

OAK ROAD, WREXHAM

[Click here to enter text.](#)

Report No F9042-19/2

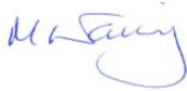
VOLUME 2: PHASE 2 REPORT : CONTAMINATED LAND ASSESSMENT FACTUAL AND INTERPRETATIVE REPORT

June 2020

Issue No 01

Carried out for:
Conrad Energy Limited
Units D and E, Windrush Court
Blacklands Way
Abingdon
OX14 1SY

Report No F9042-19/2

ISSUE NO DATE	STATUS	PREPARED BY	CHECKED BY	APPROVED BY
1 Sept 2019	Draft report	NAME and QUALIFICATIONS Melody Wareing BSc FGS	NAME and QUALIFICATIONS Chris Evans BSc Hons MSc	NAME and QUALIFICATIONS Chris Evans BSc Hons MSc
		SIGNATURE 	SIGNATURE 	SIGNATURE 
1 June 2020	Final report	NAME and QUALIFICATIONS Melody Wareing BSc FGS	NAME and QUALIFICATIONS Chris Evans BSc Hons MSc	NAME and QUALIFICATIONS Chris Evans BSc Hons MSc
		SIGNATURE 	SIGNATURE 	SIGNATURE 

This Report has been prepared by SOCOTEC UK Limited ("SOCOTEC") with all reasonable skill and care, within the terms and conditions of the contract between SOCOTEC and the Client ("Contract") and within the limitations of the resources devoted to it by agreement with the Client.

This Report shall not be used for engineering or contractual purposes unless the Report status is 'Final' and signed by the author, checker and the approver for and on behalf of SOCOTEC.

Whilst every effort has been made to ensure the accuracy of the data supplied and any analysis interpretation derived from it, the possibility exists of variations in the ground and groundwater conditions around and between the exploratory positions. SOCOTEC shall not be liable for any use of the Report for any purpose other than that for which it was originally prepared. No liability can be accepted for any such variations in these conditions. Furthermore, any recommendations are specific to the development as detailed in this Report and no liability will be accepted should they be used for the design of alternative schemes without prior consultant with SOCOTEC.

This Report is confidential between the Client and SOCOTEC. Any reliance upon the Report is subject to the Contract terms and conditions.

SOCOTEC accepts no responsibility whatsoever to third parties to whom this document, or any part thereof, is made known. Any such party relies upon the Report at their own risk. The Contracts (Rights of Third Parties) Act 1999 does not apply to this Report nor the Contract and the provisions of the said Act are hereby excluded.

Unless specifically assigned or transferred within the terms and conditions of the Contract, SOCOTEC asserts and retains all Copyright and other Intellectual Property Rights in and over the Report and its contents. The Report may not be copied or reproduced, in whole or in part, without the written authorisation from SOCOTEC.

SOCOTEC UK Limited was formerly known as Environmental Scientifics Group Limited. The Certificate of Incorporation on Change of Name was filed on 16 October 2017.

**SOCOTEC****REPORT STRUCTURE**

DATE	TITLE	REPORT No
June 2020	PHASE 1 REPORT: DESK STUDY AND SITE RECONNAISSANCE	F9042-19/1
June 2020	PHASE 2 REPORT : CONTAMINATED LAND ASSESSMENT FACTUAL AND INTERPRETATIVE REPORT	F9042-19/2
June 2020	PHASE 2 REPORT : GEOTECHNICAL ASSESSMENT FACTUAL AND INTERPRETATIVE REPORT	F9042-19/3

**C O N T E N T S**

Page

1	INTRODUCTION.....	1
2	SITE SETTING.....	1
	2.1 Location and Description	1
	2.2 Published Geology and Previous Investigations	2
3	FIELDWORK	3
	3.1 General.....	3
	3.2 Exploratory Holes	3
4	GEOENVIRONMENTAL LABORATORY TESTING	4
5	PROPOSED WORKS	4
6	GEOENVIRONMENTAL ASSESSMENT	5
	6.1 Assessment Basis	5
	6.2 Potential Site Sources of Contamination, Pathways and Receptors	5
	6.3 Technical Approach to Soil Contamination	5
	6.4 Human Health Risk Assessment Screening.....	8
	6.5 Risks to Controlled Waters.....	10
	6.6 Site Conceptual Model	11
	6.7 Remediation Recommendations	11
7	REFERENCES.....	13

APPENDIX A FIGURES AND DRAWINGS**APPENDIX B GEOENVIRONMENTAL LABORATORY RESULTS**



1 INTRODUCTION

SOCOTEC UK Limited was commissioned in August 2019 by Conrad Energy Limited (Conrad Energy), to carry out a Desk Study and Site Reconnaissance and contamination assessment at Oak Road, Wrexham. This was required to obtain geotechnical and geoenvironmental information for a proposed small scale flexible fuelled power generation project. The contamination assessment is preliminary to assist with the planning conditions. A geotechnical site investigation is pending approval.

The scope of the investigation was specified by SOCOTEC and comprised geoenvironmental sampling, laboratory testing and reporting. The investigation was performed in accordance with the contract specification, and the general requirements of BS 5930 (2015), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and other relevant related standards identified below. The fieldwork took place on 28 August 2019.

This report (Volume 2) presents the factual records of the fieldwork and laboratory testing together with a geoenvironmental assessment based on the investigation findings to date. The geoenvironmental assessment is based on close to surface samples to assess the area surrounding an unknown drum identified within the desk study walkover. The information is also presented as digital data as defined in AGS (2017).

2 SITE SETTING

2.1 Location and Description

The site is located approximately 5 km east of Wrexham, to the south east of the Wrexham Industrial Estate, at National Grid reference SJ386495, see Site Location Plan in Appendix A.

The site comprises a roughly rectangular shaped plot covering an area of approximately 0.3 hectares. The ground surface had been recently cleared by a backhoe excavator and as such was primarily topsoil and small ground level plants. Some stockpiles of cleared vegetation was present within the site, including evidence that mature trees had been felled.



The site boundary comprised a wooden bar fence along the west and south, a palisade fence along the northern boundary and palisade fencing and mature trees on the east boundary.

The site is generally level, with a gully (approximately 1.5 m deep) running roughly north west – south east from a roughly central location towards the south east corner of the site. At the west end of the gully there is a concrete service chamber cover, with a pipe exit on the eastern side. A pipe entry is shown on the north bank of the gully several metres away and these may have once been a single pipe but are now no longer connected. A rusted drum is located on the north side of the concrete service chamber. No identifying marks were apparent to indicate its origin or former content.

An electrical overhead line (OHL) crosses the site from north to south in the eastern part of the site, with an OHL tower located on site.

2.2 Published Geology and Previous Investigations

2.2.1 Published Geology

The published geological map for the area, (BGS Sheet 122, 1967), and the BGS GeoIndex Onshore online viewer (2019) show the site located on Till comprising diamicton which is a unsorted and unstratified generally overconsolidated material deposited by glacial processes and consists of clay, sand, gravel and boulders. The underlying solid geology comprises Triassic Kinnerton Sandstone Formation (sandstone) on the east of the site and Permian and Carboniferous Salop Formation (mudstone, sandstone, conglomerate) on the west of the site.

Local BGS boreholes between 90 and 190 m to south and east record clay (Till) to a maximum depth of 32 m, overlying a sand layer proven to 34 m. Rockhead was not shown in any of the available BGS logs.

Localised areas of Made Ground are possible due to the development in the surrounding area and the realignment of the road, although a significant depth is not anticipated.



2.2.2 Previous Investigations

A desk study (Volume 1) has been carried out and indicates a generally low risk relating to the proposed end use. The sources identified within the Preliminary Risk Assessment (PRA) are

- Potential localised Made Ground, including an unknown drum on site
- Historic on site pond
- Former ROF cordite factory on and off site
- Historic on site railway sidings
- Off site electrical substation (78 m west)
- Off site infilled ponds and landfill within 250 m of the site boundary

An historic feature plan is presented in Appendix A showing selected on site features.

3 FIELDWORK

3.1 General

The sampling locations were selected by SOCOTEC and set out from local features, and are shown on the Site Plan in Appendix A. The locations were targeting an unknown drum and OHL tower identified during preparation of the desk study and providing a general background for the site surfacing. Further investigation of the site is presented in Volume 3.

3.2 Exploratory Holes

Eight environmental samples were taken from 0.10 m below current ground level using hand tools.

On completion of the sampling geoenvironmental samples were transported from site directly to the SOCOTEC laboratory at Bretby, near Burton-on-Trent.



4 GEOENVIRONMENTAL LABORATORY TESTING

Laboratory testing was scheduled by SOCOTEC on the soil samples recovered during the fieldwork. The testing is summarised below and discussed further in the Table 2 and Section 6, and the results are presented in Appendix B.

- Metals and pH
- PAH 16
- Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG) and TPH with carbon banding
- Asbestos screen
- Cyanide total
- Phenol Index
- Soil Organic Matter
- Polychlorinated biphenyls (PCB) 12 congeners

5 PROPOSED WORKS

From information and the most recent development plan provided by Conrad Energy it is understood that the proposed development will comprise a small scale flexible fuelled power generation project.

This will include but is not limited to the following:

- Gas engines
- Oil Tanks
- Amenity Buildings
- Gas Kiosk
- Ecological mitigation area along the route of the OHL across the site.

On the current version of the plan, WXM-GA-01 Rev E, presented in Appendix A, all of the proposed development is on the west side of the OHL route. From information provided by the client there will be slabs underneath all of the buildings and generator sets, with a permeable aggregate finish elsewhere on the site. The gully area will be culverted and backfilled.

6 GEOENVIRONMENTAL ASSESSMENT

6.1 Assessment Basis

The preparation and development of a conceptual site model (CSM) is key to understanding the risks that may be posed to human health or the environment by contaminated land. Information contained in the Phase 1 Desk Study was prepared by SOCOTEC and a Site Reconnaissance was undertaken by SOCOTEC prior to the site investigation has been used to identify the likely contaminants, the potential pathways and the likely receptors that could be affected by contamination. This process has been undertaken in accordance with Environment Agency guidance CLR 11, Model Procedures for the Management of Land Contamination (EA, 2004).

6.2 Potential Site Sources of Contamination, Pathways and Receptors

Prior to the geotechnical investigation, and based on the Desk Study report the initial CSM is presented in the table below.

TABLE 1 : INITIAL CONCEPTUAL SITE MODEL

SOURCE	PATHWAY	RECEPTOR
Potential localised areas of Made Ground, Underlying services and other general Made Ground; small historical pond on site; former ROF cordite factory	Ingestion, direct contact, inhalation of dust	Construction site workers Future users
	Lateral Groundwater Migration	Unnamed brook to the south and underlying aquifers
	Direct contact with soil / groundwater	Built environment and services
Offsite infilled ponds within 250 m of the site boundary.	Lateral and vertical migration of ground gas.	Future users and built environment
Offsite landfill within 250 m of the site boundary		

6.3 Technical Approach to Soil Contamination

In accordance with Environment Agency guidance CLR 11, Model Procedures for the Management of Land Contamination, (EA, 2004), human health risk assessment follows a tiered approach. The



first tier comprises a Preliminary Risk Assessment, completed as part of a Desk Study. A Phase 1 Desk Study and Site Reconnaissance was undertaken by SOCOTEC prior to the site investigation. The information has been used to gain a better understanding of the history of the site, potential contaminants present and develop a conceptual model of the site.

Further tiers of risk assessment include Generic Quantitative Risk Assessment (GQRA) and Detailed Quantitative Risk Assessment (DQRA), which use data derived from the ground investigation to assess risks to identified receptors. The assessment included in this report comprises a GQRA, which is undertaken by comparing soil contaminant concentrations with conservative Generic Assessment Criteria (GAC).

Generic Assessment Criteria (GAC) for various land use and exposure scenarios have been selected from the following sources:

- CL:AIRE Category 4 Screening Levels (C4SL);
- LQM Suitable for Use Levels (S4UL) ; and
- CL:AIRE/EIC/AGS GAC

The GAC have been derived using the Environment Agency Contaminated Land Exposure Assessment (CLEA) model, for a range of land uses and exposure scenarios, including:

- Residential with the consumption of homegrown produce;
- Residential without the consumption of homegrown produce;
- Commercial;
- Allotments;
- Public Open Space near residential housing (POSresi); and
- Public Open Space public park scenario (POSpark)

It is understood that the site is to be redeveloped for the construction of an unmanned small power generation facility, subsequently the commercial GACs are considered to be the most appropriate selection to use in the comparison of measured contaminant concentrations, whilst being highly conservative.



Provisional C4SL values for a total of six priority substances (arsenic, benzene, benzo(a)pyrene, cadmium, hexavalent chromium and lead) were produced by CL:AIRE, and published in December 2013. A policy companion document was published by DEFRA in March 2014, which confirmed the final C4SL for these determinands. The final C4SL values are considered to represent 'relevant technical tools', as per paragraph 4.21(c) of the Contaminated Land Part IIA Statutory Guidance. Their purpose is to identify land that falls within Category 4 (Human Health) as defined by the Statutory Guidance, i.e. land that is definitely not Contaminated Land as defined by the Part IIA legislation.

It should be noted that the C4SLs have been derived using toxicological criteria that are presented as posing a 'low level of toxicological concern'. This is in comparison with previous Soil Guidelines

Values (SGVs) and LQM GAC, which were derived using toxicological criteria that represent a 'minimal risk' to human health.

The LQM Suitable for Use Levels (S4ULs) have been derived in accordance with the changes in exposure modelling presented within the C4SL framework, whilst still using a set of toxicological criteria that are set within the 'minimal risk' range. The S4ULs were published to offer a set of collated information on the toxicity and transport properties for a number of common contaminants, and should be seen as suitable for use in planning and change of use assessments, as well as in Part IIA assessments.

The CL:AIRE/EIC/AGC Generic Assessment Criteria were published in December 2009. Assessment criteria were produced using the CLEA model for a total of 35 No. less common contaminants, in accordance with the CLEA guidance. The GAC were intended to compliment the SGVs produced by the Environment Agency, and the LQM GAC that were current at the time. These have been used in the assessment for contaminants where S4ULs and C4SLs are not available.

The SOCOTEC approach to human health risk assessment in planning and development risk assessments is to use the various assessment criteria in the following order of preference: S4UL > EIC GAC > C4SLs.



Where contaminants fail the initial screen against S4UL or EIC GAC, a further assessment may be possible by screening against C4SLs. Where this is undertaken it should be clearly understood that the C4SLs represent 'low risk' rather than 'minimal risk' GAC.

6.4 Human Health Risk Assessment Screening

The maximum recorded concentrations of contaminants in the samples are compared with a conservative commercial GACs (adjusted for 1 % SOM) and presented in Table 2 below.

TABLE 2 : COMPARISON OF MAXIMUM MEASURED CONCENTRATIONS WITH COMMERCIAL GACS ADJUSTED FOR 1% SOM

DETERMINAND	MAXIMUM MEASURED CONCENTRATION (mg/Kg)	GENERIC ASSESSMENT CRITERION (GAC) (mg/Kg)	NO. OF RESULTS EXCEEDING GAC (NO. OF TESTS IN BRACKETS)
Metals & semi- metals			
Arsenic	9.2	640	0 (8)
Barium	198	22000	0 (8)
Beryllium	0.69	12	0 (8)
Cadmium	1.4	190	0 (8)
Chromium III	41.7	8600	0 (8)
Chromium VI	<0.1	33	0 (8)
Lead ¹	271.6	2330	0 (8)
Mercury ²	<0.5	1100	0 (8)
Nickel	35.1	980	0 (8)
Selenium	<0.5	12000	0 (8)
Vanadium	39.5	9000	0 (8)
Zinc	673.8	730000	0 (8)
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	<0.14	84000	0 (8)
Acenaphthylene	<.14	83000	0 (8)
Anthracene	0.25	520000	0 (8)
Benzo(a)anthracene	1	170	0 (8)
Benzo(a)pyrene	1.36	35	0 (8)
Benzo(b)fluoranthene	1.96	44	0 (8)
Benzo(g,h,i)perylene	1.57	3900	0 (8)



Benzo(k)fluoranthene	0.6	1200	0 (8)
Chrysene	1	350	0 (8)
Dibenzo(a,h)anthracene	0.27	3.5	0 (8)
Fluoranthene	1.97	23000	0 (8)
Fluorene	<0.14	63000	0 (8)
Indeno(1,2,3,c,d)pyrene	1.26	500	0 (8)
Napthalene	<0.14	190	0 (8)
Phenanthrene	0.73	22000	0 (8)
Pyrene	1.66	54000	0 (8)
Total Petroleum Hydrocarbons and BTEX			
TPH by GCFID	2500	N/A	N/A
GRO C5-C10 ³	<0.271	7800	0 (3)
TPH Aliphatic >EC08-C10 ³	4.06	2000	0 (8)
TPH Aliphatic >EC10-C12 ³	3.41	9700	0 (8)
TPH Aliphatic >EC12-C16 ³	<5.42	59000	0 (3)
TPH Aliphatic >EC16-C35 ³	62.1	1600000	0 (3)
TPH Aromatic >EC08-10 ³	<5.42	3500	0 (3)
TPH Aromatic >EC10-12 ³	<5.42	16000	0 (3)
TPH Aromatic >EC12-16 ³	6.59	36000	0 (8)
TPH Aromatic >EC16-21 ³	107.7	28000	0 (8)
TPH Aromatic >EC21-35 ³	2010	28000	0 (8)
Benzene	<13.6	27	0 (3)
Toluene	<13.6	56000	0 (3)
Ethylbenzene	<13.6	5700	0 (3)
m/p-Xylene	<27.1	5900	0 (3)
o-Xylene	<13.6	6600	0 (3)
Other Compounds			
Asbestos	No asbestos detected in samples	0.001%	0 (3)
Cyanide (total)	2.4	157	0 (8)
Phenol (total)	<0.7	760	0 (1)
PCB sum of 12 ⁴	<0.07	0.24	0 (1)
pH (range of results, pH units)	6.7 to 8.2	N/A	N/A

¹C4SL²GAC for Inorganic Mercury used³Most conservative aliphatic/aromatic GAC used⁴GAC for Dioxin, Furans and Dioxin like PCBs (12 Congeners) used

6.4.1 Risk to Site Users



The samples analysed were all from 0.10 m below current ground level following site clearance activities. As highlighted in the above Table 2 none of the chemical contaminants exceeded the GAC for the commercial land use scenario.

6.4.2 Risk to Other Human Receptors

The CLEA model cannot be used to assess the acute risks to construction and/or maintenance workers from soil contamination. CLEA only deals with chronic long term risks.

In order to assess potential risks to these workers reference has been made to the thresholds for hazardous waste (EA, 2011). Soils with concentrations of hazardous contaminants (e.g. harmful, toxic, carcinogenic) above certain thresholds are classified as hazardous for disposal. These types of contaminated soils would potentially pose a risk to construction and/or maintenance workers.

Based on the chemical analysis results in Section 6.4, the levels of the majority of contaminants in the soil at the site are such that they are unlikely to pose a hazard to construction and/or maintenance workers. However, it is considered that TPH contamination in the vicinity of ES7 could pose a moderate risk via direct contact, ingestion/inhalation of soil particles.

A TPH interpretation of the gas chromatographic data was scheduled on the ES7 sample following completion of the main analysis and this indicated mineral oil in the range nC18-nC40+.

Contact with soil should be avoided and standard site hygiene procedures should be implemented, such as wearing gloves and overalls and providing adequate washing facilities. Eating, drinking and smoking should be banned in the working areas to prevent inadvertent ingestion of the soil.

6.5 Risks to Controlled Waters

Currently no groundwater or soil leachate samples have been analysed. Therefore, the potential risk to Controlled Waters cannot be assessed further than that in the current desk study. Should groundwater be encountered during the intrusive investigation laboratory analysis may be required.



6.6 Site Conceptual Model

In Section 6.2 potential sources of contamination, pathways and receptors were identified for the site based on the available information. These potential pollutant linkages constituted the preliminary conceptual model for the site.

The results of the preliminary ground investigation have been used to refine the conceptual model and to define the specific source-pathway-receptor pollutant linkages for the site based on the proposed development.

The chemical analysis results indicate there is currently a very low risk to future site users from near surface (0.1 m below current ground level) soil contamination at the site, however, there is a moderate risk to construction workers from elevated TPH recorded in sample/location ES7. If the construction worker contamination exposure control and mitigation measures recommended above are adopted, the mitigated risks are considered to be very low.

No asbestos was detected in the three samples analysed, but this is a limited number of test and only on soils at 0.1 m below former ground level..

6.7 Remediation Recommendations

The level of contamination in general is low for the analysed contaminants. In addition the expected hardstanding to be installed at the site would further reduce any risk to future end users. Therefore, on the basis of the current investigation and risk assessment, no specific remedial measures are deemed necessary to mitigate potential contamination risk to future site end users.

Where excavation work is to be carried out in the vicinity of ES7 then contact with soil should be avoided and standard site hygiene procedures should be implemented, such as wearing gloves and overalls and providing adequate washing facilities. Eating, drinking and smoking should be banned in the working areas to prevent inadvertent ingestion of the soil.



6.8 Limitations

As noted above this assessment is based on near surface samples and does not currently include for any groundwater assessment. Should deep Made Ground deposits or shallow groundwater be encountered during a subsequent site investigation or construction phase then further analysis may be required.



7 REFERENCES

- AGS : 2017 : Electronic transfer of geotechnical and geoenvironmental data (Edition 4.0.4 February 2017). Association of Geotechnical and Geoenvironmental Specialists.
- BGS England and Wales Sheet 122 : 1967 : Nantwich. 1:63360 geological map (drift). British Geological Survey.
- BGS England and Wales Sheet 122 : 1967 : Nantwich. 1:63360 geological map (solid). British Geological Survey.
- BGS GeoIndex Onshore : 2019. www.bgs.ac.uk. British Geological Survey.
- BS 5930 : 2015 : Code of practice for ground investigations. British Standards Institution.



SOCOTEC

APPENDIX A

FIGURES AND DRAWINGS

Site Location Plan

A1

Proposed Layout Plan

WXM-GA-01 Rev E

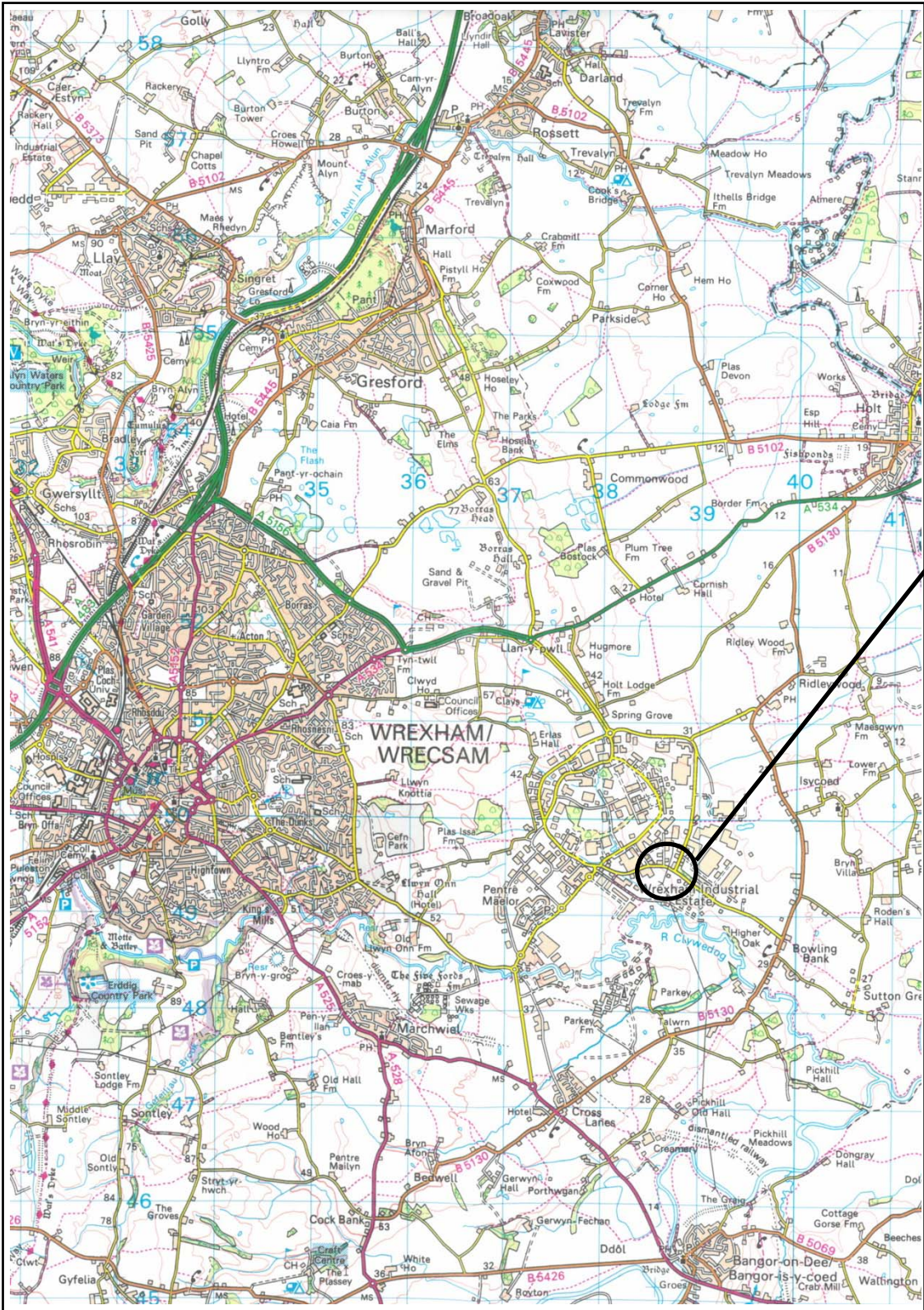
Site Plan

A2

Historic Features Plan

A3

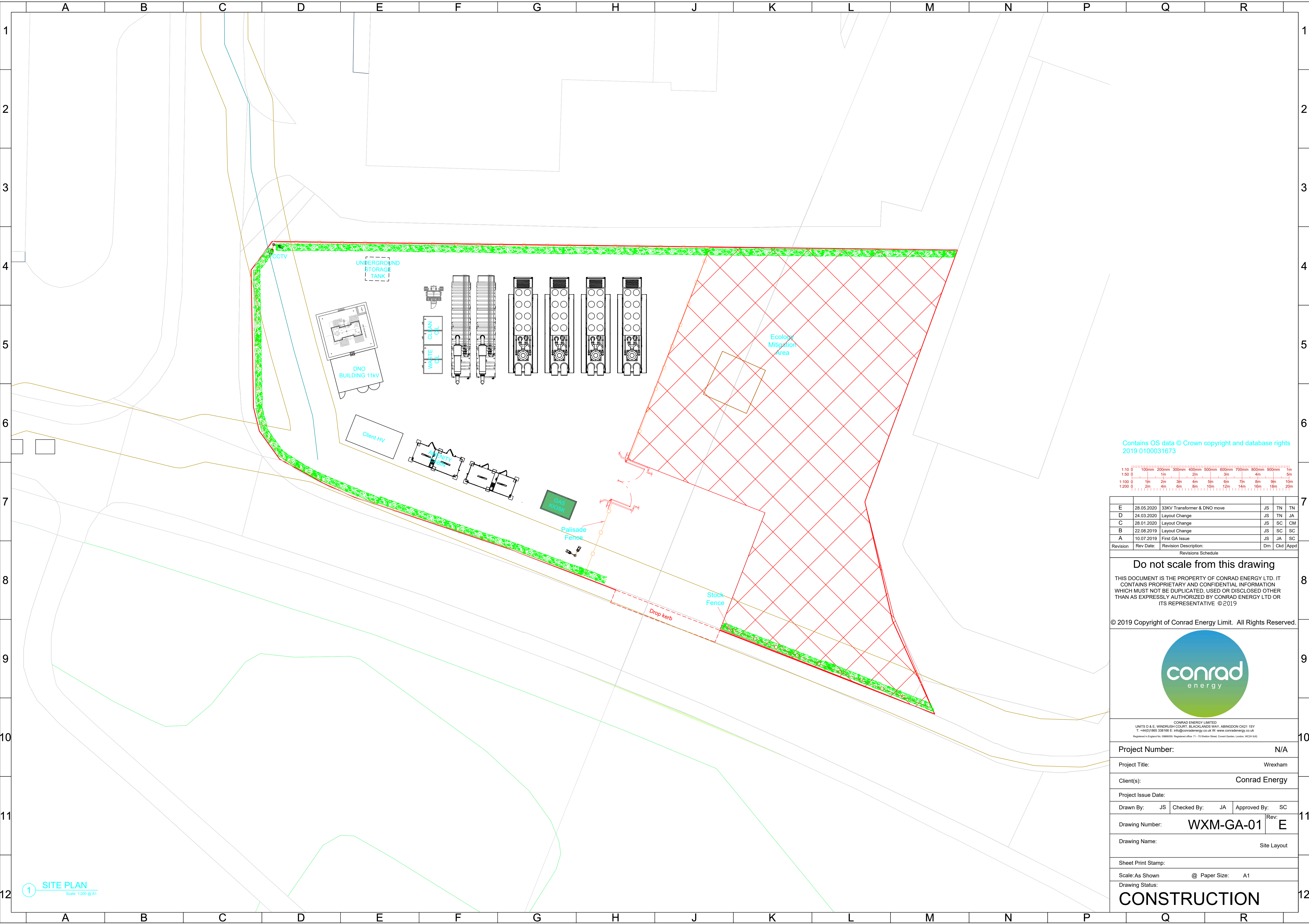
Site Location Plan



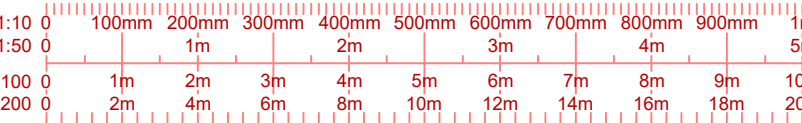
THE
SITE

Reproduced from the 2016 Ordnance Survey 1:50 000 scale Landranger map No 117 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright, SOCOTEC UK Limited. All rights reserved. Licence Number 100006060

Notes: Scale 1:50 000	Project Wrexham SI Project No. F9042-19 Carried out for Conrad Energy	Figure A1
----------------------------------	--	--------------------------------



Contains OS data © Crown copyright and database rights
2019 0100031673



E	28.05.2020	33KV Transformer & DNO move	JS	TN	TN
D	24.03.2020	Layout Change	JS	TN	JA
C	28.01.2020	Layout Change	JS	SC	CM
B	22.08.2019	Layout Change	JS	SC	SC
A	10.07.2019	First GA Issue	JS	JA	SC
Revision	Rev Date:	Revision Description:	Drm	Ckd	Appd

Revisions Schedule

Do not scale from this drawing

THIS DOCUMENT IS THE PROPERTY OF CONRAD ENERGY LTD. IT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION WHICH MUST NOT BE DUPLICATED, USED OR DISCLOSED OTHER THAN AS EXPRESSLY AUTHORIZED BY CONRAD ENERGY LTD OR ITS REPRESENTATIVE ©2019

© 2019 Copyright of Conrad Energy Limit. All Rights Reserved.



CONRAD ENERGY LIMITED
UNITS D & E, WINDRUSH COURT, BLACKLANDS WAY, ABRINGDON OX21 1SY
T: +44(0)1865 338160 E: info@conradenergy.co.uk W: www.conradenergy.co.uk
Registered in England No. 0886005 Registered Office: T1 - 75 Shafes Street, Covent Garden, London, WC2D 8UD

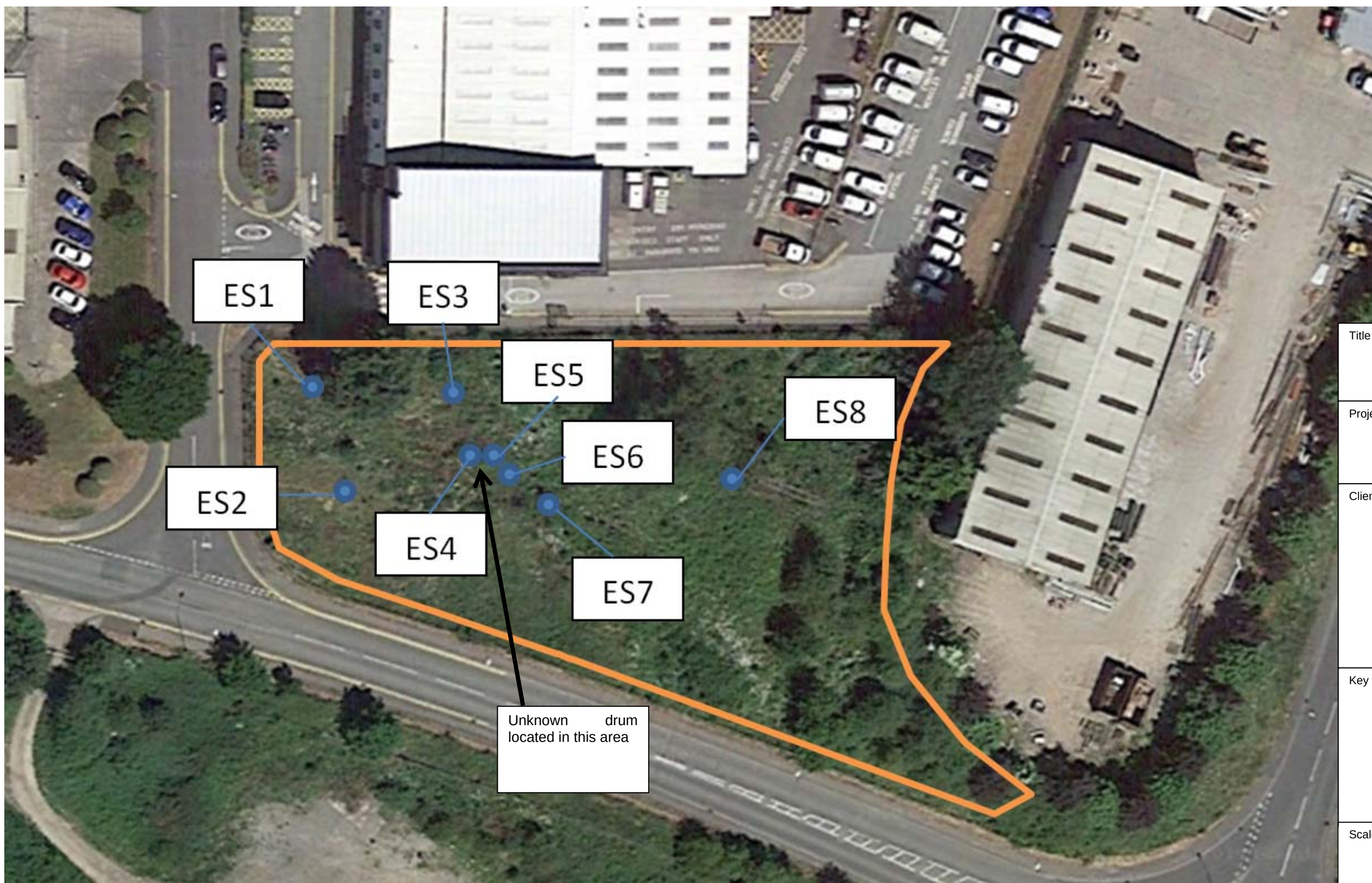
Project Number:			N/A		
Project Title:			Wrexham		
Client(s):			Conrad Energy		
Project Issue Date:					
Drawn By: JS		Checked By: JA		Approved By: SC	
Drawing Number: WXM-GA-01				Rev: E	
Drawing Name:				Site Layout	

Sheet Print Stamp:

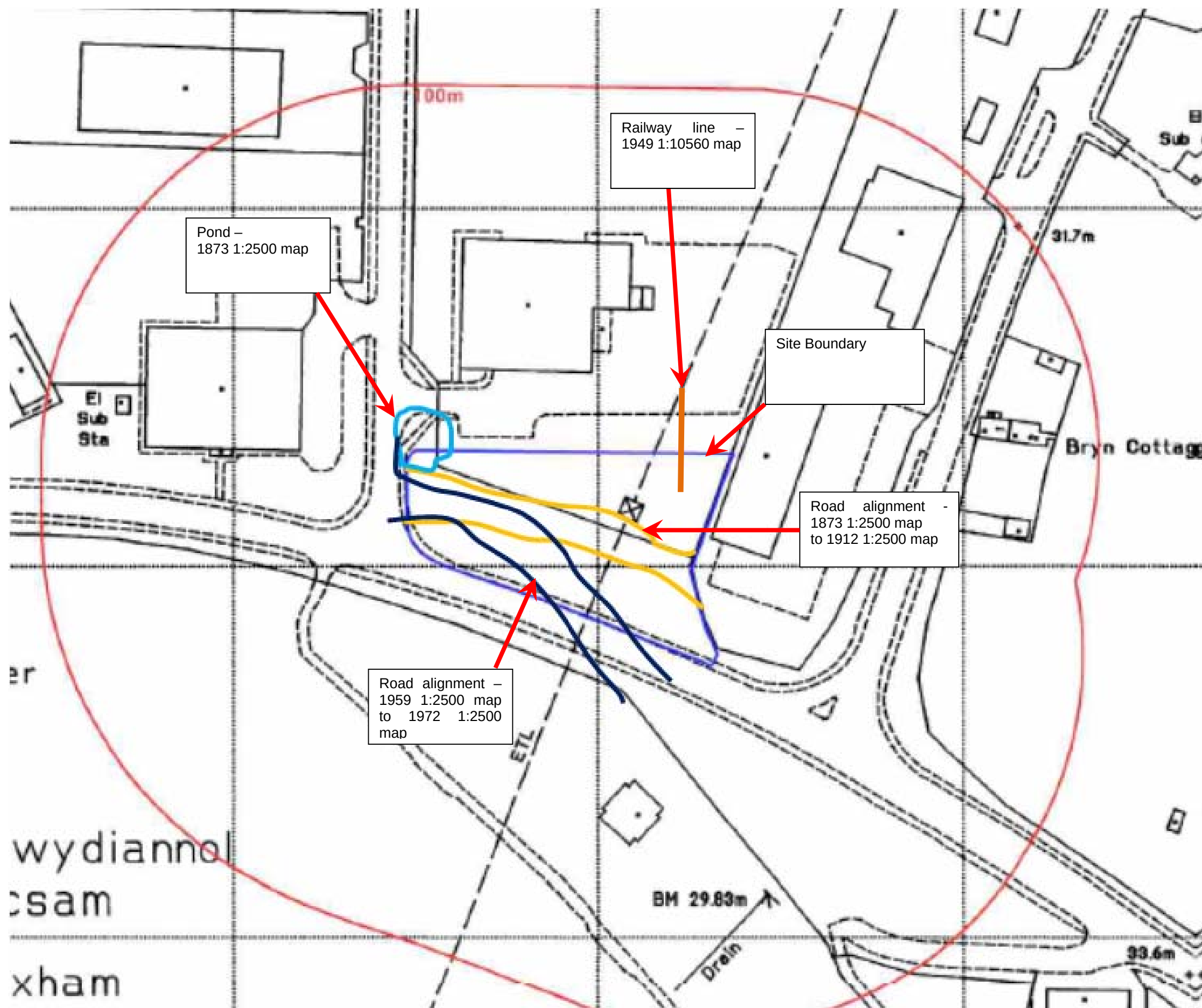
Scale:As Shown @ Paper Size: A1

Drawing Status:

CONSTRUCTION



Title	
SITE PLAN	
Project	
Oak Road, Wrexham	
Client	
Conrad Energy	
Key	
 Sample Location	
Scale	
NTS	
	
Project No	Figure No
F9042-19/2	A2



Title HISTORIC FEATURES PLAN	
Project Wrexham Industrial Estate	
Client Conrad Energy	
Notes: Features are approximate only based on historical map locations.	
Scale NTS	
 SOCOTEC	
Project No F9042-19/2	Figure No A3



SOCOTEC

APPENDIX B
GEOENVIRONMENTAL LABORATORY RESULTS

Test Report

EFS/201670

TEST REPORT



Report No. EFS/201670M (Ver. 2)

SOCOTEC UK Deeside
Unit 18
Drome Road
Deeside Industrial Estate
Deeside
Flintshire
CH2 2NY

Site: A9008-19 Wrexham

The 8 samples described in this report were registered for analysis by SOCOTEC UK Limited on 30-Aug-2019. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 13-Sep-2019

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by SOCOTEC UK Limited.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 7)
Table of TPH Interpretations (Page 8)
Subcontracted Analysis Reports (Pages 9 to 10)
The accreditation status of subcontracted analysis is displayed on the appended subcontracted analysis reports.
Analytical and Deviating Sample Overview (Pages 11 to 12)
Table of Additional Report Notes (Page 13)
Table of Method Descriptions (Page 14)
Table of Report Notes (Page 15)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
SOCOTEC UK Lim 
Becky Batham Operations Manager
Energy & Waste Services

Date of Issue: 13-Sep-2019

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked '^' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)

SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

Interpretation of GC/FID Chromatographic Data

Client:	SOCOTEC UK Deeside
Site:	A9008-19 Wrexham
Report Number:	S201670
Date:	12/09/2019M

Assessment Type	Standard Interpretation
Assessor:	C Oqvist
Analysis:	TPH by GC-FID(AR)

Sample ID	Client Description	Interpretation
CL1970567	ES7 ES 7 0.10	Mineral oil style UCM in the range nC18-nC40+. Some PAHs has been noted in the sample. GC-MS suggested for further identification.

CERTIFICATE OF ANALYSIS

ANALYSIS REQUESTED BY: SOCOTEC UK Ltd
Environmental Chemistry
PO Box 100
Burton upon Trent
Staffordshire
DE15 0XD

CONTRACT NO: S07859-7

DATE OF ISSUE: 10.09.19

DATE SAMPLES RECEIVED: 03.09.19

DATE SAMPLES ANALYSED: 10.09.19

DESCRIPTION: Three soil/loose aggregate samples.

ANALYSIS REQUESTED: Qualitative analysis of samples for determination of presence/type of asbestos.

METHODS:

Our method involves initial examination of the sampleS followed by detailed analysis of representative sub-samples. The sub-samples are analysed qualitatively for asbestos by polarised light and dispersion staining as described by the Health and Safety Executive in HSG 248.

RESULTS:

Initial Screening

No asbestos was detected in any of the soil samples by stereo-binocular and polarised light microscopy.

A summary of the results is given in Table 1.





CONTRACT NO: S07859-7
DATE OF ISSUE: 10.09.19

RESULTS: (cont.)

Table 1: Qualitative Results

SOCOTEC Job I.D: S201670

IOM sample number	Client sample number	ACM type detected	PLM result
S66813	S1970561 ES1 0.10	-	No Asbestos Detected
S66814	S1970563 ES3 0.10	-	No Asbestos Detected
S66815	S1970567 ES7 0.10	-	No Asbestos Detected

Our detection limit for this method is 0.001%.

COMMENTS:

IOM Consulting cannot accept responsibility for samples that have been incorrectly collected or despatched by external clients.

Any opinions and interpretations expressed herein are outwith the scope of our UKAS accreditation.

AUTHORISED BY:

J Simpson
Senior Scientific Technician

CustomerSOCOTEC UK Deeside
SiteA9008-19 Wrexham
Report NoS201670M

Consignment No S87653
Date Logged 30-Aug-2019
In-House Report Due 19-Sep-2019

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	CuIserv	FOCS	GROHSA	ICPMSS	ICPSOIL	KONECR	MCertS	PAMHSUS	PCBECD	PHSOIL	SFAP1	Sub020	TMSS	TPHRIJUS	TPH Carbon Banding.
		Sampled		S.O.M. % (Calc)	GRO (AA) by HSA GC-FID	Arsenic (MS)		Beryllium.	Chromium vi:	PAH (16) by GCMS	PCB-12 Congeners Analysis	pH units (AR)	Cyanide(Total) (AR)	Phenol Index.(AR)	Tot.Moisture @ 105C	TPH by GC/FID (AR)	
		REPORT A															
CL/1970561	ES1 0.10	28/08/19															
CL/1970562	ES2 0.10	28/08/19															
CL/1970563	ES3 0.10	28/08/19															
CL/1970564	ES4 0.10	28/08/19															
CL/1970565	ES5 0.10	28/08/19															
CL/1970566	ES6 0.10	28/08/19															
CL/1970567	ES7 0.10	28/08/19															
CL/1970568	ES8 0.10	28/08/19															

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key

AThe sample was received in an inappropriate container for this analysis
BThe sample was received without the correct preservation for this analysis
CHeadspace present in the sample container
DThe sampling date was not supplied so holding time may be compromised - applicable to all analysis
ESample processing did not commence within the appropriate holding time
FSample processing did not commence within the appropriate handling time

Requested Analysis Key

Analysis Required

Analysis dependant upon trigger result - Note: due date may be affected if triggered

No analysis scheduled

^Analysis Subcontracted - Note: due date may vary

CustomerSOCOTEC UK Deeside
SiteA9008-19 Wrexham
Report NoS201670M

Consignment No S87653
Date Logged 30-Aug-2019
In-House Report Due 19-Sep-2019

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	TPHIDUS	TPHUSI												WSLMS9	
				Sampled	TPH Interpretation.	TPH Ali Band >C10-C12	TPH Ali Band >C12-C16	TPH Ali Band >C16-C21	TPH Ali Band >C21-C35	TPH Ali Band >C8-C10	TPH Ali Band >C8-C40	TPH Aro Band >C10-C12	TPH Aro Band >C12-C16	TPH Aro Band >C16-C21	TPH Aro Band >C21-C35	TPH Aro Band >C8-C10	TPH Aro Band >C8-C40
				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CL/1970561	ES1 0.10	28/08/19															
CL/1970562	ES2 0.10	28/08/19															
CL/1970563	ES3 0.10	28/08/19															
CL/1970564	ES4 0.10	28/08/19															
CL/1970565	ES5 0.10	28/08/19															
CL/1970566	ES6 0.10	28/08/19															
CL/1970567	ES7 0.10	28/08/19															
CL/1970568	ES8 0.10	28/08/19															

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key

AThe sample was received in an inappropriate container for this analysis
BThe sample was received without the correct preservation for this analysis
CHeadspace present in the sample container
DThe sampling date was not supplied so holding time may be compromised - applicable to all analysis
ESample processing did not commence within the appropriate holding time
FSample processing did not commence within the appropriate handling time

Requested Analysis Key

Analysis Required

Analysis dependant upon trigger result - Note: due date may be affected if triggered

No analysis scheduled

^Analysis Subcontracted - Note: due date may vary

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
BTEXHSA	CL1970564 CL1970565 CL1970566	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (Benzene,) . These circumstances should be taken into consideration when utilising the data.
GROHSA	CL1970564 CL1970565 CL1970566	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (C6-C7 ALI) . These circumstances should be taken into consideration when utilising the data.
TPHFIDUS	CL1970561 TO CL1970568	The Secondary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily (including the Primary Process Control) and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation , where applicable, from the affected analytes (C10-C12) . These circumstances should be taken into consideration when utilising the data.
PCBECD	CL1970568	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes PCB 126 . These circumstances should be taken into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	FOCS	Oven Dried @ < 35°C	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	ICPSOIL	Oven Dried @ < 35°C	Determination of Metals in soil samples by aqua regia digestion followed by ICPOES detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBECD	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/arocloris by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105°C by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

▮ Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : SOCOTEC UK Deeside

Site : A9008-19 Wrexham

Report Number : S20_1670

Note: major constituent in upper case

[illegible]