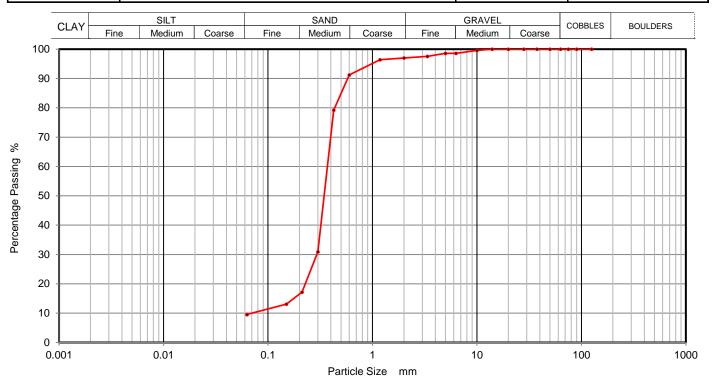
Sample Proportions	% dry mass	
Cobbles	0	
Gravel	7	
Sand	86	
Silt and Clay	7	

Grading Analysis	
Uniformity Coefficient	

Operators	Checked	20/09/2017	Sean Penn
RO/MH	Approved	21/09/2017	Ben Sharp



CCTI	PARTICLE SIZE DISTRIBUTION		36525
GSIL	BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Borehole/Pit No.	BH17-C5-02
Site Name	E Anglia Wind Farm - Cable Route	Sample No.	7
Soil Description	Decree State Control of the Control	Depth Top	8.50
	Brown slightly fine to medium gravelly silty fine to coarse SAND	Depth Base	8.95
		Sample Type	D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	98		
2	97		
1.18	96		
0.6	91		
0.425	79		
0.3	31		
0.212	17		
0.15	13		
0.063	10		

Sample Proportions	% dry mass	
Cobbles	0	
Gravel	3	
Sand	87	
Silt and Clay	10	

Grading Analysis	
Uniformity Coefficient	

Operators	Checked	20/09/2017	Sean Penn
RO/MH	Approved	21/09/2017	Ben Sharp



CCTI	PARTICLE SIZE DISTRIBUTION		36525
GOIL	BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Borehole/Pit No.	BH17-C5-04
Site Name	E Anglia Wind Farm - Cable Route	Sample No.	5
Soil Description		Depth Top	3.50
	Brown slightly fine gravelly silty fine to coarse SAND		3.95
		Sample Type	D



Sieving		Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	98		
0.425	96		
0.3	83		
0.212	62		
0.15	42		
0.063	22		

Sample Proportions	% dry mass	
Cobbles	0	
Gravel	1	
Sand	77	
Silt and Clay	22	

Grading Analysis	
Uniformity Coefficient	

Operators	Checked	20/09/2017	Sean Penn
RO/MH	Approved	21/09/2017	Ben Sharp





Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences Certificate of Analysis

3 Crittall Drive Springwood Industrial Estate Braintree Essex CM7 2RT

Tel: 01376 560120 Fax: 01376 552923

Report Number: Supplement 1D to Report Number

684646-1

Date of Report: 23-Oct-2017

Customer: TerraConsult (South) Limited

Suite F17 Dugard House

Peartree Road Colchester Essex CO3 0UL

Customer Contact: Victoria Smith

Customer Job Reference:

Customer Site Reference: Happisburgh/East Anglia

Date Job Received at Concept: 05-Sep-2017
Date Analysis Started: 26-Sep-2017
Date Analysis Completed: 29-Sep-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs
All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical
Services Quality Manual





Report checked and authorised by : Chelsea Entwistle Senior Customer Service Advisor Issued by : Aislinn Arthey Customer Service Adv



Project Site: Happisburgh/East Anglia

Customer Reference:

Soil

BRE SD1 (SE)

Analysed as Soil

						1
	684646 006	684646 007				
	17-C4-04 D3 @ 1.50-1.95m	17-C5-04 D3 @ 1.50-1.95m				
			D	ate Sampled	Deviating	Deviating
				Matrix Class	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units		
(Water soluble) Ammonia expressed as NH4	T710	AR	0.01	g/l	<0.01	<0.01
(Water soluble) CI-	T710	A40	0.01	g/l	<0.01	<0.01
Magnesium	T112	A40	1	mg/l	3	<1
(Water soluble) NO3	T710	A40	0.01	g/l	<0.01	<0.01
pH	T7	A40			7.7	8.3
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	0.05	0.02
SO4(Total)	T102	A40	0.02	%	0.02	<0.02
Sulphur (total)	T6	A40	0.01	%	0.02	<0.01
Moisture @105C	T162	AR	0.1	%	21	17
Retained on 2mm	T2	A40	0.1	%	0.5	<0.1

Index to symbols used in Supplement 1D to Report Number 684646-1

Value	Description
A40	Assisted dried < 40C
AR	As Received
М	Analysis is MCERTS accredited
N	Analysis is not UKAS accredited

Notes

Retained on 2mm is removed before analysis

The date of sampling has not been provided and therefore the time from sampling to analysis is unknown. It is possible therefore that the results provided may be compromised

Supplement 1D Report reissued to include only samples 006 and 007

Method Index

Value	Description
T2	Grav
T7	Probe
T112	ICP/OES (SIM)(Water Extract)
T6	ICP/OES
T102	ICP/OES (HCI extract)
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T162	Grav (1 Dec) (105 C)
T710	2:1 Extraction / Discrete Analyser

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
(Water soluble) Ammonia expressed as NH4	T710	AR	0.01	g/l	N	006-007
(Water soluble) CI-	T710	A40	0.01	g/l	N	006-007
Magnesium	T112	A40	1	mg/l	N	006-007
(Water soluble) NO3	T710	A40	0.01	g/l	N	006-007
рН	T7	A40			М	006-007
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	М	006-007
SO4(Total)	T102	A40	0.02	%	М	006-007
Sulphur (total)	T6	A40	0.01	%	М	006-007
Moisture @105C	T162	AR	0.1	%	N	006-007
Retained on 2mm	T2	A40	0.1	%	N	006-007

APPENDIX F Geoenvironmental Laboratory Test Results

Report References: 674086

675010

675177

677813

677853

November 2017 Report No 3318-R004



Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences Certificate of Analysis

3 Crittall Drive Springwood Industrial Estate Braintree Essex CM7 2RT

Tel: 01376 560120 Fax: 01376 552923

Report Number: Supplement 1D to Report Number

677813-1

Date of Report: 23-Oct-2017

Customer: TerraConsult Limited

Unit 34

Bold Business Centre

Bold Lane Sutton St Helens WA9 4TX

Customer Contact: Mr Jimmy Thorburn

Customer Job Reference: 3318

Customer Purchase Order: PO-001839

Customer Site Reference: Norfolk Vanguard Cable Route

Date Job Received at Concept: 31-Jul-2017
Date Analysis Started: 29-Aug-2017
Date Analysis Completed: 12-Sep-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs
All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical
Services Quality Manual





Report checked and authorised by : Chelsea Entwistle Senior Customer Service Advisor Issued by : Aislinn Arthey Customer Service Adv



Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Miscellaneous

			Conce	ot Reference	677813 010	677813 022	677813 030	677813 034
	Customer Sample Reference					BH17-C4-02 ES2 @ 1.00m	BH17-C4-04 ES2 @ 1.00m	BH17-C4-01 ES2 @ 1.00m
			D	ate Sampled	04-AUG-2017	11-AUG-2017	08-AUG-2017	09-AUG-2017
				Matrix Class	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units				
Arsenic	T257	A40	2	mg/kg	7	6	7	6
Barium	T257	A40	2	mg/kg	34	19	20	27
Beryllium	T245	A40	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5
Boron (water-soluble)	T82	A40	1	mg/kg	<1	<1	<1	<1
Cadmium	T257	A40	0.1	mg/kg	<0.1	<0.1	0.1	<0.1
Chromium	T257	A40	0.5	mg/kg	8.9	14	6.5	14
Copper	T257	A40	2	mg/kg	4	5	4	5
Lead	T257	A40	2	mg/kg	9	7	75	13
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	4.8	7.7	4.3	8.0
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3
Vanadium	T257	A40	0.1	mg/kg	12	20	12	21
Zinc	T257	A40	2	mg/kg	9	21	18	23
Moisture @105C	T162	AR	0.1	%	13	8.9	7.6	12
Retained on 2mm	T2	A40	0.1	%	3.7	28.1	3.8	<0.1

Concept Reference: 677813

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Asbestos

			677813 009	677813 021		
		Custon	BH17-C4-03 ES1 @ 0.50m	BH17-C4-02 ES1 @ 0.50m		
			D	ate Sampled	04-AUG-2017	11-AUG-2017
Determinand	Method	Test Sample	LOD	Units	L.G.	
Asbestos ID	T27	A40	Asbestos not detected	Asbestos not detected		

Concept Reference: 677813

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Soil Organic Matter

			677813 010	677813 022		
		Custor	BH17-C4-03 ES2 @ 1.00m	BH17-C4-02 ES2 @ 1.00m		
			04-AUG-2017	11-AUG-2017		
				Matrix Class	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample				
Soil Organic Matter	ganic Matter T287 A40 0.1 %					1.0

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

TPH CWG

		677813 010	677813 022			
		BH17-C4-03 ES2 @ 1.00m	BH17-C4-02 ES2 @ 1.00m			
			Da	ate Sampled	04-AUG-2017	11-AUG-2017
			ı	Matrix Class	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units		
Benzene	T209	AR	10	μg/kg	<10	<10
Toluene	T209	AR	10	μg/kg	<10	<10
EthylBenzene	T209	AR	10	μg/kg	<10	<10
M/P Xylene	T209	AR	10	μg/kg	<10	<10
O Xylene	T209	AR	10	μg/kg	<10	<10
Methyl tert-Butyl Ether	T54	AR	1	μg/kg	3	3
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	<2	<2
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	<2	<2
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	<2	<2
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	<2	<2
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	<2	<2
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	<2	<2
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	3	<2
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	6	<2
TPH (C35-C40 aliphatic)	T219	AR	2	mg/kg	<2	<2
TPH (C35-C40 aromatic)	T219	AR	2	mg/kg	<2	<2

Concept Reference: 677813

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Organochlorine insecticides

			Conce	ot Reference	677813 010	677813 022
		BH17-C4-03 ES2 @ 1.00m	BH17-C4-02 ES2 @ 1.00m			
			D	ate Sampled	04-AUG-2017	11-AUG-2017
				Matrix Class	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units	2014	
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	<0.01	<0.01
Hexachlorobenzene	T1	AR	0.01	mg/kg	<0.01	<0.01
Heptachlor	T16	AR	0.01	mg/kg	<0.01	<0.01
Aldrin	T16	AR	0.01	mg/kg	<0.01	<0.01
Heptachlor epoxide	T16	AR	0.01	mg/kg	<0.01	<0.01
Chlordane	T16	AR	0.01	mg/kg	<0.01	<0.01
Endosulphan	T16	AR	0.01	mg/kg	<0.01	<0.01
DDE	T16	AR	0.01	mg/kg	<0.01	<0.01
Dieldrin	T16	AR	0.01	mg/kg	<0.01	<0.01
Endrin	T16	AR	0.01	mg/kg	<0.01	<0.01
DDD	T16	AR	0.01	mg/kg	<0.01	<0.01
DDT	T16	AR	0.01	mg/kg	⁽¹³¹⁾ <0.01	⁽¹³¹⁾ <0.01

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Analysed as Soil

Organophosphorous insecticides

			Concep	t Reference	677813 010	677813 022
		Custon	BH17-C4-03 ES2 @ 1.00m	BH17-C4-02 ES2 @ 1.00m		
			D	ate Sampled	04-AUG-2017	11-AUG-2017
			Sandy Soil	Sandy Soil		
Determinand	Method	Test Sample	LOD	Units		
Dichlorvos	T16	AR	0.01	mg/kg	<0.01	<0.01
Mevinphos	T16	AR	0.01	mg/kg	<0.01	<0.01
Dimethoate	T16	AR	0.01	mg/kg	<0.01	<0.01
Diazinon	T16	AR	0.01	mg/kg	<0.01	<0.01
Pirimiphos methyl	T16	AR	0.01	mg/kg	(162) < 0.02	(162) < 0.02
Malathion	T16	AR	0.01	mg/kg	<0.01	<0.01
Fenitrothion	T16	AR	0.01	mg/kg	<0.01	<0.01
Parathion	T16	AR	0.01	mg/kg	<0.01	<0.01
Azinphos methyl	T16	AR	0.01	mg/kg	<0.01	<0.01

Concept Reference: 677813

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Triazines Suite

			677813 010	677813 022		
		Custon	BH17-C4-03 ES2 @ 1.00m	BH17-C4-02 ES2 @ 1.00m		
			Da	ate Sampled	04-AUG-2017	11-AUG-2017
		Sandy Soil	Sandy Soil			
Determinand	Method	Test Sample	LOD	Units	Same	
Simazine	T16	AR	0.01	mg/kg	⁽⁶⁴⁾ < 0.01	⁽⁶⁴⁾ <0.01
Atrazine	T16	AR	0.01	mg/kg	⁽⁶⁴⁾ < 0.01	⁽⁶⁴⁾ <0.01
Propazine	T16	AR	0.01	mg/kg	⁽⁶⁴⁾ < 0.01	(64) < 0.01
Trietazine	T16	AR	0.01	mg/kg	(64) < 0.01	⁽⁶⁴⁾ <0.01
Prometryn	T16	AR	0.01	mg/kg	⁽⁶⁴⁾ < 0.01	(64) < 0.01
Terbutryn	T16	AR	0.01	ma/ka	(64) < 0.01	(64) < 0.01

Concept Reference: 677813

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Urons

orono						
			677813 010	677813 022		
		Custon	BH17-C4-03 ES2 @ 1.00m	BH17-C4-02 ES2 @ 1.00m		
			04-AUG-2017	11-AUG-2017		
			Sandy Soil	Sandy Soil		
Determinand	Method	Test Sample	LOD	Units		
Chlorotoluron	T310	AR	0.01	mg/kg	<0.01	<0.01
Diuron	T310	AR	0.01	mg/kg	<0.01	<0.01
Isoproturon	T310	AR	0.01	mg/kg	<0.01	<0.01
Linuron	T310	AR	0.01	mg/kg	<0.01	<0.01
Monuron	T310	AR	0.01	mg/kg	<0.01	<0.01

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Phenoxy Acetic acid herbicides

	677813 010	677813 022				
	BH17-C4-03 ES2 @ 1.00m	BH17-C4-02 ES2 @ 1.00m				
			Da	ate Sampled	04-AUG-2017	11-AUG-2017
	Sandy Soil	Sandy Soil				
Determinand	Method	Test Sample	LOD	Units		
Mecoprop	T16	AR	0.01	mg/kg	(36) < 0.02	(36) < 0.02
Phenoxy Acetic acid herbicide: MCPA	T16	AR	0.01	mg/kg	(36) < 0.02	(36) < 0.02
Dichlorprop	T16	AR	0.01	mg/kg	(36) < 0.02	(36) < 0.02
Phenoxy Acetic acid herbicide: 2,4-D	T16	AR	0.01	mg/kg	(36) < 0.02	(36) < 0.02
Fenoprop	T16	AR	0.01	mg/kg	(36) < 0.02	(36) < 0.02
Phenoxy Acetic acid herbicide: 2,4,5-T	T16	AR	0.01	mg/kg	(36) < 0.02	(36) < 0.02

Concept Reference: 677813

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Phenols (Speciated)

			677813 010	677813 022			
		Custon	BH17-C4-03 ES2 @ 1.00m	BH17-C4-02 ES2 @ 1.00m			
				Date Sampled	04-AUG-2017	11-AUG-2017 Sandy Soil	
				Matrix Class	Sandy Soil		
Determinand	Method	Test Sample	LOD	Units			
Resorcinol	T17	AR	0.05	mg/kg	<0.05	<0.05	
Catechol	T17	AR	0.05	mg/kg	<0.05	<0.05	
Phenol	T17	AR	0.1	mg/kg	<0.1	<0.1	
Cresols	T17	AR	0.05	mg/kg	<0.05	<0.05	
Xylenols	T17	AR	0.05	mg/kg	<0.05	<0.05	
Naphthols	T17	AR	0.05	mg/kg	<0.05	<0.05	
Trimethyl phenol	T17	AR	0.05	mg/kg	<0.05	<0.05	
Total Phenols	T17	AR	0.1	ma/ka	<0.1	<0.1	

Index to symbols used in Supplement 1D to Report Number 677813-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
131	Result is outside of the scope of accreditation due to a QC Failure
36	LOD Raised due to low Matrix spike recovery
64	Analysis was performed by an alternative technique
162	LOD determined by matrix spike recovery
S	Analysis was subcontracted
М	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Urons and Triazines analysis transferred to Concept Life Sciences Cambridge
PAAH, OCP and OPP analysis transferred to Concept Life Sciences Manchester
BTEX: Samples submitted for GC/MS (Headspace) analysis were submitted in inappropriate containers. It is possible therefore that the results provided may be compromised.
Retained on 2mm is removed before analysis
Asbestos subcontracted to REC Limited
Phenols, OCP, OPP, BTEX/MTBE, and TPH: These samples have been analysed exceeding recommended holding times. It is possible therefore that the results provided may be compromised.
Reported results on as received samples are corrected to a 105 degree centigrade dry weight basis except OCP, OPP and PAAH
Supplement 1D report reissued to include only samples 009, 010, 021, 022, 030 and 034

Method Index

Value	Description
T257	ICP/OES (SIM) (Aqua Regia Extraction)
T82	ICP/OES (Sim)
T16	GC/MS
T209	GC/MS (Head Space)(MCERTS)
T287	Calc TOC/0.58
T27	PLM
T162	Grav (1 Dec) (105 C)
T245	ICP/OES (Aqua Regia Extraction)
T310	LC/MS/MS
T1	GC/MS (HR)
T2	Grav
T17	HPLC
T219	GC/FID (SE)
T54	GC/MS (Headspace)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Arsenic	T257	A40	2	mg/kg	М	010,022,030,034
Barium	T257	A40	2	mg/kg	U	010,022,030,034
Beryllium	T245	A40	0.5	mg/kg	U	010,022,030,034
Boron (water-soluble)	T82	A40	1	mg/kg	N	010,022,030,034
Cadmium	T257	A40	0.1	mg/kg	М	010,022,030,034
Chromium	T257	A40	0.5	mg/kg	М	010,022,030,034
Copper	T257	A40	2	mg/kg	М	010,022,030,034
Lead	T257	A40	2	mg/kg	М	010,022,030,034
Mercury	T245	A40	1.0	mg/kg	U	010,022,030,034
Nickel	T257	A40	0.5	mg/kg	М	010,022,030,034
Selenium	T257	A40	3	mg/kg	U	010,022,030,034
Vanadium	T257	A40	0.1	mg/kg	U	010,022,030,034
Zinc	T257	A40	2	mg/kg	М	010,022,030,034
Moisture @105C	T162	AR	0.1	%	N	010,022,030,034
Retained on 2mm	T2	A40	0.1	%	N	010,022,030,034
Asbestos ID	T27	A40			SU	009,021
Soil Organic Matter	T287	A40	0.1	%	N	010,022
Benzene	T209	AR	10	μg/kg	М	010,022
Toluene	T209	AR	10	μg/kg	М	010,022
EthylBenzene	T209	AR	10	μg/kg	М	010,022
M/P Xylene	T209	AR	10	μg/kg	М	010,022
O Xylene	T209	AR	10	μg/kg	М	010,022
Methyl tert-Butyl Ether	T54	AR	1	μg/kg	U	010,022
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	N	010,022
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	N	010,022
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	N	010,022
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	N	010,022
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	N	010,022
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	N	010,022
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	N	010,022
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	N	010,022
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	N	010,022
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	N	010,022
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	N	010,022
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	N	010,022
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	N	010,022
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	N	010,022
TPH (C35-C40 aliphatic)	T219	AR	2	mg/kg	N	010,022
TPH (C35-C40 aromatic)	T219	AR	2	mg/kg	N	010,022
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	U	010,022
Hexachlorobenzene	T1	AR	0.01	mg/kg	U	010,022
Heptachlor	T16	AR	0.01	mg/kg	U	010,022
Aldrin	T16	AR	0.01	mg/kg	U	010,022
Heptachlor epoxide	T16	AR	0.01	mg/kg	U	010,022
Chlordane	T16	AR	0.01	mg/kg	U	010,022
Endosulphan	T16	AR	0.01	mg/kg	U	010,022
DDE	T16	AR	0.01	mg/kg	U	010,022
Dieldrin	T16	AR	0.01	mg/kg	U	010,022

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Endrin	T16	AR	0.01	mg/kg	U	010,022
DDD	T16	AR	0.01	mg/kg	U	010,022
DDT	T16	AR	0.01	mg/kg	U	010,022
Dichlorvos	T16	AR	0.01	mg/kg	U	010,022
Mevinphos	T16	AR	0.01	mg/kg	U	010,022
Dimethoate	T16	AR	0.01	mg/kg	U	010,022
Diazinon	T16	AR	0.01	mg/kg	U	010,022
Pirimiphos methyl	T16	AR	0.01	mg/kg	U	010,022
Malathion	T16	AR	0.01	mg/kg	U	010,022
Fenitrothion	T16	AR	0.01	mg/kg	U	010,022
Parathion	T16	AR	0.01	mg/kg	U	010,022
Azinphos methyl	T16	AR	0.01	mg/kg	U	010,022
Simazine	T16	AR	0.01	mg/kg	N	010,022
Atrazine	T16	AR	0.01	mg/kg	N	010,022
Propazine	T16	AR	0.01	mg/kg	N	010,022
Trietazine	T16	AR	0.01	mg/kg	N	010,022
Prometryn	T16	AR	0.01	mg/kg	N	010,022
Terbutryn	T16	AR	0.01	mg/kg	N	010,022
Chlorotoluron	T310	AR	0.01	mg/kg	N	010,022
Diuron	T310	AR	0.01	mg/kg	N	010,022
Isoproturon	T310	AR	0.01	mg/kg	N	010,022
Linuron	T310	AR	0.01	mg/kg	N	010,022
Monuron	T310	AR	0.01	mg/kg	N	010,022
Mecoprop	T16	AR	0.01	mg/kg	N	010,022
Phenoxy Acetic acid herbicide: MCPA	T16	AR	0.01	mg/kg	N	010,022
Dichlorprop	T16	AR	0.01	mg/kg	N	010,022
Phenoxy Acetic acid herbicide: 2,4-D	T16	AR	0.01	mg/kg	N	010,022
Fenoprop	T16	AR	0.01	mg/kg	N	010,022
Phenoxy Acetic acid herbicide: 2,4,5-T	T16	AR	0.01	mg/kg	N	010,022
Resorcinol	T17	AR	0.05	mg/kg	М	010,022
Catechol	T17	AR	0.05	mg/kg	N	010,022
Phenol	T17	AR	0.1	mg/kg	М	010,022
Cresols	T17	AR	0.05	mg/kg	М	010,022
Xylenols	T17	AR	0.05	mg/kg	М	010,022
Naphthols	T17	AR	0.05	mg/kg	N	010,022
Trimethyl phenol	T17	AR	0.05	mg/kg	М	010,022
Total Phenols	T17	AR	0.1	mg/kg	N	010,022



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Concept Life Sciences Certificate of Analysis

3 Crittall Drive Springwood Industrial Estate Braintree Essex CM7 2RT

Tel: 01376 560120 Fax: 01376 552923

Report Number: Supplement 1C to Report Number

674086-1

Date of Report: 17-Oct-2017

Customer: TerraConsult Limited

Unit 34

Bold Business Centre

Bold Lane Sutton St Helens WA9 4TX

Customer Contact: Mr Derek Daniels

Customer Job Reference: 3318

Customer Purchase Order: PO-001839

Customer Site Reference: Norfolk Vanguard Cable Route

Date Job Received at Concept: 08-Aug-2017
Date Analysis Started: 09-Aug-2017
Date Analysis Completed: 22-Aug-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory. Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs. All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual.





Report checked and authorised by : Claire Brown Crociquia Customer Service Manager

Issued by : Aislinn Arthey Customer Service Ad



Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

CLEA metals, Braintree

				ot Reference		1	
		674086 006	674086 010				
		Custon	BH17-C5-01 ES2 @ 1.00m	BH17-C5-02 ES2 @ 1.00m			
			Da	ate Sampled	03-AUG-2017	03-AUG-2017	
			Sandy Soil	Sandy Soil			
Determinand	Method	Test Sample	LOD	Units			
Arsenic	T257	A40	2	mg/kg	20	7	
Barium	T257	A40	2	mg/kg	25	19	
Beryllium	T245	A40	0.5	mg/kg	0.8	<0.5	
Boron (water-soluble)	T82	A40	1	mg/kg	<1	<1	
Cadmium	T257	A40	0.1	mg/kg	0.1	<0.1	
Chromium	T257	A40	0.5	mg/kg	25	14	
Copper	T257	A40	2	mg/kg	11	8	
Lead	T257	A40	2	mg/kg	11	8	
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	
Nickel	T257	A40	0.5	mg/kg	17	9.9	
Selenium	T257	A40	3	mg/kg	<3	<3	
Vanadium	T257	A40	0.1	mg/kg	66	27	
Zinc	T257	A40	2	mg/kg	43	28	
Soil Organic Matter	T287	A40	0.1	%		0.2	
Moisture @105C	T162	AR	0.1	%	7.9	7.5	
Retained on 2mm	T2	A40	0.1	%	<0.1	<0.1	

Concept Reference: 674086

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Asbestos

ASDESIOS					
	674086 009				
	BH17-C5-02 ES1 @ 0.50m				
	03-AUG-2017				
	Sandy Soil				
Determinand	Method	Test Sample	LOD	Units	
Asbestos ID	T27	A40			Asbestos not detected

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil
Total and Speciated USEPA16 PAH (SE) (MCERTS)

	674086 010							
	BH17-C5-02 ES2 @ 1.00m							
			D	ate Sampled	03-AUG-2017			
	Matrix Class							
Determinand	Method	Test Sample	LOD	Units				
Naphthalene	T16	AR	0.1	mg/kg	<0.1			
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1			
Acenaphthene	T16	AR	0.1	mg/kg	<0.1			
Fluorene	T16	AR	0.1	mg/kg	<0.1			
Phenanthrene	T16	AR	0.1	mg/kg	<0.1			
Anthracene	T16	AR	0.1	mg/kg	<0.1			
Fluoranthene	T16	AR	0.1	mg/kg	<0.1			
Pyrene	T16	AR	0.1	mg/kg	<0.1			
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	<0.1			
Chrysene	T16	AR	0.1	mg/kg	<0.1			
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	<0.1			
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	<0.1			
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	<0.1			
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	<0.1			
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	<0.1			
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	<0.1			
PAH(total)	T16	AR	0.1	mg/kg	<0.1			

Concept Reference: 674086

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analys	ed as Soil				
TPH CWG					
			Conce	t Reference	674086 010
		Custon		e Reference	BH17-C5-02 ES2 @ 1.00m
		- 4	D	ate Sampled	03-AUG-2017
				Matrix Class	Sandy Soil
Determinand	Method	Test Sample	LOD	Units	
Benzene	T209	AR	10	μg/kg	<10
Toluene	T209	AR	10	μg/kg	<10
EthylBenzene	T209	AR	10	μg/kg	<10
M/P Xylene	T209	AR	10	μg/kg	<10
O Xylene	T209	AR	10	μg/kg	<10
Methyl tert-Butyl Ether	T54	AR	1	μg/kg	<1
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	<2
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	<2
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	<2
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	<2
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	<2
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	<2
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	<2
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	<2
TPH (C35-C40 aliphatic)	T219	AR	2	mg/kg	<2
TPH (C35-C40 aromatic)	T219	AR	2	mg/kg	<2
TPH (Aliphatic+Aromatic) C10-C25 (Sum)	T85	AR	4	mg/kg	<4
TPH (Aliphatic+Aromatic) C25-C40 (Sum)	T85	AR	4	mg/kg	<4

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Phenols (Speciated)

	674086 010								
	BH17-C5-02 ES2 @ 1.00m								
			D	ate Sampled	03-AUG-2017				
	Sandy Soil								
Determinand	Method	Test Sample	LOD	Units					
Resorcinol	T17	AR	0.05	mg/kg	<0.05				
Catechol	T17	AR	0.05	mg/kg	<0.05				
Phenol	T17	AR	0.1	mg/kg	<0.1				
Cresols	T17	AR	0.05	mg/kg	<0.05				
Xylenols	T17	AR	0.05	mg/kg	<0.05				
Naphthols	T17	AR	0.05	mg/kg	<0.05				
Trimethyl phenol	T17	T17 AR 0.05 mg/kg <0.05							
Total Phenols	T17	AR	0.1	mg/kg	<0.1				

Concept Reference: 674086

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Organochlorine insection	ides									
	674086 010									
	Customer Sample Reference									
		1770	D	ate Sampled	03-AUG-2017					
			Matrix Class	Sandy Soil						
Determinand	Method	Test Sample	LOD	Units						
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	<0.01					
Hexachlorobenzene	T1	AR	0.01	mg/kg	<0.01					
Heptachlor	T16	AR	0.01	mg/kg	⁽¹³¹⁾ <0.01					
Aldrin	T16	AR	0.01	mg/kg	<0.01					
Heptachlor epoxide	T16	AR	0.01	mg/kg	<0.01					
Chlordane	T16	AR	0.01	mg/kg	<0.01					
Endosulphan	T16	AR	0.01	mg/kg	<0.01					
DDE	T16	AR	0.01	mg/kg	<0.01					
Dieldrin	T16	AR	0.01	mg/kg	<0.01					
Endrin	T16	AR	0.01	mg/kg	<0.01					
DDD	T16	AR	0.01	mg/kg	<0.01					
DDT	T16	AR	0.01	mg/kg	⁽¹³¹⁾ <0.01					

Concept Reference: 674086

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

Organophosphorous insecticides

	Concept Reference											
	BH17-C5-02 ES2 @ 1.00m											
	03-AUG-2017											
				Matrix Class	Sandy Soil							
Determinand	Determinand Method Test Sample LOD Units											
Dichlorvos	T16	AR	0.01	mg/kg	<0.01							
Mevinphos	T16	AR	0.01	mg/kg	<0.01							
Dimethoate	T16	AR	0.01	mg/kg	<0.01							
Diazinon	T16	AR	0.01	mg/kg	<0.01							
Pirimiphos methyl	T16	AR	0.01	mg/kg	<0.01							
Malathion	T16	AR	0.01	mg/kg	<0.01							
Fenitrothion	T16	AR	0.01	mg/kg	<0.01							
Parathion	T16	AR	0.01	mg/kg	<0.01							
Azinphos methyl	T16	AR	0.01	mg/kg	<0.01							

Concept Reference: 674086 Project Site: Norfolk Vanguard Cable Route Customer Reference: 3318 Soil Analysed as Soil Triazines Suite Concept Reference 674086 010 **Customer Sample Reference** BH17-C5-02 ES2 @ 1.00m Date Sampled 03-AUG-2017 **Matrix Class** Sandy Soil Test Sample Determinand Method LOD Units ⁽⁶⁴⁾ < 0.01 T16 0.01 Simazine AR mg/kg (64) < 0.01 T16 AR 0.01 Atrazine mg/kg (64) < 0.01 T16 AR Propazine 0.01 mg/kg

0.01

0.01

0.01

mg/kg

mg/kg

mg/kg

⁽⁶⁴⁾ < 0.01

(64) <<u>0.01</u>

(64) < 0.01

T16

T16

T16

Trietazine

Prometryn

Terbutryn

AR

AR

AR

Concept Reference: 674086 Project Site: Norfolk Vanguard Cable Route Customer Reference: 3318 Soil Analysed as Soil Urons 674086 010 Concept Reference BH17-C5-02 ES2 @ 1.00m **Customer Sample Reference** Date Sampled 03-AUG-2017 **Matrix Class** Sandy Soil Test Method LOD Determinand Units T310 0.01 <0.01 Chlorotoluron AR mg/kg Diuron T310 AR 0.01 mg/kg <0.01 Isoproturon T310 AR 0.01 < 0.01 mg/kg Linuron T310 AR 0.01 mg/kg <0.01 T310 0.01 Monuron AR < 0.01 mg/kg

Concept Reference:	674086		91977	1117.20	
Project Site:	Norfolk Vangua	ard Cable R	oute		
Customer Reference:	3318				
Soil	Analysed as S	oil			
Phenoxy Acetic acid herbicides					
			Conce	ot Reference	674086 010
		Custor	ner Samp	le Reference	BH17-C5-02 ES2 @ 1.00m
			D	ate Sampled	03-AUG-2017
				Matrix Class	Sandy Soil
Determinand	Method	Test Sample	LOD	Units	0
Mecoprop	T16	AR	0.01	mg/kg	(100) < 0.05
Phenoxy Acetic acid herbicide: MCPA	T16	AR	0.01	mg/kg	(100) < 0.05
Dichlorprop	T16	AR	0.01	mg/kg	(100) < 0.05
Phenoxy Acetic acid herbicide: 2,4-D	T16	AR	0.01	mg/kg	(100) < 0.05
Fenoprop	T16	AR	0.01	mg/kg	(100) < 0.05
Phenoxy Acetic acid herbicide: 2,4,5-7	Г Т16	AR	0.01	mg/kg	(100) < 0.05

Index to symbols used in Supplement 1C to Report Number 674086-1

Value	Description
A40	Assisted dried < 40C
AR	As Received
131	Result is outside of the scope of accreditation due to a QC Failure
64	Analysis was performed by an alternative technique
100	LOD determined by sample aliquot used for analysis
S	Analysis was subcontracted

М	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Triazines & Urons analysis transferred to Concept Life Sciences Cambridge
OCP, OPP and PAAH analysis transferred to Concept Life Sciences Manchester
Supplement 1C Report reissued to include only samples 006, 009 and 010
Asbestos subcontracted to REC Limited
Retained on 2mm is removed before analysis
Reported results on as received samples are corrected to a 105 degree centigrade dry weight basis except TPH c5-c40 aro/ali split, OCP, OPP and PAAH

Method Index

Value	Description
T257	ICP/OES (SIM) (Aqua Regia Extraction)
T287	Calc TOC/0.58
T17	HPLC
T82	ICP/OES (Sim)
T245	ICP/OES (Aqua Regia Extraction)
T54	GC/MS (Headspace)
T85	Calc
T162	Grav (1 Dec) (105 C)
T1	GC/MS (HR)
T209	GC/MS (Head Space)(MCERTS)
T2	Grav
T27	PLM
T219	GC/FID (SE)
T310	LC/MS/MS
T16	GC/MS

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Arsenic	T257	A40	2	mg/kg	М	006,010
Barium	T257	A40	2	mg/kg	U	006,010
Beryllium	T245	A40	0.5	mg/kg	U	006,010
Boron (water-soluble)	T82	A40	1	mg/kg	N	006,010
Cadmium	T257	A40	0.1	mg/kg	М	006,010
Chromium	T257	A40	0.5	mg/kg	М	006,010
Copper	T257	A40	2	mg/kg	М	006,010
Lead	T257	A40	2	mg/kg	М	006,010
Mercury	T245	A40	1.0	mg/kg	U	006,010
Nickel	T257	A40	0.5	mg/kg	М	006,010
Selenium	T257	A40	3	mg/kg	U	006,010
Vanadium	T257	A40	0.1	mg/kg	U	006,010
Zinc	T257	A40	2	mg/kg	М	006,010
Soil Organic Matter	T287	A40	0.1	%	N	010
Moisture @105C	T162	AR	0.1	%	N	006,010
Retained on 2mm	T2	A40	0.1	%	N	006,010
Asbestos ID	T27	A40			SU	009
Naphthalene	T16	AR	0.1	mg/kg	U	010
Acenaphthylene	T16	AR	0.1	mg/kg	U	010
Acenaphthene	T16	AR	0.1	mg/kg	M	010
Fluorene	T16	AR	0.1	mg/kg	М	010
Phenanthrene	T16	AR	0.1	mg/kg	U	010
Anthracene	T16	AR	0.1	mg/kg	М	010
Fluoranthene	T16	AR	0.1	mg/kg	N	010
Pyrene	T16	AR	0.1	mg/kg	N	010
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	M	010
Chrysene	T16	AR	0.1	mg/kg	М	010
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	U	010
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	N	010
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	М	010
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	М	010
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	М	010
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	М	010

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
PAH(total)	T16	AR	0.1	mg/kg	U	010
Benzene	T209	AR	10	μg/kg	М	010
Toluene	T209	AR	10	μg/kg	М	010
EthylBenzene	T209	AR	10	μg/kg	М	010
M/P Xylene	T209	AR	10	μg/kg	М	010
O Xylene	T209	AR	10	μg/kg	М	010
Methyl tert-Butyl Ether	T54	AR	1	μg/kg	U	010
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	N	010
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	N	010
TPH (C6-C8 aliphatic)	T54 T54	AR AR	0.010	mg/kg	N N	010
TPH (C7-C8 aromatic) TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg mg/kg	N N	010
TPH (C8-C10 anipmatic)	T54	AR	0.010	mg/kg	N	010
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	N	010
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	N	010
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	N	010
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	N	010
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	N	010
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	N	010
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	N	010
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	N	010
TPH (C35-C40 aliphatic)	T219	AR	2	mg/kg	N	010
TPH (C35-C40 aromatic)	T219	AR	2	mg/kg	N	010
TPH (Aliphatic+Aromatic) C10-C25 (Sum)	T85	AR	4	mg/kg	N	010
TPH (Aliphatic+Aromatic) C25-C40 (Sum) Resorcinol	T85 T17	AR AR	0.05	mg/kg	N M	010
Catechol	T17	AR	0.05	mg/kg mg/kg	N	010
Phenol	T17	AR	0.03	mg/kg	M	010
Cresols	T17	AR	0.05	mg/kg	M	010
Xylenols	T17	AR	0.05	mg/kg	М	010
Naphthols	T17	AR	0.05	mg/kg	N	010
Trimethyl phenol	T17	AR	0.05	mg/kg	М	010
Total Phenols	T17	AR	0.1	mg/kg	N	010
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	U	010
Hexachlorobenzene	T1	AR	0.01	mg/kg	U	010
Heptachlor	T16	AR	0.01	mg/kg	U	010
Aldrin	T16	AR	0.01	mg/kg	U	010
Heptachlor epoxide	T16	AR	0.01	mg/kg	U	010
Chlordane	T16 T16	AR AR	0.01	mg/kg mg/kg	U	010
Endosulphan DDE	T16	AR	0.01	mg/kg	U	010
Dieldrin	T16	AR	0.01	mg/kg	U	010
Endrin	T16	AR	0.01	mg/kg	U	010
DDD	T16	AR	0.01	mg/kg	U	010
DDT	T16	AR	0.01	mg/kg	U	010
Dichlorvos	T16	AR	0.01	mg/kg	U	010
Mevinphos	T16	AR	0.01	mg/kg	U	010
Dimethoate	T16	AR	0.01	mg/kg	U	010
Diazinon	T16	AR	0.01	mg/kg	U	010
Pirimiphos methyl	T16	AR	0.01	mg/kg	U	010
Malathion	T16	AR	0.01	mg/kg	U	010
Fenitrothion	T16	AR	0.01	mg/kg	U	010
Parathion Azinphos methyl	T16 T16	AR AR	0.01	mg/kg mg/kg	U	010
Simazine	T16	AR	0.01	mg/kg	N	010
Atrazine	T16	AR	0.01	mg/kg	N	010
Propazine	T16	AR	0.01	mg/kg	N	010
Trietazine	T16	AR	0.01	mg/kg	N	010
Prometryn	T16	AR	0.01	mg/kg	N	010
Terbutryn	T16	AR	0.01	mg/kg	N	010
Chlorotoluron	T310	AR	0.01	mg/kg	N	010
Diuron	T310	AR	0.01	mg/kg	N	010
Isoproturon	T310	AR	0.01	mg/kg	N	010
Linuron	T310	AR	0.01	mg/kg	N	010
Monuron	T310	AR	0.01	mg/kg	N	010
Mecoprop	T16	AR	0.01	mg/kg	N	010
Phenoxy Acetic acid herbicide: MCPA	T16	AR	0.01	mg/kg	N N	010
Dichlorprop Phonoxy Acatic acid harbicide: 2.4-D	T16	AR	0.01	mg/kg	N N	010
Phenoxy Acetic acid herbicide: 2,4-D Fenoprop	T16 T16	AR AR	0.01	mg/kg mg/kg	N N	010
ι σποριορ	110	AIX	0.01	my/ky	I IN	VIV

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Phenoxy Acetic acid herbicide: 2,4,5-T	T16	AR	0.01	ma/ka	N	010





Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences Certificate of Analysis

3 Crittall Drive Springwood Industrial Estate Braintree Essex CM7 2RT

Tel: 01376 560120 Fax: 01376 552923

Report Number: Supplement 1B to Report Number

677813-1

Date of Report: 18-Oct-2017

Customer: TerraConsult Limited

Unit 34

Bold Business Centre

Bold Lane Sutton St Helens WA9 4TX

Customer Contact: Mr Jimmy Thorburn

Customer Job Reference: 3318

Customer Purchase Order: PO-001839

Customer Site Reference: Norfolk Vanguard Cable Route

Date Job Received at Concept: 31-Jul-2017
Date Analysis Started: 29-Aug-2017
Date Analysis Completed: 12-Sep-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs
All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical
Services Quality Manual





Report checked and authorised by : Chelsea Entwistle Senior Customer Service Advisor Issued by :
Aislinn Arthey
Customer Service



Waste Acceptance Criteria

Customer Sample Reference: BH17-C4-03 ES2 @ 1.00m

Matrix Class: Sandy Soil

SAL Sample Reference: 677813 010

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318
Test Portion Mass (g): 175
Date Sampled: 04-AUG-2017

	Soil Summary	Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill			
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			М	7.3		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	М	2.7			10.0
Total Organic Carbon	OX/IR	0.1	%	N	1.0	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	М	(13) 15	500.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	13			
Retained on 2mm	Grav	0.1	%	N	3.7			

							ı	1
	10:1 Leachate	Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill			
Determinand	Technique	LOD	Units	Symbol			1	
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.0064	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.019	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	Ν	27	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.021	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	110	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	3.7	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4	Calc / Discrete Analyser	5.0	mg/kg	N	61	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	260	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

Landfill WAC analysis (specifically leaching test results) should not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Waste Acceptance Criteria

Customer Sample Reference: BH17-C4-02 ES2 @ 1.00m

SAL Sample Reference: 677813 022

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Test Portion Mass (g): 175

Date Sampled: 11-AUG-2017

Matrix Class: Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			М	7.9		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	М	2.4			10.0
Total Organic Carbon	OX/IR	0.1	%	N	0.6	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	М	(13) < 10	500.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	8.9			
Retained on 2mm	Grav	0.1	%	N	28.1			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.014	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.13	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	49	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.017	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.041	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	200	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	1.2	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.011	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.013	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.013	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4	Calc / Discrete Analyser	5.0	mg/kg	N	21	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	990	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.075	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

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Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil
Total and Speciated USEPA16 PAH (SE) (MCERTS)

			Concep	t Reference	677813 010	677813 022
	Customer Sample Reference					BH17-C4-02 ES2 @ 1.00m
			7	Test Sample	AR	AR
			Da	te Sampled	04-AUG-2017	11-AUG-2017
				Matrix Class	Sandy Soil	Sandy Soil
Determinand	Method	LOD	Units	Symbol		
Naphthalene	GC/MS	0.1	mg/kg	U	<0.1	<0.1
Acenaphthylene	GC/MS	0.1	mg/kg	U	<0.1	<0.1
Acenaphthene	GC/MS	0.1	mg/kg	М	<0.1	<0.1
Fluorene	GC/MS	0.1	mg/kg	М	<0.1	<0.1
Phenanthrene	GC/MS	0.1	mg/kg	U	<0.1	<0.1
Anthracene	GC/MS	0.1	mg/kg	М	<0.1	<0.1
Fluoranthene	GC/MS	0.1	mg/kg	N	<0.1	<0.1
Pyrene	GC/MS	0.1	mg/kg	N	<0.1	<0.1
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	М	<0.1	<0.1
Chrysene	GC/MS	0.1	mg/kg	М	<0.1	<0.1
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	U	<0.1	<0.1
Benzo(k)fluoranthene	GC/MS	0.1	mg/kg	N	<0.1	<0.1
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	М	<0.1	<0.1
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	М	<0.1	<0.1
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	М	<0.1	<0.1
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	М	<0.1	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	U	<0.1	<0.1

Concept Reference: 677813

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

BTEX

	677813 010	677813 022				
	Customer Sample Reference					BH17-C4-02 ES2 @ 1.00m
				Test Sample	AR	AR
			Da	ate Sampled	04-AUG-2017	11-AUG-2017
				Matrix Class	Sandy Soil	Sandy Soil
Determinand	Method	LOD	Units	Symbol		
Benzene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10	<10
Toluene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10	<10

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

PCBs EC7 (SE)

Analysed as Soil

Concept Reference					677813 010	677813 022
	BH17-C4-03 ES2 @ 1.00m	BH17-C4-02 ES2 @ 1.00m				
			1	est Sample	AR	AR
			Da	te Sampled	04-AUG-2017	11-AUG-2017
	Sandy Soil	Sandy Soil				
Determinand	Method	LOD	Units	Symbol		
Polychlorinated biphenyl BZ#28	GC/MS	20	μg/kg	М	<20	<20
Polychlorinated biphenyl BZ#52	GC/MS	20	μg/kg	М	<20	<20
Polychlorinated biphenyl BZ#101	GC/MS	20	μg/kg	М	<20	<20
Polychlorinated biphenyl BZ#118	GC/MS	20	μg/kg	М	<20	<20
Polychlorinated biphenyl BZ#153	GC/MS	20	μg/kg	М	<20	<20
Polychlorinated biphenyl BZ#138	GC/MS	20	μg/kg	М	<20	<20
Polychlorinated biphenyl BZ#180	GC/MS	20	μg/kg	М	<20	<20

Index to symbols used in Supplement 1B to Report Number 677813-1

Value	Description
A40	Assisted dried < 40C
2:1	Leachate to BS EN 12457-3 (2:1)
8:1	Leachate to BS EN 12457-3 (8:1)
AR	As Received
13	Results have been blank corrected.
М	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Supplement 1B report reissued to include only samples 010 and 022				
BTEX: Samples submitted for GC/MS (Headspace) analysis were submitted in inappropriate containers. It is possible therefore that the results provided may be compromised.				
Retained on 2mm is removed before analysis				
Reported results on as received samples are corrected to a 105 degree centigrade dry weight basis except ANC				
pH, LOI & TOC were performed on assisted dried samples (<40 degree centigrade). All other results relate to samples as received.				
PAH, BTEX/MTBE, TPH & PCB: These samples have been analysed exceeding recommended holding times. It is possible therefore that the results provided may be compromised.				



Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences Certificate of Analysis

3 Crittall Drive Springwood Industrial Estate Braintree Essex CM7 2RT

Tel: 01376 560120 Fax: 01376 552923

Report Number: Supplement 1 to Report Number 674086-

1 A

Date of Report: 17-Oct-2017

Customer: TerraConsult Limited

Unit 34

Bold Business Centre

Bold Lane Sutton St Helens WA9 4TX

Customer Contact: Mr Derek Daniels

Customer Job Reference: 3318

Customer Purchase Order: PO-001839

Customer Site Reference: Norfolk Vanguard Cable Route

Date Job Received at Concept: 08-Aug-2017
Date Analysis Started: 09-Aug-2017
Date Analysis Completed: 22-Aug-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs
All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical
Services Quality Manual





Report checked and authorised by : Claire Brown Crociquia Customer Service Manager Issued by : Aislinn Arthey Customer Service



Waste Acceptance Criteria

Customer Sample Reference: BH17-C5-02 ES2 @ 1.00m

SAL Sample Reference: 674086 010

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Test Portion Mass (g): 175

Date Sampled: 03-AUG-2017

Matrix Class: Sandy Soil

Inert Waste Landfill Stable non reactive Hazardous Waste Landfill Soil Summary Result Determinand Technique LOD Units Symbol М Ign @450C/Grav Loss on Ignition @450C 0.1 М 1.4 10.0 Ν 3.0 5.0 Total Organic Carbon OX/IR 0.1 % 0.1 6.0 Acid Neutralising Capacity (pH 7) Titration 2.0 Mol/kg Ν <2.0 GC/MS (MCERTS) Ν 0.1 <0.1 Coronene mg/kg BTEX (Sum) Calc 0.040 mg/kg U < 0.040 PCB EC7 (Sum) 0.00035 Calc N 1.0 mg/kg < 0.14 PAH (Sum) Calc 1.6 mg/kg Ν <1.6 100.0 TPH (C10-C40) GC/FID (SE) M 500.0 10 mg/kg <10 Moisture @105C Grav (1 Dec) (105 C) Ν 7.5 0.1 Ν <0.1 Retained on 2mm Grav

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.0060	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.026	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	17	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0086	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	130	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	3.6	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4	Calc / Discrete Analyser	5.0	mg/kg	N	24	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	400	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

Landfill WAC analysis (specifically leaching test results) should not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil
Total and Speciated USEPA16 PAH (SE) (MCERTS)

			Concep	t Reference	674086 010
		Custo	mer Sampl	BH17-C5-02 ES2 @ 1.00m	
			1	Test Sample	AR
			Da	te Sampled	03-AUG-2017
			N	Matrix Class	Sandy Soil
Determinand	Method	LOD	Units	Symbol	
Naphthalene	GC/MS	0.1	mg/kg	U	<0.1
Acenaphthylene	GC/MS	0.1	mg/kg	U	<0.1
Acenaphthene	GC/MS	0.1	mg/kg	M	<0.1
Fluorene	GC/MS	0.1	mg/kg	М	<0.1
Phenanthrene	GC/MS	0.1	mg/kg	U	<0.1
Anthracene	GC/MS	0.1	mg/kg	М	<0.1
Fluoranthene	GC/MS	0.1	mg/kg	N	<0.1
Pyrene	GC/MS	0.1	mg/kg	N	<0.1
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	M	<0.1
Chrysene	GC/MS	0.1	mg/kg	M	<0.1
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	U	<0.1
Benzo(k)fluoranthene	GC/MS	0.1	mg/kg	N	<0.1
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	М	<0.1
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	М	<0.1
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	M	<0.1
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	М	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	U	<0.1

Concept Reference: 674086

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

ВТЕХ					
			Concep	t Reference	674086 010
		Custo	mer Sampl	e Reference	BH17-C5-02 ES2 @ 1.00m
				Test Sample	AR
			Da	ate Sampled	03-AUG-2017
				Matrix Class	Sandy Soil
Determinand	Method	LOD	Units	Symbol	
Benzene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10
Toluene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

PCBs EC7 (SE)

	t Reference	674086 010			
		Custo	mer Sampl	e Reference	BH17-C5-02 ES2 @ 1.00m
			1	Test Sample	AR
			Da	ate Sampled	03-AUG-2017
				Matrix Class	Sandy Soil
Determinand	Method	LOD	Units	Symbol	
Polychlorinated biphenyl BZ#28	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#52	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#101	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#118	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#153	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#138	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#180	GC/MS	20	μg/kg	M	<20

Index to symbols used in Supplement 1 to Report Number 674086-1 A

Value	Description
AR	As Received
2:1	Leachate to BS EN 12457-3 (2:1)
8:1	Leachate to BS EN 12457-3 (8:1)
A40	Assisted dried < 40C
М	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Supplement 1 Report Reissued to include only sample 010							
pH, LOI & TOC were performed on assisted dried samples (<40 degree centigrade). All other results relate to samples as received.							
Retained on 2mm is removed before analysis							
Reported results on as received samples are corrected to a 105 degree centigrade dry weight basis except ANC							



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Concept Life Sciences Certificate of Analysis

3 Crittall Drive Springwood Industrial Estate Braintree Essex CM7 2RT

Tel: 01376 560120 Fax: 01376 552923

Report Number: Supplement 1 to Report Number 675010-

1 A

Date of Report: 25-Oct-2017

Customer: TerraConsult Limited

Unit 34

Bold Business Centre

Bold Lane Sutton St Helens WA9 4TX

Customer Contact: Mr Jimmy Thorburn

Customer Job Reference: 3318

Customer Purchase Order: PO-001839

Customer Site Reference: Norfolk Vanguard Cable Route

Date Job Received at Concept: 03-Aug-2017
Date Analysis Started: 15-Aug-2017
Date Analysis Completed: 06-Sep-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory. Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs. All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual.





Report checked and authorised by : Aislinn Arthey Customer Service Advisor Issued by : Aislinn Arthey Customer Service A



Waste Acceptance Criteria

Customer Sample Reference: BH17-C5-03 ES2 @ 1.00m

SAL Sample Reference: 675010 002

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Test Portion Mass (g): 175

Date Sampled: 31-JUL-2017

Matrix Class: Sandy Soil

	Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill				
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			М	8.1		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	М	1.4			10.0
Total Organic Carbon	OX/IR	0.1	%	N	0.2	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	М	<10	500.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	7.6			
Retained on 2mm	Grav	0.1	%	N	18.7			

10:1 Leachate						Inert Waste	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.0028	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.024	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	25	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.011	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	120	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	2.6	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0051	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4	Calc / Discrete Analyser	5.0	mg/kg	N	29	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	240	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

Landfill WAC analysis (specifically leaching test results) should not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Analysed as Soil Total and Speciated USEPA16 PAH (SE) (MCERTS)

	675010 002				
		Custor	ner Sampl	BH17-C5-03 ES2 @ 1.00m	
			1	est Sample	AR
			Da	te Sampled	31-JUL-2017
			N	Matrix Class	Sandy Soil
Determinand	Method	LOD	Units	Symbol	
Naphthalene	GC/MS	0.1	mg/kg	U	<0.1
Acenaphthylene	GC/MS	0.1	mg/kg	U	<0.1
Acenaphthene	GC/MS	0.1	mg/kg	М	<0.1
Fluorene	GC/MS	0.1	mg/kg	М	<0.1
Phenanthrene	GC/MS	0.1	mg/kg	U	<0.1
Anthracene	GC/MS	0.1	mg/kg	М	<0.1
Fluoranthene	GC/MS	0.1	mg/kg	N	<0.1
Pyrene	GC/MS	0.1	mg/kg	N	<0.1
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	М	<0.1
Chrysene	GC/MS	0.1	mg/kg	М	<0.1
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	U	<0.1
Benzo(k)fluoranthene	GC/MS	0.1	mg/kg	N	<0.1
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	М	<0.1
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	М	<0.1
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	M	<0.1
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	М	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	U	<0.1

Concept Reference: 675010

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

BTEX					
	675010 002				
		Custo	mer Sampl	e Reference	BH17-C5-03 ES2 @ 1.00m
				Test Sample	AR
			Da	ate Sampled	31-JUL-2017
				Matrix Class	Sandy Soil
Determinand	Method	LOD	Units	Symbol	
Benzene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10
Toluene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	μg/kg	М	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	μg/kg	M	<10

Project Site: Norfolk Vanguard Cable Route

Customer Reference: 3318

Soil Analysed as Soil

PCBs EC7 (SE)

	675010 002				
	BH17-C5-03 ES2 @ 1.00m				
			1	Test Sample	AR
			Da	ate Sampled	31-JUL-2017
	Sandy Soil				
Determinand	Method	LOD	Units	Symbol	
Polychlorinated biphenyl BZ#28	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#52	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#101	GC/MS	20	μg/kg	M	<20
Polychlorinated biphenyl BZ#118	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#153	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#138	GC/MS	20	μg/kg	М	<20
Polychlorinated biphenyl BZ#180	GC/MS	20	μg/kg	М	<20

Index to symbols used in Supplement 1 to Report Number 675010-1 A

Value	Description
AR	As Received
8:1	Leachate to BS EN 12457-3 (8:1)
2:1	Leachate to BS EN 12457-3 (2:1)
A40	Assisted dried < 40C
М	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

TPH c10-c40: Due to lab error, these samples have been analysed exceeding recommended holding times. It is possible therefore that the results provided may be compromised.
Supplement 1A report reissued to include only sample 014
pH, LOI & TOC were performed on assisted dried samples (<40 degree centigrade). All other results relate to samples as received.
Reported results on as received samples are corrected to a 105 degree centigrade dry weight basis except ANC
Retained on 2mm is removed before analysis
BTEX: Samples submitted for GC/MS (Headspace) analysis were submitted in inappropriate containers. It is possible therefore that the results provided may be compromised.



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Concept Life Sciences Certificate of Analysis

3 Crittall Drive Springwood Industrial Estate Braintree Essex CM7 2RT

Tel: 01376 560120 Fax: 01376 552923

Report Number: Supplement 1C to Report Number

677853-1

Date of Report: 18-Oct-2017

Customer: TerraConsult (South) Limited

Suite F17 Dugard House

Peartree Road Colchester Essex CO3 0UL

Customer Contact: Victoria Smith

Customer Job Reference: 3318

Customer Site Reference: East Anglia OWF Date Job Received at Concept: 24-Aug-2017 Date Analysis Started: 25-Aug-2017

Date Analysis Completed: 04-Sep-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs
All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical
Services Quality Manual



Report checked and authorised by : Aislinn Arthey Customer Service Advisor Issued by : Aislinn Arthey Customer Service Advi



Project Site: East Anglia OWF

Customer Reference: 3318

Water Analysed as Water

Heavy Metals (9)

	677853 004	677853 005				
	C4-01	C4-03				
			Da	ate Sampled	22-AUG-2017	22-AUG-2017
Determinand						
As (Dissolved)	T281	F	0.0002	mg/l	0.0006	0.0005
Cd (Dissolved)	T281	F	0.00002	mg/l	<0.00002	0.00004
Cr (Dissolved)	T281	F	0.001	mg/l	<0.001	<0.001
Cu (Dissolved)	T281	F	0.0005	mg/l	0.0006	0.0011
Pb (Dissolved)	T281	F	0.0003	mg/l	<0.0003	<0.0003
Hg (Dissolved)	T281	F	0.00005	mg/l	<0.00005	<0.00005
Ni (Dissolved)	T281	F	0.001	mg/l	0.001	0.003
Se (Dissolved)	T281	F	0.0005	mg/l	<0.0005	0.0009
Zn (Dissolved)	T281	F	0.002	mg/l	0.022	0.038

Concept Reference: 677853

Project Site: East Anglia OWF

Customer Reference: 3318

Water Analysed as Water

Total and Speciated USEPA16 PAH (SE)

	Concept Reference						
		Custon	ner Sam	ple Reference	C4-01	C4-03	
				Date Sampled	22-AUG-2017	22-AUG-2017	
Determinand	Method	Test Sample	LOD	Units	21/27	No.	
Naphthalene	T149	AR	0.01	μg/l	<0.01	<0.01	
Acenaphthylene	T149	AR	0.01	μg/l	<0.01	<0.01	
Acenaphthene	T149	AR	0.01	μg/l	<0.01	<0.01	
Fluorene	T149	AR	0.01	μg/l	<0.01	<0.01	
Phenanthrene	T149	AR	0.01	μg/l	<0.01	<0.01	
Anthracene	T149	AR	0.01	μg/l	<0.01	<0.01	
Fluoranthene	T149	AR	0.01	μg/l	<0.01	<0.01	
Pyrene	T149	AR	0.01	μg/l	<0.01	<0.01	
Benzo(a)Anthracene	T149	AR	0.01	μg/l	<0.01	<0.01	
Chrysene	T149	AR	0.01	μg/l	<0.01	<0.01	
Benzo(b)fluoranthene	T149	AR	0.01	μg/l	<0.01	<0.01	
Benzo(k)fluoranthene	T149	AR	0.01	μg/l	<0.01	<0.01	
Benzo(a)Pyrene	T149	AR	0.01	μg/l	<0.01	<0.01	
Indeno(123-cd)Pyrene	T149	AR	0.01	μg/l	<0.01	<0.01	
Dibenzo(ah)Anthracene	T149	AR	0.01	μg/l	<0.01	<0.01	
Benzo(ghi)Perylene	T149	AR	0.01	μg/l	<0.01	<0.01	
PAH(total)	T149	AR	0.01	μg/l	<0.01	<0.01	

Concept Reference: 677853

Project Site: East Anglia OWF

Customer Reference: 3318

Water Analysed as Water

TPH (CWG) with MTBE & BTEX SE

	677853 004	677853 005				
	C4-01	C4-03				
			D	ate Sampled	22-AUG-2017	22-AUG-2017
Determinand	Method	Test Sample	LOD	Units		
Benzene	T54	AR	1	μg/l	<1	<1
Toluene	T54	AR	1	μg/l	<1	<1
EthylBenzene	T54	AR	1	μg/l	<1	<1
M/P Xylene	T54	AR	1	μg/l	<1	<1
O Xylene	T54	AR	1	μg/l	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	μg/l	<1	<1
TPH (C5-C6 aliphatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C6-C7 aromatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C6-C8 aliphatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C7-C8 aromatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C8-C10 aliphatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C8-C10 aromatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C10-C12 aliphatic)	T219	AR	0.01	mg/l	<0.01	<0.01
TPH (C10-C12 aromatic)	T219	AR	0.01	mg/l	<0.01	<0.01
TPH (C12-C16 aliphatic)	T219	AR	0.01	mg/l	<0.01	<0.01
TPH (C12-C16 aromatic)	T219	AR	0.01	mg/l	<0.01	<0.01
TPH (C16-C21 aliphatic)	T219	AR	0.01	mg/l	0.02	<0.01
TPH (C16-C21 aromatic)	T219	AR	0.01	mg/l	0.02	<0.01
TPH (C21-C35 aliphatic)	T219	AR	0.01	mg/l	0.04	<0.01
TPH (C21-C35 aromatic)	T219	AR	0.01	mg/l	0.03	<0.01

Concept Reference: 677853
Project Site: East Anglia OWF
Customer Reference: 3318

Water Analysed as Water

Organochlorine insecticides

			Conce	ot Reference	677853 004	677853 005
		Custon	ner Samp	C4-01	C4-03	
			D	ate Sampled	22-AUG-2017	22-AUG-2017
Determinand	Method	Test Sample	LOD	Units		
Hexachlorocyclohexane	T16	AR	0.01	μg/l	<0.01	<0.01
Hexachlorobenzene	T16	AR	0.01	μg/l	<0.01	<0.01
Heptachlor	T16	AR	0.01	μg/l	<0.01	<0.01
Aldrin	T16	AR	0.01	μg/l	<0.01	<0.01
Heptachlor epoxide	T16	AR	0.01	μg/l	<0.01	<0.01
Chlordane	T16	AR	0.01	μg/l	<0.01	<0.01
Endosulphan	T16	AR	0.01	μg/l	<0.01	<0.01
DDE	T16	AR	0.01	μg/l	<0.01	<0.01
Dieldrin	T16	AR	0.01	μg/l	<0.01	<0.01
Endrin	T16	AR	0.01	μg/l	<0.01	<0.01
DDD	T16	AR	0.01	μg/l	<0.01	<0.01
DDT	T16	AR	0.01	μg/l	(36) < 0.02	(36) < 0.02

Concept Reference: 677853

Project Site: East Anglia OWF

Customer Reference: 3318

Water Analysed as Water

Organophosphorous insecticides

	677853 004	677853 005					
	Customer Sample Reference						
	Date Sampled						
Determinand	Method	Test Sample	LOD	Units			
Dichlorvos	T16	AR	0.01	μg/l	<0.01	<0.01	
Mevinphos	T16	AR	0.01	μg/l	<0.01	<0.01	
Dimethoate	T16	AR	0.01	μg/l	<0.01	<0.01	
Diazinon	T16	AR	0.01	μg/l	<0.01	<0.01	
Pirimiphos methyl	T16	AR	0.01	μg/l	<0.01	<0.01	
Malathion	T16	AR	0.01	μg/l	<0.01	<0.01	
Fenitrothion	T16	AR	0.01	μg/l	<0.01	<0.01	
Parathion	T16	AR	0.01	μg/l	<0.01	<0.01	
Azinphos methyl	T16	AR	0.01	μg/l	<0.01	<0.01	

Index to symbols used in Supplement 1C to Report Number 677853-1

Value	Description
F	Filtered
AR	As Received
149	LOD raised due to high dissolved solids
100	LOD determined by sample aliquot used for analysis
36	LOD Raised due to low Matrix spike recovery
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

PAH and TPH, 005: These samples have been analysed exceeding recommended holding times due to lab error. It is possible therefore that the results provided may be compromised.

OCP and OPP analysis transferred to Concept Life Sciences Manchester

Supplement 1C Report Reissued to include only samples 004 and 005

Method Index

Value	Description					
T54	GC/MS (Headspace)					
T149	GC/MS (SIR)					
T219	GC/FID (SE)					
T16	GC/MS					
T281	ICP/MS (Filtered)					

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
As (Dissolved)	T281	F	0.0002	mg/l	U	004-005
Cd (Dissolved)	T281	F	0.00002	mg/l	U	004-005
Cr (Dissolved)	T281	F	0.001	mg/l	U	004-005
Cu (Dissolved)	T281	F	0.0005	mg/l	U	004-005
Pb (Dissolved)	T281	F	0.0003	mg/l	U	004-005
Hg (Dissolved)	T281	F	0.00005	mg/l	U	004-005
Ni (Dissolved)	T281	F	0.001	mg/l	U	004-005
Se (Dissolved)	T281	F	0.0005	mg/l	U	004-005
Zn (Dissolved)	T281	F	0.002	mg/l	U	004-005
Naphthalene	T149	AR	0.01	μg/l	U	004-005
Acenaphthylene	T149	AR	0.01	μg/l	U	004-005
Acenaphthene	T149	AR	0.01	μg/l	U	004-005
Fluorene	T149	AR	0.01	μg/l	U	004-005
Phenanthrene	T149	AR	0.01	μg/l	U	004-005
Anthracene	T149	AR	0.01	μg/l	U	004-005
Fluoranthene	T149	AR	0.01	μg/l	U	004-005

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Pyrene	T149	AR	0.01	μg/l	U	004-005
Benzo(a)Anthracene	T149	AR	0.01	μg/l	U	004-005
Chrysene	T149	AR	0.01	μg/l	U	004-005
Benzo(b)fluoranthene	T149	AR	0.01	μg/l	N	004-005
Benzo(k)fluoranthene	T149	AR	0.01	μg/l	U	004-005
Benzo(a)Pyrene	T149	AR	0.01	μg/l	U	004-005
Indeno(123-cd)Pyrene	T149	AR	0.01	μg/l	U	004-005
Dibenzo(ah)Anthracene	T149	AR	0.01	μg/l	U	004-005
Benzo(ghi)Perylene	T149	AR	0.01	μg/l	U	004-005
PAH(total)	T149	AR	0.01	μg/l	N	004-005
Benzene	T54	AR	1	μg/l	U	004-005
Toluene	T54	AR	1	μg/l	U	004-005
EthylBenzene	T54	AR	1	μg/l	U	004-005
M/P Xylene	T54	AR	1	μg/l	U	004-005
O Xylene	T54	AR	1	μg/l	U	004-005
Methyl tert-Butyl Ether	T54	AR	1	μg/l	U	004-005
TPH (C5-C6 aliphatic)	T54	AR	0.020	mg/l	N	004-005
TPH (C6-C7 aromatic)	T54	AR	0.020	mg/l	N	004-005
TPH (C6-C8 aliphatic)	T54	AR	0.020	mg/l	N	004-005
TPH (C7-C8 aromatic)	T54	AR	0.020	mg/l	N	004-005
TPH (C8-C10 aliphatic)	T54	AR	0.020	mg/l	N	004-005
TPH (C8-C10 aromatic)	T54	AR	0.020	mg/l	N	004-005
TPH (C10-C12 aliphatic)	T219	AR	0.01	mg/l	N	004-005
TPH (C10-C12 aromatic)	T219	AR	0.01	mg/l	N	004-005
TPH (C12-C16 aliphatic)	T219	AR	0.01	mg/l	N	004-005
TPH (C12-C16 aromatic)	T219	AR	0.01	mg/l	N	004-005
TPH (C16-C21 aliphatic)	T219	AR	0.01	mg/l	N	004-005
TPH (C16-C21 aromatic)	T219	AR	0.01	mg/l	N	004-005
TPH (C21-C35 aliphatic)	T219	AR	0.01	mg/l	N	004-005
TPH (C21-C35 aromatic)	T219	AR	0.01	mg/l	N	004-005
Hexachlorocyclohexane	T16	AR	0.01	µg/l	N	004-005
Hexachlorobenzene	T16	AR	0.01	μg/l	N	004-005
Heptachlor	T16	AR	0.01	μg/l	N	004-005
Aldrin	T16	AR	0.01	μg/l	N	004-005
Heptachlor epoxide	T16	AR	0.01	µg/l	N	004-005
Chlordane	T16	AR	0.01	μg/l	N	004-005
Endosulphan	T16	AR	0.01	μg/l	N	004-005
DDE	T16	AR	0.01	μg/l	N	004-005
Dieldrin	T16	AR	0.01	μg/l	N	004-005
Endrin	T16	AR	0.01	μg/l	N	004-005
DDD	T16	AR	0.01	μg/l	N	004-005
DDT	T16	AR	0.01	μg/l	N	004-005
Dichlorvos	T16	AR	0.01	μg/l	N	004-005
Mevinphos	T16	AR	0.01	μg/l	N	004-005
Dimethoate	T16	AR	0.01	μg/l	N	004-005
Diazinon	T16	AR	0.01	μg/l	N	004-005
Pirimiphos methyl	T16	AR	0.01	μg/l	N	004-005
Malathion	T16	AR	0.01	μg/l	N	004-005
Fenitrothion	T16	AR	0.01	μg/l	N	004-005
Parathion	T16	AR	0.01	μg/l	N	004-005
Azinphos methyl	T16	AR	0.01	μg/l	N	004-005
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Concept Life Sciences Certificate of Analysis

3 Crittall Drive Springwood Industrial Estate Braintree Essex CM7 2RT

Tel: 01376 560120 Fax: 01376 552923

Report Number: Supplement 1B to Report Number

675177-1

Date of Report: 18-Oct-2017

Customer: TerraConsult (South) Limited

Suite F17 Dugard House

Peartree Road Colchester Essex CO3 0UL

Customer Contact: Victoria Smith

Customer Job Reference: 3318

Customer Site Reference: East Anglia OWF Date Job Received at Concept: 11-Aug-2017 Date Analysis Started: 14-Aug-2017

Date Analysis Completed: 25-Aug-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

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Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs
All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual



Report checked and authorised by : Claire Brown Crociquia Customer Service Manager Issued by : Aislinn Arthey Customer Service Advi



Project Site: East Anglia OWF

Customer Reference: 3318

Water Analysed as Water

Heavy Metals (9)

		t Reference	675177 003	675177 004		
	BH17-C5-01	BH17-C5-03				
	Date Sampled					
Determinand	Method	Test Sample	LOD	Units		
As (Dissolved)	T281	F	0.0002	mg/l	0.0057	0.0007
Cd (Dissolved)	T281	F	0.00002	mg/l	<0.00002	<0.00002
Cr (Dissolved)	T281	F	0.001	mg/l	<0.001	<0.001
Cu (Dissolved)	T281	F	0.0005	mg/l	<0.0005	<0.0005
Pb (Dissolved)	T281	F	0.0003	mg/l	<0.0003	< 0.0003
Hg (Dissolved)	T281	F	0.00005	mg/l	<0.00005	<0.0005
Ni (Dissolved)	T281	F	0.001	mg/l	0.003	0.002
Se (Dissolved)	T281	F	0.0005	mg/l	0.0036	0.0024
Zn (Dissolved)	T281	F	0.002	ma/l	<0.002	<0.002

Concept Reference: 675177

Project Site: East Anglia OWF

Customer Reference: 3318

Water Analysed as Water

Total and Speciated USEPA16 PAH (SE)

			Conc	ept Reference	675177 003	675177 004
		Custon	ner Sam	BH17-C5-01	BH17-C5-03	
				Date Sampled	11-AUG-2017	11-AUG-2017
Determinand	Method	Test Sample	LOD	Units		
Naphthalene	T149	AR	0.01	μg/l	<0.01	<0.01
Acenaphthylene	T149	AR	0.01	μg/l	<0.01	<0.01
Acenaphthene	T149	AR	0.01	μg/l	<0.01	<0.01
Fluorene	T149	AR	0.01	μg/l	<0.01	<0.01
Phenanthrene	T149	AR	0.01	μg/l	<0.01	<0.01
Anthracene	T149	AR	0.01	μg/l	<0.01	<0.01
Fluoranthene	T149	AR	0.01	μg/l	<0.01	<0.01
Pyrene	T149	AR	0.01	μg/l	<0.01	<0.01
Benzo(a)Anthracene	T149	AR	0.01	μg/l	<0.01	<0.01
Chrysene	T149	AR	0.01	μg/l	<0.01	<0.01
Benzo(b)fluoranthene	T149	AR	0.01	μg/l	<0.01	<0.01
Benzo(k)fluoranthene	T149	AR	0.01	μg/l	<0.01	<0.01
Benzo(a)Pyrene	T149	AR	0.01	μg/l	<0.01	<0.01
Indeno(123-cd)Pyrene	T149	AR	0.01	μg/l	<0.01	<0.01
Dibenzo(ah)Anthracene	T149	AR	0.01	μg/l	<0.01	<0.01
Benzo(ghi)Perylene	T149	AR	0.01	μg/l	<0.01	<0.01
PAH(total)	T149	AR	0.01	μg/l	<0.01	<0.01

Concept Reference: 675177

Project Site: East Anglia OWF

Customer Reference: 3318

Water Analysed as Water

TPH (CWG) with MTBE & BTEX SE

	Concept Reference					
		Custor	ner Sampl	e Reference	BH17-C5-01	BH17-C5-03
			D	ate Sampled	11-AUG-2017	11-AUG-2017
Determinand	Method	Test Sample	LOD	Units		
Benzene	T54	AR	1	μg/l	<1	<1
EthylBenzene	T54	AR	1	μg/l	<1	<1
M/P Xylene	T54	AR	1	μg/l	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	μg/l	<1	<1
O Xylene	T54	AR	1	μg/l	<1	<1
Toluene	T54	AR	1	μg/l	<1	<1
TPH (C5-C6 aliphatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C6-C7 aromatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C6-C8 aliphatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C7-C8 aromatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C8-C10 aliphatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C8-C10 aromatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C10-C12 aliphatic)	T219	AR	0.01	mg/l	<0.01	<0.01
TPH (C10-C12 aromatic)	T219	AR	0.01	mg/l	<0.01	<0.01
TPH (C12-C16 aliphatic)	T219	AR	0.01	mg/l	0.01	<0.01
TPH (C12-C16 aromatic)	T219	AR	0.01	mg/l	0.03	0.02
TPH (C16-C21 aliphatic)	T219	AR	0.01	mg/l	<0.01	<0.01
TPH (C16-C21 aromatic)	T219	AR	0.01	mg/l	<0.01	<0.01
TPH (C21-C35 aliphatic)	T219	AR	0.01	mg/l	0.01	<0.01
TPH (C21-C35 aromatic)	T219	AR	0.01	mg/l	0.02	0.01

Concept Reference: 675177

Project Site: East Anglia OWF

Customer Reference: 3318

Water Analysed as Water

Organochlorine insecticides

			Conce	ot Reference	675177 003	675177 004
	Customer Sample Reference					
			D	ate Sampled	11-AUG-2017	11-AUG-2017
Determinand	Method	Test Sample	LOD	Units		
Hexachlorocyclohexane	T16	AR	0.01	μg/l	(36) < 0.02	(IS)
Hexachlorobenzene	T16	AR	0.01	μg/l	<0.01	(IS)
Heptachlor	T16	AR	0.01	μg/l	<0.01	(IS)
Aldrin	T16	AR	0.01	μg/l	<0.01	(IS)
Heptachlor epoxide	T16	AR	0.01	μg/l	<0.01	(IS)
Chlordane	T16	AR	0.01	μg/l	<0.01	(IS)
Endosulphan	T16	AR	0.01	μg/l	<0.01	(IS)
DDE	T16	AR	0.01	μg/l	<0.02	(IS)
Dieldrin	T16	AR	0.01	μg/l	<0.01	(IS)
Endrin	T16	AR	0.01	μg/l	(36) < 0.02	(IS)
DDD	T16	AR	0.01	μg/l	<0.01	(IS)
DDT	T16	AR	0.01	ua/l	(36) < 0.02	(IS)

Concept Reference: 675177 Project Site: East Anglia OWF Customer Reference: 3318 Water Analysed as Water Organophosphorous insecticides Concept Reference 675177 003 675177 004 Customer Sample Reference BH17-C5-03 BH17-C5-01 Date Sampled 11-AUG-2017 11-AUG-2017 Test Sample Method LOD Determinand Units (IS) T16 Dichlorvos 0.01 AR < 0.01 (IS) T16 Mevinphos AR 0.01 <0.01 μg/l (IS) Dimethoate T16 AR 0.01 <0.01 μg/l (IS) T16 Diazinon AR 0.01 <0.01 μg/l (IS) Pirimiphos methyl T16 AR 0.01 μg/l T16 Malathion AR 0.01 μg/l <0.01

0.01

0.01

0.01

μg/l

μg/l

<0.01

<0.01

(36) < 0.02

T16

T16

T16

AR

AR

AR

Fenitrothion

Azinphos methyl

Parathion

Index to symbols used in Supplement 1B to Report Number 675177-1

(IS)

(IS)

(IS)

Value	Description				
F	Filtered				
AR	As Received				
36	LOD Raised due to low Matrix spike recovery				
110	LOD raised due to low internal standard recovery.				
100	LOD determined by sample aliquot used for analysis				
IS	Insufficient Sample				
U	Analysis is UKAS accredited				
N	Analysis is not UKAS accredited				

Notes

OCP and OPP transferred to Concept Life Sciences Manchester
Supplement 1B report reissued to include only samples 003 and 004
004 - OCP/OPP - No result due to limited sample for a necessary re extraction due to a QC failure.

Method Index

V	/alue	Description
	Γ281	ICP/MS (Filtered)
	Γ149	GC/MS (SIR)
	T54	GC/MS (Headspace)
	Γ219	GC/FID (SE)
	T16	GC/MS

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
As (Dissolved)	T281	F	0.0002	mg/l	U	003-004
Cd (Dissolved)	T281	F	0.00002	mg/l	U	003-004
Cr (Dissolved)	T281	F	0.001	mg/l	U	003-004
Cu (Dissolved)	T281	F	0.0005	mg/l	U	003-004
Pb (Dissolved)	T281	F	0.0003	mg/l	U	003-004
Hg (Dissolved)	T281	F	0.00005	mg/l	U	003-004
Ni (Dissolved)	T281	F	0.001	mg/l	U	003-004
Se (Dissolved)	T281	F	0.0005	mg/l	U	003-004
Zn (Dissolved)	T281	F	0.002	mg/l	U	003-004
Naphthalene	T149	AR	0.01	μg/l	U	003-004
Acenaphthylene	T149	AR	0.01	μg/l	U	003-004
Acenaphthene	T149	AR	0.01	μg/l	U	003-004
Fluorene	T149	AR	0.01	μg/l	U	003-004
Phenanthrene	T149	AR	0.01	μg/l	U	003-004
Anthracene	T149	AR	0.01	μg/l	U	003-004

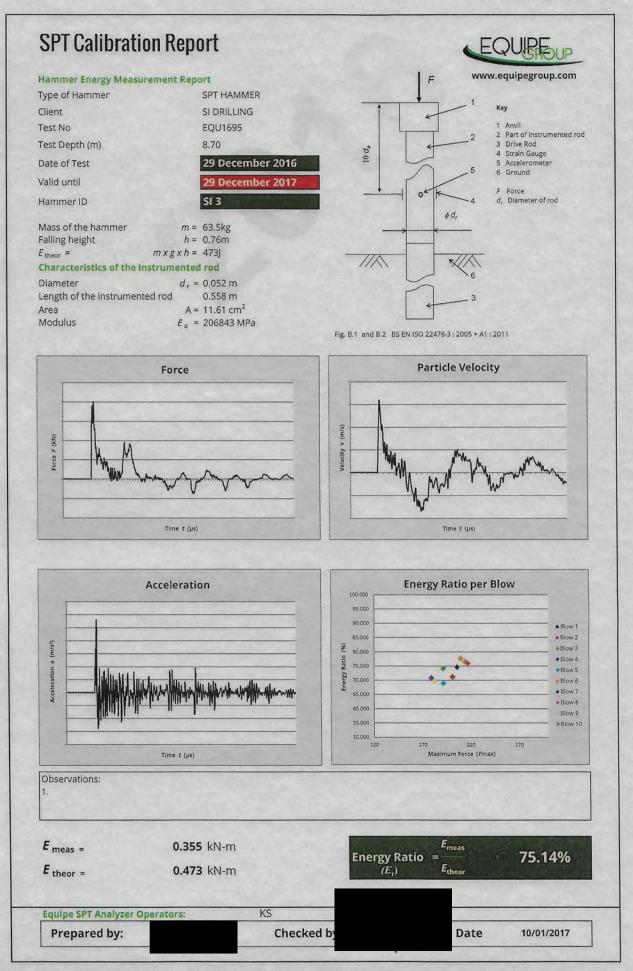
Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Fluoranthene	T149	AR	0.01	μg/l	U	003-004
Pyrene	T149	AR	0.01	μg/l	U	003-004
Benzo(a)Anthracene	T149	AR	0.01	μg/l	U	003-004
Chrysene	T149	AR	0.01	μg/l	U	003-004
Benzo(b)fluoranthene	T149	AR	0.01	μg/l	N	003-004
Benzo(k)fluoranthene	T149	AR	0.01	μg/l	U	003-004
Benzo(a)Pyrene	T149	AR	0.01	μg/l	U	003-004
Indeno(123-cd)Pyrene	T149	AR	0.01	μg/l	U	003-004
Dibenzo(ah)Anthracene	T149	AR	0.01	μg/l	U	003-004
Benzo(ghi)Perylene	T149	AR	0.01	μg/l	U	003-004
PAH(total)	T149	AR	0.01	μg/l	N	003-004
Benzene	T54	AR	1	μg/l	U	003-004
EthylBenzene	T54	AR	1	μg/l	U	003-004
M/P Xylene	T54	AR	1	μg/l	U	003-004
Methyl tert-Butyl Ether	T54	AR	1	μg/l	U	003-004
O Xylene	T54	AR	1	μg/l	U	003-004
Toluene	T54	AR	1	μg/l	U	003-004
TPH (C5-C6 aliphatic)	T54	AR	0.020	mg/l	N	003-004
TPH (C6-C7 aromatic)	T54	AR	0.020	mg/l	N	003-004
TPH (C6-C8 aliphatic)	T54	AR	0.020	mg/l	N	003-004
TPH (C7-C8 aromatic)	T54	AR	0.020	mg/l	N	003-004
TPH (C8-C10 aliphatic)	T54	AR	0.020	mg/l	N	003-004
TPH (C8-C10 aromatic)	T54	AR	0.020	mg/l	N	003-004
TPH (C10-C12 aliphatic)	T219	AR	0.01	mg/l	N	003-004
TPH (C10-C12 aromatic)	T219	AR	0.01	mg/l	N	003-004
TPH (C12-C16 aliphatic)	T219	AR	0.01	mg/l	N	003-004
TPH (C12-C16 aromatic)	T219	AR	0.01	mg/l	N	003-004
TPH (C16-C21 aliphatic)	T219	AR	0.01	mg/l	N	003-004
TPH (C16-C21 aromatic)	T219	AR	0.01	mg/l	N	003-004
TPH (C21-C35 aliphatic)	T219	AR	0.01	mg/l	N	003-004
TPH (C21-C35 aromatic)	T219	AR	0.01	mg/l	N	003-004
Hexachlorocyclohexane	T16	AR	0.01	μg/l	N	003-004
Hexachlorobenzene	T16	AR	0.01	μg/l	N	003-004
Heptachlor	T16	AR	0.01	μg/l	N	003-004
Aldrin	T16	AR	0.01	μg/l	N	003-004
Heptachlor epoxide	T16	AR	0.01	µg/l	N	003-004
Chlordane	T16	AR	0.01	μg/l	N	003-004
Endosulphan	T16	AR	0.01	μg/l	N	003-004
DDE	T16	AR	0.01	μg/l	N	003-004
Dieldrin	T16	AR	0.01	μg/l	N	003-004
Endrin	T16	AR	0.01	μg/l	N	003-004
DDD	T16	AR	0.01	μg/l	N	003-004
DDT	T16	AR	0.01		N	003-004
				μg/l		
Dichlorvos Mevinphos	T16 T16	AR AR	0.01	μg/l	N N	003-004 003-004
'	T16			μg/l		
Dimethoate		AR	0.01	μg/l	N N	003-004
Diazinon Diazinon	T16	AR	0.01	μg/l	N	003-004
Pirimiphos methyl	T16	AR	0.01	μg/l	N	003-004
Malathion	T16	AR	0.01	μg/l	N	003-004
Fenitrothion	T16	AR	0.01	μg/l	N	003-004
Parathion	T16	AR	0.01	μg/l	N	003-004
Azinphos methyl	T16	AR	0.01	μg/l	N	003-004

APPENDIX G Calibration Certificates

SPT hammer(s) SI 3, SI 4, SI 5

Gas monitor(s) GFM 435 s/n 11378

November 2017 Report No 3318-R004

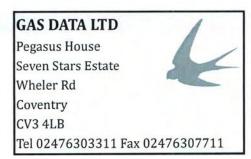


SPT Calibration Report www.equipegroup.com F **Hammer Energy Measurement Report** Type of Hammer SPT HAMMER Key Client SI DRILLING EQU1694 Test No Part of instrumented rod 8.70 Drive Rod Test Depth (m) 4 Strain Gauge 29 December 2016 Date of Test 6 Ground 29 December 2017 Valid until F Force d, Diameter of rod 4 CUT DOWN Hammer ID ød, m = 63.5 kgMass of the hammer h = 0.76m Falling height $m \times g \times h = 473$ /// Characteristics of the instrumented rod $d_r = 0.052 \,\mathrm{m}$ Length of the instrumented rod 0.558 m $A = 11.61 \text{ cm}^2$ Area Modulus $E_a = 206843 \text{ MPa}$ Fig. B.1 and B.2 BS EN ISO 22476-3: 2005 + A1: 2011 **Particle Velocity** Force Time t (µs) Time t (µs) **Energy Ratio per Blow** Acceleration 100.000 95.000 90.000 85.000 Blow 2 Blow 3 80.000 Blow 4 75.000 Blow 5 70.000 Blow 6 • Blow 7 65.000 Blow 8 Blow 9 55.000 Blow 10 50,000 Maximum Force (Fmax) Time t (µs) Observations: Emeas E meas = 0.351 kN-m **Energy Ratio** 74.14% Etheor E theor = 0.473 kN-m (E_r) **Equipe SPT Analyzer Operators:** KS Prepared by: 10/01/2017 Checked b Date

SPT Calibration Report www.equipegroup.com **Hammer Energy Measurement Report** Type of Hammer SPT HAMMER Client Key SI DRILLING Test No EQU1690 Part of instrumented rod Test Depth (m) 8.70 3 Drive Rod 4 Strain Gauge Date of Test 29 December 2016 5 Accelerometer 6 Ground Valid until 29 December 2017 F Force d_r Diameter of rod Hammer ID SI 05 ød, Mass of the hammer m = 63.5 kgFalling height h = 0.76m $E_{\text{theor}} =$ $m \times g \times h = 473$ /// Characteristics of the instrumented rod $d_r = 0.052 \,\mathrm{m}$ Length of the instrumented rod 0.558 m Area $A = 11.61 \text{ cm}^2$ Modulus $E_a = 206843 \text{ MPa}$ Fig. B.1 and B.2 BS EN ISO 22476-3: 2005 + A1: 2011 Force **Particle Velocity** Time t (µs) Time t (µs) Acceleration **Energy Ratio per Blow** 100.000 95.000 90,000 Blow 1 85.000 Blow 2 Blow 3 80.000 Blow 4 75.000 70,000 Blow 6 ♦ Blow 7 65.000 Blow 8 Blow 9 55.000 * Blow 10 170 220 Maximum Force (Fmax) Time t (µs) Observations: E meas = 0.343 kN-m Emeas Energy Ratio = 72.53% E theor = 0.473 kN-m $(E_{\rm c})$ **Equipe SPT Analyzer Operators:** Prepared by: Checked by Date 10/01/2017

TEST DATE	AND CONDI	TIONS			
Date	21/06/2017				
Atmospheric Press	sure	997	mB		
Ambient Temperat	23.0	°C			
Environics Serial N	508	9			

GFM435 Final Inspection & Calibration Check Certificate



Customer	Terraconsult (South) Ltd				
Certificate Number	119385				
Order Number	317112				

Serial Number	11378	Recalibration DUE Date
Software Version	G435-00.0024/0004	21/06/2018

		Instrum	ent Checks			
Keyboard		1	Display Contrast	1		
Pump Flow In	400	Accept > 200 cc/min	Pump Flow @ -200mB	200	Accept > 200 cc/min	
Clock Set / Running		Labels Fitted	1			

Gas Checks									
Sensor	CH	14	C	O_2	0)2			
	Instrument Gas Readings %	True Gas Value	Instrument Gas Readings %	True Gas Value %	Instrument Gas Readings %	True Gas Value			
	59.7	60	39.7	40	20.8	20.9			
	Accept +/- 3.0	00	Accept +/- 3.0	TO	Accept +/- 0.5	20.7			
1	5.0	5	4.8	5	6.0	6			
	Accept +/- 0.3	J	Accept +/- 0.3	9	Accept +/- 0.3				
Zero Reading	0.0	0.0	0.0		0.0	0.0			
100% N ₂	Accept +/- 0.0	0.0	Accept +/- 0.0	0.0	Accept + 0.1	0.0			

		Option	al Gas Check	CS			
Applied Gas 8	Range of GFM	Concentration		Instrument Re	eadings (ppm)		
Gas Type Range (ppm)		Tested @ (ppm)	Zer	o Reading	Instrument Gas Reading		
H2S	5000	1500	0	Accept +/-0.0	1500	Accept +/-5.0	
CO	2000	1000	0	Accept +/-0.0	1000	Accept +/-5.0	
				Accept +/-0.0		Accept +/-5.0	
				Accept +/-0.0		Accept +/-5.0	
Hexane	2.0%	2.0%	0	Accept +/-0.0	1.99	Accept +/-10.0	

			Cross C	as Effects					
Applied Gas (ppm)			Instrument Readings (ppm)						
Gas Type	Concentration	Toxic 1:	H2S	Toxic 2:	CO	Toxic 3:	Hex	Toxic 4:	
H2S	1500	150	1500		0		0		
СО	1000	60		100	0	0			
Hexane	2.0%	0		0		1.9	9		

	Pressure Checks					
Atr	nospheric Pressure [A	P] (mB)				
Current Atmospheric Pressure (mB)	Instrument Atmospheric Pressure Reading (mB)					
All Ports Open to Atmosphere	Open Ports	997	Accept +/- 2.0			
AP Port (Internal)	+800 mB	801	Accept +/- 5.0			
AP Port (Internal)	+1200mb	1199	Accept +/- 5.0			

Flow Checks									
Borehole Flow	Latara and Fi	D U (1/L)	Differential Pressure						
Applied Flow Reading (l/h)	instrument Fi	ow Reading (l/h)	Instrument	DP Reading (Pa)	Applied DP Pressure (Pa) -276				
-30.0	-29.8	Accept +/-3.0	-272	Accept +/-50					
-3.0	-3.1	Accept +/-1.0	-15	Accept +/-6.0	-14				
0.0	0.0	Accept +/-0.0	0.0	Accept +/-0.5	0.0				
+3.0	3.0	Accept +/-0.5	13	Accept +/-3.0	14				
+30.0	30.0	Accept +/-3.0	294	Accept +/-50	295				
+60.0	58.5	Accept +/-6.0	843	Accept +/-130	876				
+90.0	85.9	Accept +/-9.0	1616	Accept +/-250	1717				















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