

**REPORT C3584
APRIL 2010**

GEOENVIRONMENTAL APPRAISAL

**of land at
CANAL WOOD INDUSTRIAL ESTATE, CHIRK**

**prepared for
RICHARD BURBIDGE LTD**



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APPENDIX A FIGURES AND DRAWINGS

Drawing No.	Title	Scale
C3584/01	Site Location Plan	1:50,000
C3584/02	Site Features Plan (Comprising Survey Operations drawing nos. 09J080/001 and 09J080/002, dated Dec 09)	1:500
C3584/03	Preliminary Conceptual Site Model	NTS
C3584/04	Exploratory Hole Location Plan showing Proposed Development Layout	NTS
C3584/05	Revised Conceptual Site Model	NTS

NTS: Not to Scale

APPENDIX B GROUNDSURE REPORT

APPENDIX C COAL AUTHORITY AND REGULATORY AUTHORITY SEARCHES

APPENDIX D EXPLORATORY HOLE LOGS

APPENDIX E LABORATORY TEST RESULTS

APPENDIX F GROUND GAS AND GROUNDWATER MONITORING RESULTS

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EXECUTIVE SUMMARY

Introduction	Sirius Geotechnical and Environmental Ltd (Sirius) were commissioned by Vernon and Co., acting on behalf of Richard Burbidge Ltd, to undertake a geoenvironmental appraisal of land at Canal Wood Industrial Estate, Chirk.
Site Details	The site is located within Canal Wood Industrial Estate, Chirk. It is generally level with the exception of the northern portion, which rises steeply northwards. The site comprises a series of small industrial units to the south and a timber factory in the central and northern part of the site. A car park is located adjacent to the northern boundary of the site.
Site History	Prior to the 1890s the site was under agricultural land-use. Subsequently, the site underwent development associated with transportation (tramways). Since the 1980s, commercial and industrial development has taken place.
Fieldwork	The ground investigation took place on 23 rd February 2010 and comprised 8 window sample boreholes with the installation of 5 gas and groundwater installations in selected window sample boreholes. Permanent monitoring installations for both groundwater and ground gas monitoring were installed in WS3, WS4, WS5, WS6 and WS7.
Laboratory Testing	Samples of soil and groundwater were submitted for analysis of a range of metal, other inorganic and organic components. Geotechnical testing was scheduled on selected samples. All testing was undertaken at accredited laboratories.
Ground Conditions	A thin layer of made ground is present across the site (with the exception of WS1 to the north), comprising tarmac hardstanding underlain by granular sub-base materials. Made ground was encountered to a depth of 4.9m bgl within WS1, probably associated with an historic railway embankment. The made ground in WS1 comprised reworked silty sandy gravelly clays (partly clayey gravels). Natural soils comprise mainly granular glaciofluvial deposits, locally with subordinate clayey and silty layers.

Foundations	Based on the ground conditions encountered and assessment of SPT N values within the natural, soils, an overall allowable bearing pressure of 100kN/m² may be assumed on the undisturbed natural soils. Traditional pad/strip footings will be suitable, assuming 'low-rise' development. There may be soft/loose soils locally and foundations should be designed to accommodate this, with appropriate thickening and strengthening if necessary. Foundations should not be taken deeper than 1.5m begl without seeking further advice. The anticipated minimum formation level, given that shrinkable clayey soils are present, should be 900mm below existing ground level. Given that granular soils predominate, deepening because of trees is not considered likely to be required, subject to inspection of foundation excavations. Allowance should be made for potential differential movement between existing and new-build in foundations (and superstructure).
Sulphate Class	DS-1 and ACEC-1
Contamination	No significant pollutant linkages are present requiring action. However, there may be some local soils/groundwater impact associated with the AST in the vicinity of WS4, which may require local remedial work, during development. A watching brief should be maintained in this respect, by a suitably qualified consultant.
Gas Protection	Full radon precautions will be required, and at this stage, it would be prudent to include a hydrocarbon resistant sub-floor/services barrier for the new build in the vicinity of WS4.
Further Works	None considered required.

1. INTRODUCTION

Sirius Geotechnical and Environmental Ltd (Sirius) were commissioned by Vernon and Co., acting on behalf of Richard Burbidge Ltd, to undertake a geoenvironmental appraisal of land at Canal Wood Industrial Estate, Chirk (the “site”). It is understood that consideration is being given to redevelopment of parts of the site for a continued commercial / industrial end-use.

The objectives of this appraisal were:

- To establish the historical development of the site and surrounding area from a review of available plans.
- To establish the environmental setting of the site.
- To investigate near surface soil and groundwater conditions in the areas proposed to be redeveloped.
- To determine the potential risks posed by any ground contamination and provide recommendations on remedial measures to manage such risks.
- To establish the risks associated with hazardous ground gas in the areas proposed to be redeveloped.
- To evaluate whether past mining or other extractive industries could have an influence on the areas to be redeveloped.
- To provide advice relating to geotechnical issues associated with the areas to be redeveloped.
- To provide foundation recommendations for the new build elements.

The desk study element of this investigation includes an assessment of information provided by GroundSure Environmental reports, the British Geological Survey (BGS), the Coal Authority (CA) and the local authority. A mining assessment from David Bellis Consulting Surveyors has also been obtained.

Fieldwork was undertaken on 23rd February 2010 and comprised the drilling of 8 no. window sample boreholes.

This report, which was designed to meet the requirements of all relevant current guidance, presents the factual information available during this appraisal, interpretation of the data obtained and recommendations relevant to the defined objectives.

It has been assumed in the production of this report that the site is to be redeveloped for a continued commercial / industrial end-use. In addition, it is assumed that ground levels will not change significantly from those described in this report. If this is not the case, then amendments to the recommendations made in this report may be required.

Where the report refers to the potential presence of invasive plants (such as Japanese Knotweed) or asbestos-containing materials, such observations are for information only and should be verified by a suitably qualified expert.

The comments and opinions presented in this report are based on the findings of the desk study, ground conditions encountered during intrusive investigation works performed by Sirius and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of strata, contamination or other spatially variable features between or beyond investigation positions is conjectural and given for guidance only. Confirmation of ground conditions between exploratory holes should be undertaken if deemed necessary. Evaluation of ground gas and groundwater is based on observations made at the time of the investigation and monitoring visits. It should be noted that ground gas and groundwater levels and quality may vary due to seasonal and other effects.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview

Location	The site is located within Canal Wood Industrial Estate, Chirk. A site location plan is included as Drawing No. C3584/01 within Appendix A.
National Grid Reference	328312mE, 338164mN.
Topography and Features	The site is generally flat lying with the exception of the northern portion, which rises steeply northwards. The site comprises a series of small industrial units to the south and a timber factory centrally and to the northern part of the site. A car park is located within the northern most area of the site. The areas proposed for extension are located within the northwestern corner and the southern portion of the site. A small area to the east of the existing building is proposed for refurbishment / extension. The northwestern area currently comprises an area of concrete hardstanding, which provides access to shutter and pedestrian doors (to the north of the existing building). Metal racking, timber pallets, bins and an above-ground storage tank (AST) are currently situated along the western boundary. No visual or olfactory evidence of fuel spillages were noted. The southern area of the site proposed for extension is occupied by several small brick built and steel built industrial units. A hardstanding area for parking and access is located centrally. The factory located centrally and within the northern part of the site comprises a steel framed building with associated offices and manufacturing areas for timber products. A propane tank is situated to the front of the building (along the eastern boundary).
Approximate Overall Site Area	1.4 hectares.

Site Boundaries	The northern boundary and eastern boundaries form access roads and a staff car park for the timber factory, whilst the southern boundary is formed by parking areas for adjacent industrial units. The western boundary is formed by an approximately 2m to 3m high wooded embankment and Shropshire Union Canal.
Current Land Use	Occupied by commercial / industrial properties. Several of the properties within the southern areas are presently vacant.
Invasive Plant Species	None noted. An ecological survey should be carried out to confirm if any invasive plant species are present.
Adjacent Land Uses	Industrial and agricultural.

The main site features are shown on Drawing No. C3584/02 within Appendix A.

3. ENVIRONMENTAL SETTING

3.1. Introduction

Published environmental, geological and historical information relating to the site has been reviewed. A summary of relevant information is provided below and a copy of the GroundSure report is enclosed in Appendix B. A copy of the Coal Authority Mining Report and any relevant regulatory correspondence is included in Appendix C.

3.2. Site History

Table 3.1 presents a summary of the site history from 1873 to 2008. It is not the intention of this report to describe in detail all of the changes that have occurred on or adjacent to the site, only those pertinent to the proposed development.

Table 3.1 Site History

Map Dates	On-Site Features	Off-Site Features (only features within 500m that may affect the site are listed)
1873 - 1898	The site is shown as being undeveloped.	A wooded area, with a canal located in a cutting, form the western boundary to the site. Great Western Railway line is shown approximately 20m to the east of the site, with Chirk Station located 200m to the southeast. The surrounding area is generally rural. Chirk town centre is shown to be located 700m to the southeast. A gas works is shown 850m to the southeast.
1898 - 1960	Tram lines / railway sidings associated with Glyn Valley Tramway are shown within the eastern area of the site, in addition to associated engine sheds / buildings.	The canal to the west is shown to be tunnelled 270m to the south of the site. 'Old quarries' are shown 800m to the northwest and southwest of the site. A sewage works is shown 800m to the northeast.
1960 - 1973	The tram lines and Glyn Valley Tramway are no longer shown. Former engine sheds remain, and are denoted as depots.	No significant changes evident.

Map Dates	On-Site Features	Off-Site Features (only features within 500m that may affect the site are listed)
1973 - 1984	The former tram lines are now shown as a track and the depots are shown to have been demolished and cleared.	New industrial development is evident to the east of the site, including factories, tanks, an electric sub-station and chimney.
1984 - 1990	Small industrial units associated with Canal Wood Industrial Estate are shown to have been developed within the south of the site.	Further development of industrial units between 20m and 150m to the south of the site, including an electric sub-station.
1990 - present	Development of the site to form the existing layout, including construction of additional industrial units and a factory within the northern half of the site.	Further development of the industrial areas to the east.

3.3. Published Geological Information

A summary of available published geological information is provided in Table 3.2 below.

Table 3.2 Geological Summary

Sources of Information	BGS 1:50,000 scale geological map (Sheet 121 – Wrexham).
Made Ground	None recorded on the published maps but likely to be present given the history of the site.
Drift Geology	Glacial Sand and Gravel Deposits. Thickness unknown.
Solid Geology	Carboniferous Middle Coal Measures. No significant faults in the vicinity.

Mining and Quarrying	Coal Mining: The property lies outside any defined coal field area. A mining report received from David Bellis Consulting Surveyors indicates that available coal mining records have <i>'revealed no evidence of past workings within influencing distance of the site, indeed the closest workings are recorded to be some 1500m to the east and as such are significantly outside of influencing distance of the site....the site represents a low risk with regard to shallow coal workings....I do not believe that a borehole investigation into possible past coal mining is necessary.'</i> Quarries: None recorded.
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3.4. Hydrology and Hydrogeology

A summary of available information pertaining to hydrology and hydrogeology is present in Tables 3.3 to 3.5 below.

Table 3.3 Surface Water Features

	Presence/location	Comments
EA GQA Classified Watercourses	Shropshire Union Canal located to the west of the site.	Chemical Grade B (biological grade recorded as '0').
Unclassified Watercourses	Two unclassified water courses / surface water features are located within 500m of the site.	A reservoir is located 55m to the east associated with the adjacent industrial plant and an un-named drain located 350m to the northwest.
Licensed Surface Water Abstractions	Six licensed surface water abstractions are recorded to be located within 1km of the site, the two closest located 627m to the north.	The two closest surface water abstractions are recorded to be sourced from 'Eaw Surface Water', and are registered for process water and evaporative cooling.

	Presence/location	Comments
Flood Risk Status	Site does not lie within 250m of an indicative flood plain at risk of flooding from rivers and sea.	

Environment Agency GQA assessments: A = very good to E = poor

Table 3.4 Groundwater Occurrence and Abstraction

	Presence/location	Comments
Licensed Abstractions	Nine groundwater abstraction licences are recorded within 1km of the site; the four closest all recorded 445m to the northeast. One potable abstraction is recorded to be located within 2km.	The four closest groundwater abstraction licenses are recorded to be abstracted from a 33m deep borehole, for process water and evaporative cooling. The potable water abstraction is recorded 1026m to the northwest, sourced from 'Eaw Surface Water – Newhallspring'.
Private Wells	NR	
Source Protection Zones	NR within 500m of the site.	

NR - none recorded.

Table 3.5 Groundwater Vulnerability Status

	Environment Agency Classification
Groundwater Classification	Superficial drift designation – Secondary A Bedrock designation – Secondary A
Soil Classification	High leaching potential.

3.5. Landfilling and Waste Management

Table 3.6 Waste Management Activities

	Presence / Location	Comments
Local Authority Recorded Landfills	None recorded within 1.5km of the site.	
BGS / EA Recorded Landfills	One record of an EA historic landfill site within 1.5km.	The record is located at Kronospan Railway Cutting, 52m to the southeast. No further details given.
Other Licensed Waste Management Facilities	None recorded within 500m.	
Evidence of Landfilling On or Within 250m of Site	None noted.	
Walkover Evidence of Fly-Tipping on Site?	None noted.	
Ground Gas Risk Assessment Required?	Yes.	

3.6. Radon Risk

To determine whether the site is at risk from radon gas, the BRE Document “BRE 211 - Radon: Guidance on the protective measures for new dwellings” together with the National Radiological Protection Board (NRPB) “Radon Atlas of England and Wales” have been referenced.

These documents, together with a geological assessment contained within the GroundSure report, which includes information obtained from the Health Protection Agency and British Geological Survey, state that the site lies within a radon affected area as between 10% and 30% of properties are above the Action Level.

Full radon protective measures are therefore required.

3.7. Other

Other potentially contaminative activities or environmental constraints are listed below. The entries relate to activities within approximately 500m of the site, with the exception of COMAH facilities where the assessment is extended to a distance of approximately 1km from the site.

- Twenty one IPC and IPPC authorisations within 500m of the site, the closest located 251m to the east of the site, for the 'treating and processing of animal / vegetable matter'.
- One record of a List 1 Dangerous Substances Inventory site within 500m, located 45m to the east for pentachlorophenol, registered to Cadbury Schweppes Ltd.
- Three records of LAPPC authorisations within 500m, the closest recorded 54m to the south for the manufacture of timber and wood based products (registered to Richard Burbidge Ltd; assumed to be located within the site boundary).
- Seven records of Category 3 or 4 Radioactive Substance Licenses within 500m; the closest located 156m to the southeast for the keeping and use of radioactive materials.
- One record of an NIHHS site within 500m, located 26m to the east at Kronospan Ltd.
- One record of a recorded pollution incident located 212m to the east. The incident was classified as no impact to water.

4. PRELIMINARY CONCEPTUAL MODEL

Based on the desk study, a combined preliminary conceptual site model and conceptual exposure model (CSM) has been developed for the proposed future land use (commercial / industrial). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors in order to assess potential pollutant linkages. In assessing the likely contaminants present at the site, reference has been made to the Industry Profile report series issued by the Department of the Environment and other relevant supporting documentation.

A qualitative risk assessment has also been made of the likelihood of any pollutant linkage operating and its potential significance.

The preliminary conceptual model is presented in schematic form in Drawing No. C3584/03 in Appendix A.

In summary, the preliminary CSM has identified the following potential pollutant linkages which could result in an unacceptable risk to the proposed end-use, denoted as moderate or higher risk on the CSM:

- Ingestion, inhalation of dust and dermal contact with heavy metals and hydrocarbons in made ground.
- Leaching and migration of TPH, PAH's and metals to underlying aquifer and proximal surface water features.
- Inhalation of vapours from possible hydrocarbon spillage around above ground fuel tank.
- Gas risk from any infilled railways / former tram lines.

5. FIELDWORK

5.1. Scope of Investigation

The information contained in this report is limited to areas of land accessible during the investigation within the site boundary, as indicated on the site plan, presented in Appendix A as Drawing No. C3584/02.

Sirius scoped the intrusive ground investigation using guidance presented in BS 10175:2001, BS 8485:2007, the CLR series of documents (Defra and Environment Agency, 2002a-2002e) and BS EN 1997:2004 and 2007.

The investigation, which was supervised by a Sirius Geoenvironmental Engineer, took place on 23rd February 2010 and comprised:

- Drilling of 8 no. window sample boreholes to a maximum depth of 7.0m bgl.
- Installation of 5 no. gas and groundwater installations into selected window sample boreholes.

Permanent monitoring installations for both groundwater and ground gas monitoring were installed in WS3, WS4, WS5, WS6 and WS7.

5.2. Strata Description

Detailed descriptions of strata and groundwater observations made during investigation works, together with samples recovered, are presented on the Engineer's exploratory hole records in Appendix D.

Standard strata descriptions are compliant with BS EN ISO 14688:2002 and 2004 and BS EN ISO 14689:2003. The depths of strata on the record sheets are recorded from current ground levels at each location, unless indicated otherwise.

5.3. Exploratory Hole Locations

The exploratory hole locations were based on the findings of the preliminary conceptual site model in order to target specific areas of interest and achieve a general site coverage. Procedures and principals recommended in CLR4 and BS 10175:2001 were followed when determining exploratory hole locations.

The following table details the exploratory hole rationale:

Table 5.1 Exploratory Hole Rationale

Exploratory Hole	Rationale
WS1 – WS3 and WS5 – WS8	General site coverage, in areas to be redeveloped.
WS4	Above ground fuel storage tank.

Exploratory hole locations are shown on Drawing No. C3584/04 in Appendix A of this report.

5.4. Geotechnical Testing

Geotechnical laboratory testing was carried out on selected samples in accordance with techniques outlined in BS 1377:1990 “Methods of Test for Soils for Civil Engineering Purposes” at the laboratory of Professional Soils Laboratory (PSL), a UKAS accredited laboratory.

Geotechnical and geochemical test results are included within Appendix E of this report.

5.5. Chemical Testing

Selected samples of the made ground, natural soils and groundwater were tested for a range of potential contaminants under subcontract with Derwentside Environmental Testing Services (DETS), a UKAS and MCERTS accredited laboratory.

The potential contaminants of concern identified by the preliminary conceptual site model were selected as the analytes for the samples recovered from the site. The results of soil, leachate and groundwater analysis, as received from the laboratory, are presented in Appendix E of this report.

6. GROUND CONDITIONS AND MATERIAL PROPERTIES

6.1. Strata Profile

A summary of the strata profile is provided in Table 6.1 below.

Table 6.1 Strata Profile

Strata	Depth Range (Thickness Range)	Description and Comments
Made Ground	Ground Level (0.2 to 0.4m) (WS1 - 4.9m thick)	Made ground across the site (with the exception of WS1 to the north) comprised tarmac hardstanding underlain by granular sub-base materials. Made ground was encountered to a depth of 4.9m bgl within WS1, likely attributed to historic railway embankment construction. Made ground comprised reworked soft and firm, low plasticity, low to medium strength silty sandy gravelly clays (partly clayey gravels).
Glaciofluvial Deposits	0.2 to 4.9m (>6.8m)	Glaciofluvial deposits within the northern half of the site were found to comprise variable bands of stiff, low to high plasticity, high strength, brown-orange, silty sandy gravelly clays and medium dense, grey-brown and blue-grey, silty sands and gravels. Superficial deposits within the southern area of the site were found to generally comprise medium dense to dense brown-grey silty cobbly sands and gravels. Firm, low plasticity, low to very high strength, blue-grey sandy silts and medium dense light brown-grey silty fine sands were encountered at depths of between 2.75m and 4.1m bgl within every exploratory hole (excluding WS1). Grey sands and silts were encountered directly underlying the made ground within WS1 at a depth of 4.9m bgl (to the very north of the site).

6.2. Material Properties

Made Ground

SPT results in the cohesive reworked made ground within WS1 recorded N values in the range of 7 to 13, indicative of low to medium strength.

Drift Deposits

Four Atterberg Limit determinations within cohesive superficial deposits indicated the clays to be of variable plasticities (low to high), with Liquid Limits of between 23% and 58%, Plastic Limits of between 16% and 30% and Plasticity Indices of between 7% and 28%. Calculation of the modified Plasticity Indices in accordance with NHBC standards indicates that the cohesive deposits have a low to moderate volume change potential.

The natural moisture content of the cohesive soils are generally in the range of 14% to 24%. Consistency Indices (I_c) of the cohesive samples indicate I_c values of between 1.00 and 1.33, which indicate the cohesive deposits tested to be of generally stiff, to very stiff consistency.

Two samples taken from WS6 at 3.7m and WS7 at 4.0m depth were found to be non-plastic. The natural moisture contents of the non-cohesive soils were recorded to be 19% and 32% respectively.

Standard Penetration Tests (SPTs) undertaken within the superficial deposits returned 'N' values of between 11 and 50 within the shallower superficial deposits. N values of between 6 and 44 were encountered within the deeper silt and sand deposits.

The recorded N values indicate medium dense to dense conditions within granular deposits.

Indicative undrained shear strengths of cohesive soils can be derived by applying a correlation to SPT 'N' values according to the material's plasticity, after Stroud (1975)¹. Based on an average Plasticity Index of 20% for cohesive deposits a correlation factor of approximately 5 can be derived. Using Stroud's correlation the SPT N values indicate undrained shear strengths of between 30kPa and 250kPa within the cohesive deposits, indicating low to very high strength deposits.

¹ Stroud, M. A. The standard penetration test in insensitive clays and soft rocks, *Proceedings of the European Symposium on Penetration Testing*, 2, 367 – 375 (1975)

Water soluble sulphate (SO_4) concentrations recorded from twelve samples taken in made ground and natural soils recorded concentrations of 0.047g/l to 0.14g/l, together with pH conditions of between 8.7 and 9.0. These results indicate a design sulphate class of DS-1 and an ACEC class of AC-1, in accordance with BRE Special Digest 1 (2005) for the design of buried concrete, based on brownfield site designation and mobile groundwater conditions.

6.3. Groundwater

Groundwater strikes encountered during the recent ground investigation are summarised in Table 6.2, below.

Table 6.2 Summary of Groundwater Encountered

Exploratory Hole	Depth Encountered (m bgl)	Standing Water Depth Encountered during Post Fieldwork Monitoring Visits (m bgl)	Stratum
WS3	2.60m	2.56m	Sand and Gravels
WS4	2.50m	2.20m	Sand and Gravels
WS5	-	2.46m	Sand and Gravels
WS6	2.00m	2.10m	Sands
WS7	-	DRY	-

6.4. Visual / Olfactory Evidence of Contamination

During our works, there was no olfactory or visual evidence of hydrocarbon or similar contamination.

6.5. Ground Gas

Ground gas monitoring has been carried out on four occasions and the results are summarised in the Table 6.3 below. Full details of ground gas monitoring results are included in Appendix F.

Table 6.3 Summary of Gas Monitoring (4 visits)

Well	Methane (range) %v/v	Carbon Dioxide (range) %v/v	Oxygen (range) %v/v	Flow (range) l/hr
WS3	ND	ND - 2.2	17.6 - 20.2	ND - 0.5
WS4	ND	0.1 - 2.0	15.7 - 20.2	ND - 1.0
WS5	ND	0.1 - 0.3	20.1 - 20.9	-0.5 – ND
WS6	ND	0.1 - 0.3	20.0 - 20.8	ND
WS7	ND	ND - 0.3	19.1 - 21.0	ND - 0.5

ND Not Detected

In addition to the above, VOC concentrations were detected at a maximum concentration of 120ppm within WS4.

The monitoring programme included 4 visits over a 1 month period.

7. RESULTS OF CHEMICAL TESTING

7.1. Assessment Methodology

The laboratory test data for the relevant soil strata were reviewed for completeness and consistency. Those determinands that represent potential contaminants of concern were subject to further evaluation.

Statistical testing was undertaken for the Planning Scenario by the methods described in CL:AIRE & CIEH “Guidance on Comparing Soil Contamination Data with a Critical Concentration”, May 2008. This statistical testing was undertaken to determine whether there was sufficient evidence that the true mean concentration of each determinand was less than the relevant critical concentration for that component.

Data Below the Analytical Limit of Detection

The proportion of data below the analytical limit of detection (“non-detects”) was reviewed for each determinand. The dataset for each site zone (where applicable) was considered separately.

Non-detect data were given a concentration of half of the relevant limit of detection (LoD) for calculation purposes. In cases where a contaminant dataset for a zone consisted of more than 10-15% of non-detect data, then professional judgement was applied in selecting and applying statistical tests and in interpreting the data.

Assessment of Outliers and Data Distribution

Assessment of data distribution and the identification of statistical outliers was performed iteratively, applying appropriate data distribution and outlier tests for the complete and outlier-censored datasets.

The presence of outliers was determined using Grubbs’ test working with untransformed values for normally distributed data and natural log-transformed values for non-normally distributed data.

The data were tested for normality by at least two of the following methods:

- Probability histogram.
- Probability (q-q) plots.

- Shapiro-Wilk normality test.

Outliers were considered to form part of the overall site dataset *except* when there was clear evidence and justification for their exclusion.

Calculation of 95% Upper Confidence Limit of the Sample Mean

Based upon the normality and outlier tests, the 95% Upper Confidence Limit (US95) of each contaminant of concern was calculated by:

- One-sample t-test for datasets that are normally distributed or close to normal distribution.
- One-sided Chebyshev test for datasets that are significantly non-normal.

The calculated US95s are presented below and compared to the applicable Generic Assessment Criteria.

7.2. Soil Analysis

Results of chemical analysis are presented in full in Appendix E.

For this site, measured values were compared to Generic Assessment Criteria (GAC) derived for a commercial / industrial end use. Source data for all GACs are provided in Appendix G.

The chemical analysis results and screening criteria are summarised in Table 7.1.

Table 7.1 Summary of Total Soil Concentrations

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	US95	GAC (1% SOM)	No. of Samples >GAC	Outliers
Metals						
Inorganic Arsenic	6	6 - 11	10.2	640	0	
Cadmium	6	0.3 - 1.5	1.06	230	0	
Chromium (III)	6	7 - 28	26.9	30000	0	
Lead	6	8 - 18	17.0	750	0	
Inorganic Mercury	6	<0.05	0.03	3600	0	
Selenium	6	<0.5	0.25	13000	0	
Copper	6	14 - 36	31.2	72000	0	
Nickel	6	8 - 28	27.5	1800	0	
Zinc	6	47 - 78	67.1	600000	0	
Inorganics						

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	US95	GAC (1% SOM)	No. of Samples >GAC	Outliers
pH	12	8.7 - 9	8.9	<5	0	
Total Sulphate	6	40 - 2200	1700	2400	0	
Water Sol. Sulphate	12	0.047 - 0.14	0.08	0.5 g/l	0	
Speciated PAH						
Acenaphthene	6	<0.1	-	77000	0	
Anthracene	6	<0.1	-	520000	0	
Acenaphthylene	6	<0.1	-	77000	0	
Benzo(a)anthracene	6	<0.1	-	91	0	
Benzo(b)fluoranthene	6	<0.1	-	102	0	
Benzo(k)fluoranthene	6	<0.1	-	140	0	
Benzo(g,h,i)perylene	6	<0.1	-	660	0	
Benzo(a)pyrene	6	<0.1	-	14	0	
Chrysene	6	<0.1	-	140	0	
Dibenzo(a,h)anthracene	6	<0.1	-	13	0	
Fluoranthene	6	<0.1	-	23000	0	
Fluorene	6	<0.1	-	61000	0	
Indeno(1,2,3-cd)pyrene	6	<0.1	-	61	0	
Naphthalene	6	<0.1	-	110	0	
Pyrene	6	<0.1	-	54000	0	
Phenanthrene	6	<0.1	-	22000	0	
TPH						
Aliphatic EC 5-6	3	<0.01	-	2500	0	
Aliphatic EC >6-8	3	<0.01 - 0.07	-	5500	0	
Aliphatic EC >8-10	3	<0.01 - 22	-	1300	0	
Aliphatic EC >10-12	3	<1.5	-	6400	0	
Aliphatic EC >12-16	3	<1.2 - 1.5	-	44000	0	
Aliphatic EC >16-35	3	<1.5 - 45	-	No GAC	0	
Aromatic EC 5-7	3	<0.01	-	16	0	
Aromatic EC >7-8	3	<0.01	-	35000	0	
Aromatic EC >8-10	3	<0.01 - 4.2	-	2300	0	
Aromatic EC >10-12	3	<0.9 - 1.1	-	11000	0	
Aromatic EC >12-16	3	1.8 - 2.7	-	35000	0	
Aromatic EC >16-21	3	2.8 - 4.1	-	28000	0	
Aromatic EC >21-35	3	10 - 26	-	28000	0	
Others						
Phenol	6	<0.3	-	3200	0	
TOC	6	0.3 - 1.1	-	3 w/w%	0	
Asbestos	3	No fibres present	-	Fibres present	0	

Table based on a Commercial / Industrial end use.

US95 - 95th percentile estimate of the mean value; GAC - generic assessment criterion; NA - not applicable.

No determinants were found to exceed their relevant guideline values.

7.3. Leachability Testing

Analytical data from leachate testing have been evaluated against GAC values appropriate to the conceptual model for the site, based on Freshwater EQS Levels.

The results of the soil leachate analyses and the outcome of screening are summarised in Table 7.2 below.

Table 7.2 Summary of Leachate Analysis

Determinand	No. of Samples Tested	No. Samples Above Limit of Detection	Range of Results (µg/l unless specified)	GAC (µg/l unless specified)	No. of Samples >GAC
Metals					
Arsenic	3	0	<1	50	0
Cadmium	3	0	<2	5	0
Chromium +	3	1	<5 - 8	20	0
Lead +	3	0	<4	10	0
Mercury	3	0	<0.05	1	0
Selenium	3	0	<3	10	0
Copper +	3	1	<2 - 3	10	0
Nickel +	3	0	<10	150	0
Zinc +	3	3	2 - 3	75	0
Organics					
Naphthalene	3	0	<0.01	10	0
Benzo(a)pyrene	3	0	<0.01	0.01	0
Benzo(b)fluoranthene	3	0	<0.01	0.1	0
Benzo(k)fluoranthene	3	0	<0.01	0.1	0
Benzo(ghi)perylene	3	0	<0.01	0.1	0
Indeno(1,2,3-cd)pyrene	3	0	<0.01	0.1	0
Sum PAH-4	3	0	<0.01	0.1	0
Phenol	3	0	<0.5	30	0
Others					
pH	3	-	7.2 - 8.1	6-9 pH units	0

Based on Environment Agency Freshwater (Salmonid) EQS levels where available.

+ Hardness related – Based on a receiving water hardness of >100-150 µg/l CaCO₃.

No determinants were found to exceed their relevant guideline values.

7.4. Groundwater Analysis

Groundwater analytical data have been evaluated against GAC values appropriate to the conceptual model for the site, based on Freshwater EQS Levels. The derivation of the GAC values is described in Appendix G.

The analytical results for groundwater samples and the outcome of screening are summarised in Table 7.3.

Table 7.3 Summary of Groundwater Analysis

Determinand	No. of Samples Tested	No. Samples Above Limit of Detection	Range of Results (µg/l unless specified)	GAC (µg/l unless specified)	No. of Samples >GAC
Metals					
Arsenic	3	0	<1	50	0
Cadmium	3	0	<2	5	0
Chromium +	3	0	<5	20	0
Lead +	3	0	<4	10	0
Mercury	3	0	<0.05	1	0
Selenium	3	0	<3	10	0
Copper +	3	3	2	10	0
Nickel +	3	0	<10	150	0
Zinc +	3	0	<1	75	0
Inorganics					
Sulphate	3	3	11 - 46	400 mg/l	0
Ammonia (NH ₃ as N)	3	3	2 - 28	15	1
Organics					
Total TPH	3	2	<10 - 16	10	2
Naphthalene	3	1	<0.01 - 0.04	10	0
Benzo(a)pyrene	3	0	<0.01	0.01	0
Benzo(b)fluoranthene	3	0	<0.01	0.1	0
Benzo(k)fluoranthene	3	0	<0.01	0.1	0
Benzo(ghi)perylene	3	0	<0.01	0.1	0
Indeno(1,2,3-cd)pyrene	3	0	<0.01	0.1	0
Sum PAH-4	3	0	<0.01	0.1	0
Phenol	3	2	<0.5 - 0.97	30	0
Others					
Electrical Conductivity	3	-	279 - 1170	2500 µS/cm	0
pH	3	-	7.2 - 7.8	6-9 pH units	0

Based on Environment Agency Freshwater (Salmonid) EQS levels where available.

+ Hardness related – Based on a receiving water hardness of >100-150 µg/l CaCO₃.

Metals and Metalloids

No metals recorded concentrations above the relevant GAC.

Other Inorganic Analytes

Ammonia was found to slightly exceed the relevant threshold value within one groundwater sample. This is considered to pose a low risk to controlled waters, given the small concentrations encountered and the site's relatively low-risk environmental setting.

No other inorganics recorded concentrations above the relevant GAC.

Organics

Total TPH (DRO range, C10-C24) was encountered at concentrations slightly exceeding the relevant guideline value within two groundwater samples (16µg/l compared to the guideline value of 10µg/l). Given the relatively marginal exceedances, the lack of any identified significant source within soils tested, and the site's relatively low risk environmental setting, the concentrations encountered are not considered to pose a significant risk to controlled waters.

No other organics recorded concentrations above the relevant GAC.

8. REVISED CONCEPTUAL MODEL AND GENERIC QUANTITATIVE RISK ASSESSMENT OF POLLUTANT LINKAGES

The preliminary combined conceptual site model and conceptual exposure model, developed from the desk study information and presented in Section 4, has been revised in light of the ground investigation and the chemical analysis results presented above.

The revised conceptual model has been developed for the proposed future land use (commercial / industrial). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors.

The revised conceptual model is presented in schematic form in Appendix A, Drawing No. C3584/05.

8.1. Summary of Identified Pollutant Linkages

In summary, the revised CSM has identified the following potential pollutant linkages which could result in an unacceptable risk to the proposed end-use, denoted as a moderate or higher risk on the CSM:

- Volatile soil gases from area adjacent to AST and radon posing a moderate to high risk to human health receptors.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1. General

This geoenvironmental appraisal has been performed for land at Canal Wood Industrial Estate, Chirk.

It has been assumed in the production of this report that the site is to be used for a continued commercial end use, comprising two / three extensions to the existing building. In addition, it has been assumed that ground levels will not change significantly from those described in this report. If this is not the case, then amendments to the interpretation and conclusions in this report may be required.

9.2. Flood Risk

According to the Environment Agency the site is not recorded to lie within an alluvial indicative flood plain.

9.3. Geotechnical

Mining and Quarrying

Based on published geological information and information provided by David Bellis Consulting Surveyors, it is considered that there is a low risk of mining affecting surface stability at the site. No mine entries are known to exist on the site.

No quarrying activities are known to have taken place on site.

Foundations

Area of WS1

The area of WS1 (located outside of the proposed development area, in the north of the site) was found to comprise made ground to a depth of approximately 5.0m bgl. It is understood that no construction is proposed in this area. Further advice should be sought from a suitably qualified consultant should development be considered within this area.

Remainder of Site

The investigation has identified a thin layer of made ground across the remainder of the site to depths of between 0.2 and 0.4m, underlain by superficial deposits comprising predominantly sand and gravel, with subordinate clayey and silty soils.

The made ground is unsuitable as a bearing stratum.

Based on the ground conditions encountered and assessment of SPT N values within the natural soils, an overall allowable bearing pressure of 100kN/m² may be assumed on the undisturbed natural soils. There may be soft/loose soils locally and foundations should be designed to accommodate this, with appropriate thickening and strengthening if necessary. Foundations should not be taken deeper than 1.5m below existing ground level without seeking further advice. The anticipated minimum formation level, given that shrinkable clayey soils are present, should be 900mm below existing ground level.

Given that granular soils predominate, deepening because of trees is not considered likely to be required, subject to inspection of foundation excavations.

Allowance should be made for potential differential movement between existing and new-build in foundations (and superstructure).

Floors

Suspended (precast or cast *in situ*) floor slabs may be used, with appropriate construction to accommodate full radon precautions.

Sulphate Attack

Based on the samples tested, a Design Sulphate Class of DS-1 and an ACEC Class of AC-1 should be used for buried concrete structures in contact with both made ground and natural ground.

Groundworks, Excavation Stability and Groundwater Dewatering

Excavations into existing made ground and the underlying natural soils should be assumed to be unstable. No man entry into unsupported excavations should be allowed without an appropriate risk assessment. Reference to CIRIA report 97 (1983) should be made to establish suitable means of support or battering of excavation sides.

Based on the results of this investigation, ingress of groundwater into open excavations may occur. To control this groundwater at less than 2.00m bgl, localised pumping from sumps should generally be adequate. Well pointing may be required at greater depths (or should the groundwater table rise).

9.4. Soil and Groundwater Contamination

Risk Evaluation for the Proposed Land Use (commercial)

Human Health Receptors

Ground gas (volatile vapours) may pose a potential risk to site end users. Ground gas is discussed separately below.

No determinants were found to be at concentrations exceeding relevant guideline values, and given that the development proposals are to incorporate hardstanding, it is considered that the soils tested pose a negligible risk through direct contact pathways to end-users or neighbouring site users.

Controlled Waters Receptors

Slightly elevated hydrocarbon concentrations in the groundwater adjacent to the fuel storage tanks poses a potential risk (albeit low) to controlled waters. A watching brief should be maintained in this area by a suitably qualified consultant, during construction of foundations, to confirm the absence (or otherwise) of a local hydrocarbon contaminant source.

Ecological Receptors

No potential pollutant linkages to ecological receptors have been identified for the site.

Utilities

It is recommended that the results of the chemical testing and details of the proposed remedial works are provided to the appropriate utility companies to determine the necessity for service protection.

Construction and Maintenance Workers

Contamination may pose a short-term (acute) or long-term (chronic) risk to workers during construction and maintenance. The potential risks must be specifically assessed as part of the

health and safety evaluation for the works to be performed in accordance with prevailing legislation. Site practices must conform to the specific legislative requirements and follow appropriate guidance (e.g., HSE, 1991; CIRIA, 1996).

Outline Remediation Requirements

Based on the findings of this investigation, it is not considered that any remedial works are required. It is recommended however that the ground in the vicinity of the AST is inspected during enabling works to ensure that no previously unencountered hydrocarbon contamination is present (particularly located beneath the AST).

Should any hydrocarbon impacted soils be encountered, these should be excavated and treated / removed to an appropriately licensed waste disposal facility. Off-site disposal should be carried out by a registered waste carrier in accordance with Duty of Care Regulations, 1991 and the Hazardous Waste Regulations, 2005. The base and side walls of any excavation should be validated to confirm that all potentially hazardous hydrocarbon contamination has been removed.

9.5. Ground Gas

Given that no concentrations of methane and only natural/background concentrations of carbon dioxide have been recorded at the site with no detectable / negligible steady state positive flows, the overall ground gas regime has been assessed as Characteristic Situation 1, based on Situation A presented in CIRIA C665.

VOC concentrations have been recorded at a maximum concentration of 120ppm, from the monitoring well installed in WS4, adjacent to the AST. Specific protective measures may be required within this area; however, this will be assessed further upon completion of the enabling works. A hydrocarbon barrier should be included at preliminary design stage, to include sub-floor and services protection .

Full radon protection measures are currently required for the proposed development on this site.

9.6. Invasive Plants

Invasive plant species were not observed on this site at the time of investigation.

It is recommended that the presence of invasive plant species is confirmed by a qualified consultant ecologist and their advice taken on appropriate treatment. The treatment of any invasive species should take place in advance of the proposed construction works.

9.7. Disposal of Soils

Any materials removed from site should be undertaken in accordance with the Duty of Care Regulations 1991. There will also be a requirement to classify the waste in accordance with the European Waste Catalogue. Where necessary, the waste should also be subject to Waste Acceptance Criteria (WAC) testing. In light of the new regulations it is recommended that discussion with landfill operators takes place at an early stage.

10. REGULATORY APPROVALS

The conclusions and recommendations presented above are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and, therefore, the report should be passed to the appropriate regulatory authorities and/or other organisations for their comment and approval prior to undertaking any works on site.



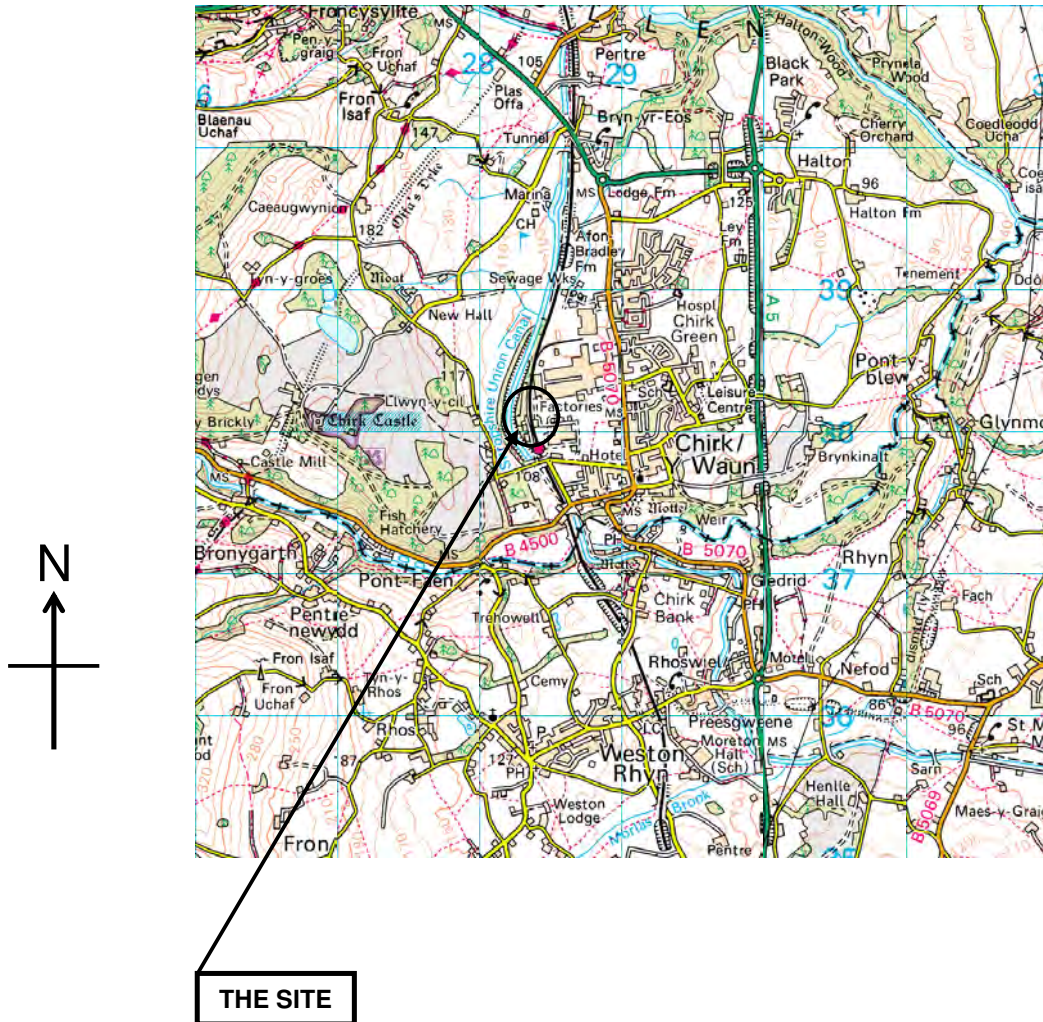
APPENDIX A

FIGURES AND DRAWINGS



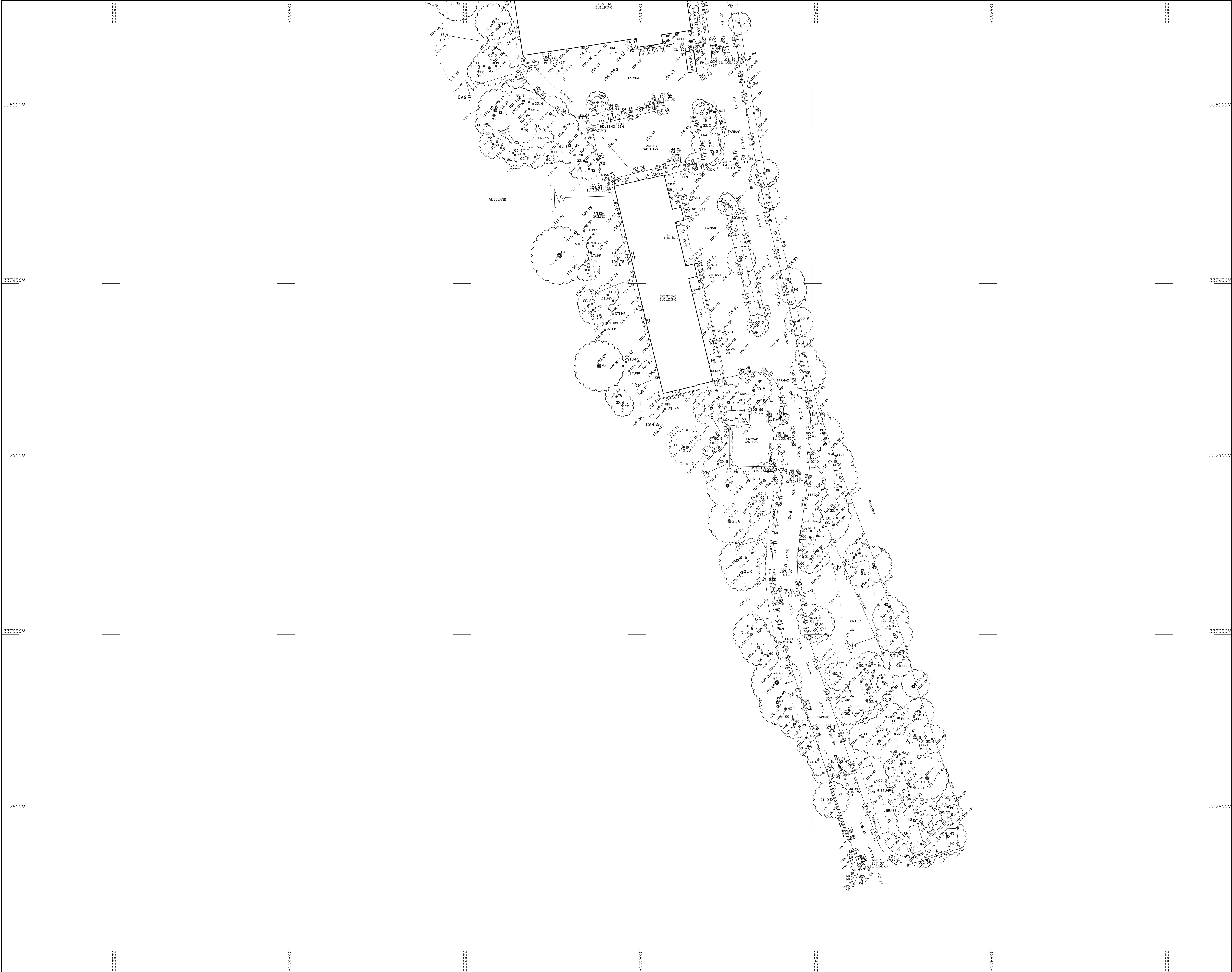
Site Location Plan

Contract Number	C3584
Contract	Canal Wood Industrial Estate Chirk
Client	Richard Burbidge Ltd

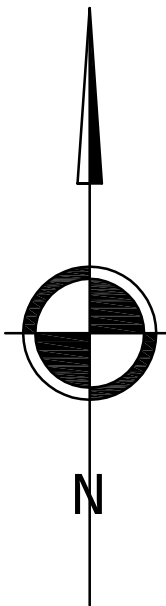


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Drawn by	JC	Approved GH
Drawing Number	C3584/01	



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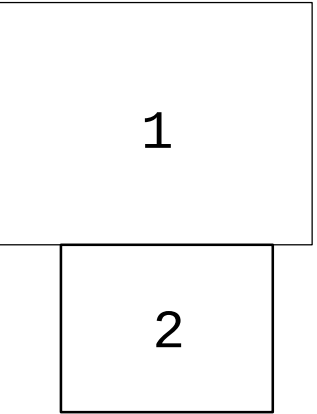


Note:
The survey is plotted on a plane local
Grid. Orientation to National Grid.
All levels relate to Ordnance Datum,
achieved using the
OS National GPS Network.

Survey Control Markers established for
Mapping purposes only and should not be
used for Construction without the written
approval of Survey Operations Ltd.

Drainage information must be verified
with local authority records before use

SURVEY STATIONS			
Name	Eastings	Northing	Height
WPT	328366.57	338105.93	103.15
MS1B	328361.11	338194.30	102.70
D1	328361.99	338287.84	102.23
MS3	328315.55	338291.14	102.23
MS4	328314.23	338254.97	103.30
MS5	328302.38	338248.23	102.78
MS7	328288.21	338162.85	102.65
MS8	328287.92	338295.80	103.38
CAL	328371.70	338059.58	103.50
MS1C	328362.85	338132.04	102.89
MS1BA	328351.25	338247.47	102.73
MS2	328364.40	338303.21	103.30
MS1	328362.88	338306.60	102.14
MS1A	328310.85	338305.89	102.36
MS4A	328308.59	338252.74	102.94
MS1A	328292.56	338189.55	102.80
MSBA	328286.89	338122.01	102.99
MSB9	328271.09	338088.20	107.13
MS1CA	328356.06	338151.61	102.88
MS1CB	328347.26	338151.14	102.99
MS1CC	328363.48	338141.89	102.94
MS1CD	328362.19	338169.20	102.81
MS2A	328347.40	338380.73	103.54
CA2	328378.60	337969.76	104.54
CA3	328390.86	337712.04	105.48
CA4	328355.78	337909.74	110.42
CA5	328337.42	337953.78	104.21
CA6	328302.12	338003.25	111.51
CA7	328276.71	338050.10	108.79



Sheet Layout



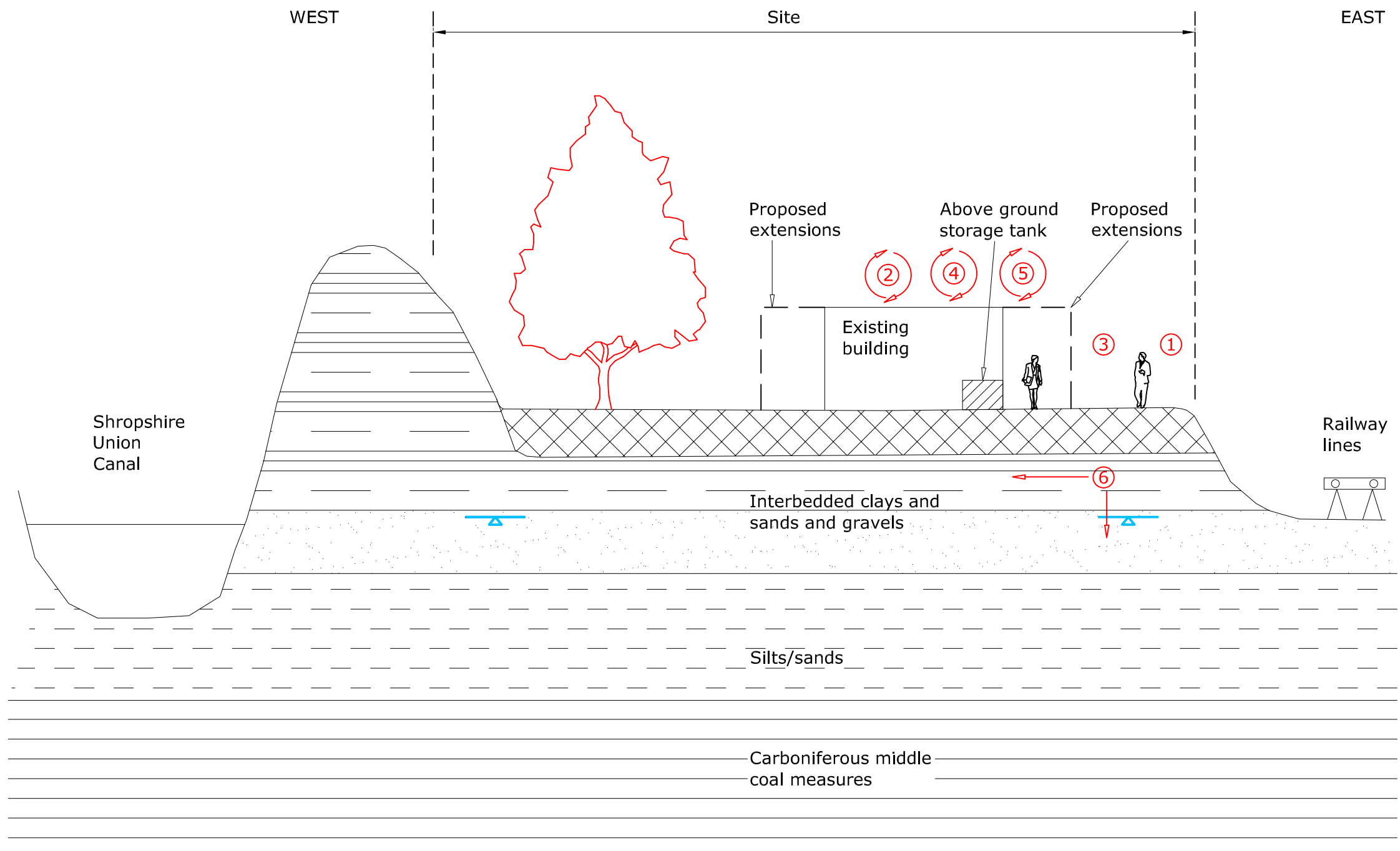
Smith Street, Skelmersdale, Lancs. WN8 8LN
Tel: 01695 725662 Fax: 01695 51816
Email: mail@survops.co.uk - www.survops.co.uk

Client
Vernon & Co.
Belgrave House
58 High Street, Gargrave
Skipton, BD23 3LX

Drawing Title
Topographical Survey of Land at :
Canal Wood Industrial Estate
Chirk
Sheet 2 of 2

Scale(s)	1:500	Surveyor	CA
Date	DEC 09	Drawn	RAB
Job Number	09J080	Checked	MG/MH

Sheet Size & Drg Number & Revision
A0 09J080/002



Contamination Sources	Contamination Pathways	Potential Receptors	Likelihood of Potential Pollutant Linkage
Ingestion, inhalation of dust and dermal contact with heavy metals and hydrocarbons in made ground	① Direct and indirect ingestion ② Inhalation of contaminated particles ③ Dermal contact	Construction workers End users Adjacent site users	Moderate
Inhalation of vapours from possible hydrocarbons around AST	④ Inhalation of vapours	Construction workers End users Adjacent site users	Moderate
Gas risk from possible made ground/radon	⑤ Migration and accumulation of hazardous gas/radon	End users Adjacent site users	Moderate-High
Leaching and migration of TPH PAHs and metals to controlled waters	⑥ Leaching and migration to minor aquifer/proximal surface water features	Controlled waters	Low-Moderate

NOTES

REVISION

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A	>>
B	>>
C	>>
D	>>

SIRIUS GEOTECHNICAL & ENVIRONMENTAL
4245 Park Approach,
Thorpe Park,
Leeds
LS15 8GB
www.thesiriusgroup.com
TEL: 0113 264 9960
FAX: 0113 264 9962



CLIENT

**RICHARD
BURBIDGE LTD**

SITE
**CANAL WOOD,
CHIRK**

DRAWING TITLE

**PRELIMINARY
CONCEPTUAL
SITE MODEL**

DRAWING NO. C3584/03	REVISION NO. >>	
DRAWN BY RM	APPROVED BY >>	
DATE APRIL 2010	SCALE NTS	PAPER SIZE A3



NOTES

 WINDOW SAMPLE BOREHOLE LOCATION

 PROPOSED DEVELOPMENT LAYOUT

 INDICATIVE SITE BOUNDARY

REVISION	
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A	>>
B	>>
C	>>
D	>>

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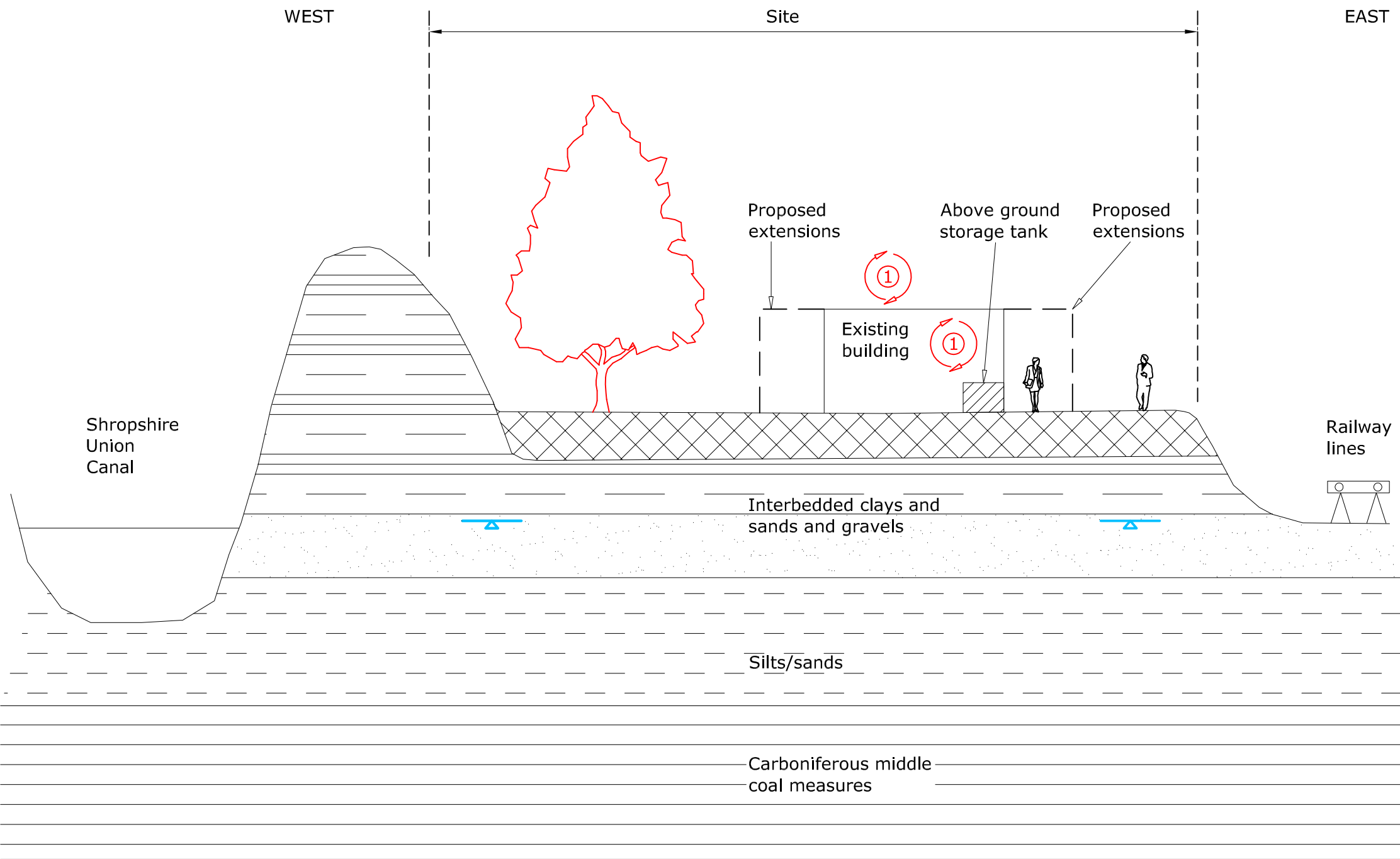
SITE

CANAL WOOD, CHIRK

DRAWING TITLE

EXPLORATORY HOLE LOCATION PLAN

DRAWING NO. C3584/04		REVISION NO. >>	
DRAWN BY RM		APPROVED BY >>	
DATE APRIL 2010	SCALE NTS		PAPER SIZE A3



Contamination Sources	Contamination Pathways	Potential Receptors	Likelihood of Potential Pollutant Linkage
Gas risk from radon and volatile vapours	① Migration and accumulation of radon/volatile vapours	End users Adjacent site users	Moderate-High

NOTES

REVISION

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A	>>
B	>>
C	>>
D	>>

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DRAWING TITLE

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DATE APRIL 2010	SCALE NTS	PAPER SIZE A3



APPENDIX B

GROUNDSURE REPORT

GroundSure EnvirolInsight

Address: CANAL WOOD INDUSTRIAL ESTATE, CHIRK, LL14 5RL

Date: Nov 11, 2009

GroundSure Reference: HMD-283-620813

Your Reference: C3584/RIH/1866

Client: Sirius Geotechnical & Environmental Limited



Brought to you by GroundSure

Aerial Photograph of Study Site



Aerial photography supplied by Getmapping PLC.
© Copyright Getmapping PLC 2003. All Rights Reserved.

Site Name:CANAL WOOD INDUSTRIAL ESTATE, CHIRK, LL14 5RL
Grid Reference: 328312,338164

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Report Section	Number of records found within (X) m of the study site boundary					
1. Authorisations, Incidents and Registers	on-site	0-50	51-250	251-500	501-1000	1000-1500
1.1 Industrial Sites Holding Licences and/or Authorisations						
Records of IPC Authorisations	0	0	0	7	-	-
Records of IPPC Authorisations	0	0	0	14	-	-
Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0	-	-
Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0	-	-
Records of List 1 Dangerous Substances Inventory sites	0	1	0	0	-	-
Records of List 2 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of LAPPC Authorisations	0	0	1	2	-	-
Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	2	5	-	-
Records of Licensed Discharge Consents	0	0	0	0	-	-
Records of Planning Hazardous Substance Consents	0	0	0	1		
1.2 Records of COMAH and NIHS sites	0	1	0	0	-	-
1.3 Environment Agency Recorded Pollution Incidents						
National Incidents Recording System, List 2	0	0	1	-	-	-
National Incidents Recording System, List 1	0	0	0	-	-	-
1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990	0	0	0	0	-	-
1.5 Planning Hazardous Substance Enforcements	0	0	0	0	-	-
2. Landfill and Other Waste Sites	on-site	0-50	51-250	251-500	501-1000	1000-1500
2.1 Landfill Sites						
Environment Agency Registered landfill Sites	0	0	0	0	0	-
Landfill Data – Operational Landfill Sites	0	0	0	0	0	-
Environment Agency Historic Landfill Sites	0	0	1	0	0	0
Landfill Data – Non-Operational Landfill Sites	0	0	0	0	0	-
BGS/DoE Landfill Site Survey	0	0	0	0	0	0
GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Environment Agency (REGIS) Waste Sites	0	0	0	0	0	0
3. Current Land Uses	on-site	0-50	51-250	251-500	501-1000	1000-1500
3.1 Current Industrial Sites Data	2	2	7	-	-	-
3.2 Records of Petrol and Fuel Sites	0	0	0	0	-	-

3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0	-	-
---	---	---	---	---	---	---

4. Geology	Description
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site? *	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site? *	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	

Source: Scale: 1:50,000 BGS Sheet 121

* This includes an automatically generated 50m buffer zone around the site.

5. Hydrogeology and Hydrology	on-site	0-50	51-250	251-500	501-1000	1001-2000
5.1 Environment Agency Groundwater Vulnerability and Soil Classification						
Is a Minor Aquifer present on site?	Yes	-	-	-	-	-
Is a Major Aquifer present on site?	No	-	-	-	-	-
Are there any Soil Classification records present on site?	Yes	-	-	-	-	-
5.2 Groundwater Abstraction Licences (within 1000m of the study site).	0	0	0	4	5	-
5.3 Surface Water Abstraction Licences (within 1000m of the study site).	0	0	0	0	6	-
5.4 Potable Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	1
5.5 Are there any Source Protection Zones within 500m of the study site?			No			
5.6 River Quality						
Is there any Environment Agency information on river quality within 500m of the study site?	Yes	No	No	No	-	-
5.7 Main Rivers within 500m of the study site.	0	0	0	0	-	-
5.8 Surface water features within 250m of the study site	No	Yes	Yes	-	-	-

6. Flooding	
6.1 Are there any Environment Agency indicative Zone 2 floodplains within 250m of the study site?	No
6.2 Are there any Environment Agency indicative Zone 3 floodplains within 250m of the study site?	No
6.3 Are there any Flood Defences within 250m of the study site?	No
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	High
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate

7. Designated Environmentally Sensitive Sites	on-site	0-50	51-250	251-500	501-1000	1001-1500
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	-	-
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	-	-
7.3 Records of Local Nature Reserves (LNR)	0	0	0	0	-	-
7.4 Records of Special Areas of Conservation (SAC)	0	0	0	0	-	-
7.5 Records of Special Protection Areas (SPA)	0	0	0	0	-	-
7.6 Records of Ramsar sites	0	0	0	0	-	-
7.7 Records of World Heritage Sites	0	0	0	0	-	-
7.8 Records of Environmentally Sensitive Areas	0	0	0	0	-	-
7.9 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	-	-
7.10 Records of National Parks	0	0	0	0	-	-

7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	-	-
7.11 Records of Nitrate Sensitive Areas	0	0	0	0	-	-
7.12 Records of Nitrate Vulnerable Zones	0	0	0	0	-	-

8. Natural Hazards

8.1 What is the maximum risk of natural ground subsidence? Very Low

9. Mining

9.1 Are there any coal mining areas within 75m of the study site? Yes

9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site? Low

9.3 Are there any brine affected areas within 75m of the study site? No

Using this Report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between GroundSure and the Client. The document contains the following sections:

1. Authorisations, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure underground oil and gas pipelines.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

5. Hydrogeology and Hydrology

Provides information on groundwater vulnerability, soil leaching potential, abstraction licenses, Source Protection Zones (SPZ) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites. These searches are conducted using radii of up to 500m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

9. Mining

Provides information on areas of coal and shallow mining.

10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, GroundSure provide a free Technical Helpline (01273 819700) for further information and guidance.

Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

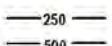
1. Authorisations, Incidents and Registers Map



Authorisations, Incidents and Registers Legend

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- | | | | | | |
|---|--------------------|---|-------------------------------|--|---------------------------------------|
|  | Site Outline |  | Recorded Pollution Incident |  | IPPC & IPC Authorisations |
|  | Search Buffers (m) |  | Dangerous Substances (List 1) |  | LAPPC Authorisations |
| | |  | Dangerous Substances (List 2) |  | COMAH / NIHHS Sites |
| | |  | Water Industry Referrals |  | Sites Determined as Contaminated Land |
| | |  | Licenced Discharge Consents |  | Hazardous Substance Consents |
| | |  | Red List Discharge Consents |  | Hazardous Substance Enforcements |
| | |  | RAS 3 & 4 Authorisations | | |

1. Authorisations, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

Records of IPC Authorisations within 500m of the study site:

7

The following IPC Authorisations are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
3A	251.0	E	328600, 338000	Operator: Cadbury Schweppes Plc Address: Station Avenue, Chirk, LL14 5LT Process: Treating/processing Of Animal/veg Matter	Permit Number: AY8492 Original Permit Number: IPCAPP Date Approved: 20-10-1997 Effective Date: 27-10-1997 Status: Superseded By Variation
4A	251.0	E	328600, 338000	Operator: Cadbury Schweppes Plc Address: Station Avenue, Chirk, LL14 5LT Process: Treating/processing Of Animal/veg Matter	Permit Number: BD9769 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation
5A	251.0	E	328600, 338000	Operator: Cadbury Schweppes Plc Address: Station Avenue, Chirk, LL14 5LT Process: Treating/processing Of Animal/veg Matter	Permit Number: BH3924 Original Permit Number: IPCMAJVAR Date Approved: 12-4-2000 Effective Date: 17-4-2000 Status: Superseded By Variation
6A	251.0	E	328600, 338000	Operator: Cadbury Schweppes Plc Address: Station Avenue, Chirk, LL14 5LT Process: Treating/processing Of Animal/veg Matter	Permit Number: BM2012 Original Permit Number: IPCMINVAR Date Approved: 30-1-2003 Effective Date: 5-2-2003 Status: Revoked - Now Ippc
7B	347.0	E	328700, 338200	Operator: Kronospan Ltd Address: Hollyhead Road, Chirk, Wrexham, Clwyd, LL14 5NT Process: Manufacture And Use Of Organic Chemicals	Permit Number: AK4877 Original Permit Number: IPCAIRAPP Date Approved: 22-2-1994 Effective Date: 27-2-1994 Status: Superseded By Variation
8B	347.0	E	328700, 338200	Operator: Kronospan Ltd Address: Hollyhead Road, Chirk, Wrexham, Clwyd, LL14 5NT Process: Manufacture And Use Of Organic Chemicals	Permit Number: AZ1710 Original Permit Number: IPCMAJVAR Date Approved: 8-12-1997 Effective Date: 22-12-1997 Status: Superseded By Variation
9B	347.0	E	328700, 338200	Operator: Kronospan Ltd Address: Hollyhead Road, Chirk, Wrexham, Clwyd, LL14 5NT Process: Manufacture And Use Of Organic Chemicals	Permit Number: BE0252 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked - Now Ippc

Records of IPPC Authorisations within 500m of the study site:

14

The following IPPC Authorisations are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
10C	295.0	E	328640, 337980	Operator: Cadbury Ltd Installation Name: Chirk Confectionery Plant Process: Dead Animal Or Vegetable Matter; Processing, Storing Or Drying Not Otherwise Listed	Permit Number: BN3766IA Original Permit Number: BN3766IA Issue Date: 28/4/2006 Effective Date: 28/4/2006 Status: Superseded
11C	295.0	E	328640, 337980	Operator: Cadbury Ltd Installation Name: Chirk Confectionery Plant Process: Dead Animal Or Vegetable Matter; Processing, Storing Or Drying Not Otherwise Listed	Permit Number: BN3766IA Original Permit Number: BN3766IA Issue Date: 28/4/2006 Effective Date: 28/4/2006 Status: Superseded
12C	295.0	E	328640, 337980	Operator: Cadbury Ltd Installation Name: Chirk Confectionery Plant Process: Other Waste Disposal; Non-hazardous Waste →50t/d By Biological Treatment	Permit Number: BN3766IA Original Permit Number: BN3766IA Issue Date: 28/4/2006 Effective Date: 28/4/2006 Status: Superseded

Report Reference: HMD-283-620813

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13C	295.0	E	328640, 337980	Operator: Cadbury Uk Ltd Installation Name: Chirk Confectionery Plant Process: Dead Animal Or Vegetable Matter; Processing, Storing Or Drying Not Otherwise Listed	Permit Number: GP3539XW Original Permit Number: BN3766IA Issue Date: 22/4/2008 Effective Date: 22/4/2008 Status: Effective
14C	295.0	E	328640, 337980	Operator: Cadbury Uk Ltd Installation Name: Chirk Confectionery Plant Process: Dead Animal Or Vegetable Matter; Processing, Storing Or Drying Not Otherwise Listed	Permit Number: GP3539XW Original Permit Number: BN3766IA Issue Date: 22/4/2008 Effective Date: 22/4/2008 Status: Effective
15C	295.0	E	328640, 337980	Operator: Cadbury Uk Ltd Installation Name: Chirk Confectionery Plant Process: Other Waste Disposal; Non-hazardous Waste →50t/d By Biological Treatment	Permit Number: GP3539XW Original Permit Number: BN3766IA Issue Date: 22/4/2008 Effective Date: 22/4/2008 Status: Effective
16C	295.0	E	328640, 337980	Operator: Cadbury Ltd Installation Name: Chirk Confectionery Plant Process: Dead Animal Or Vegetable Matter; Processing, Storing Or Drying Not Otherwise Listed	Permit Number: SP3933XB Original Permit Number: BN3766IA Issue Date: 26/10/2007 Effective Date: 26/10/2007 Status: Superseded
17C	295.0	E	328640, 337980	Operator: Cadbury Ltd Installation Name: Chirk Confectionery Plant Process: Dead Animal Or Vegetable Matter; Processing, Storing Or Drying Not Otherwise Listed	Permit Number: SP3933XB Original Permit Number: BN3766IA Issue Date: 26/10/2007 Effective Date: 26/10/2007 Status: Superseded
18C	295.0	E	328640, 337980	Operator: Cadbury Ltd Installation Name: Chirk Confectionery Plant Process: Other Waste Disposal; Non-hazardous Waste →50t/d By Biological Treatment	Permit Number: SP3933XB Original Permit Number: BN3766IA Issue Date: 26/10/2007 Effective Date: 26/10/2007 Status: Superseded
19B	347.0	E	328700, 338200	Operator: Kronospan Holdings Ltd Installation Name: - Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: BR7194 Original Permit Number: BR7194 Issue Date: - Effective Date: - Status: Superseded By Pas
20B	347.0	E	328700, 338200	Operator: Kronospan Ltd Installation Name: - Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: BW9999 Original Permit Number: BW9999 Issue Date: - Effective Date: - Status: Superseded By Pas
21D	367.0	E	328720, 338240	Operator: Kronospan Ltd Installation Name: Chirk, Particleboard Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: JP3037XX Original Permit Number: BW9999IG Issue Date: 28/4/2009 Effective Date: 28/4/2009 Status: Effective
22D	367.0	E	328720, 338240	Operator: Kronospan Ltd Installation Name: Chirk, Particleboard Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: KP3735SC Original Permit Number: BW9999IG Issue Date: 5/4/2006 Effective Date: 5/4/2006 Status: Superseded
23	398.0	NE	328600, 338600	Operator: Kronospan Ltd Installation Name: Chirk, Particleboard Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: BW9999IG Original Permit Number: BW9999IG Issue Date: 17/9/2004 Effective Date: 17/9/2004 Status: Superseded

Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

1

The following List 1 Dangerous Substance Inventory Site records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details
----	----------	-----------	-----	---------

Report Reference: [HMD-283-620813](#)

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2	45.0	E	328400, 338100	Name: Cadbury Schweppes Plc Status: Active Receiving Water: -	Authorised Substances: Pentachlorophenol
---	------	---	-------------------	---	--

Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

Records of LAPPC Authorisations within 500m of the study site:

3

The following LAPPC (LAPC) Authorisations are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	Status
24	54.0	S	328300, 338000	Address: Richard Burbidge Ltd, Canalwood Industrial Estate, Chirk, Wrexham, LL14 5rl Process: Manufacture Of Timber And Wood Based Products	Status: Operating Date: 2004
25	292.0	W	328000, 338000	Address: Petrol Filling Stations, Holyhead Road, Chirk, Wrexham Process: Petrol Filling Station	Status: Operating Date: 2004
26D	374.0	E	328727, 338241	Address: Kronospan Ltd, Holy Head Road, Chirk, Wrexham, LL14 5nt Process: Manufacture Of Mdf And Wood Processing	Status: Operating Date: 2004

Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site:

7

The following RAS Licence (3 or 4) records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	Status
27E	156.0	SE	328500, 338000	Address: Cadbury Schweppes Plc, Station Avenue, Chirk, Wrexham, Clwyd, Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AR2783 Original Permission Number: AQ8611	Status: - Date Approved: - Effective Date: -
28E	156.0	SE	328500, 338000	Address: Cadbury Schweppes Plc, Station Avenue, Chirk, Wrexham, Clwyd, Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AQ8611 Original Permission Number: AQ8611	Status: Superseded By Variation Date Approved: 2-4-1991 Effective Date: 2-4-1991
29B	347.0	E	328700, 338200	Address: Kronospan Ltd, Maesgwyn Farm, Wrexham, Clwyd, LL14 5NT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: BF0134 Original Permission Number: AH9219	Status: - Date Approved: - Effective Date: -
30B	347.0	E	328700, 338200	Address: Kronospan Ltd, Hollyhead Road, Wrexham, Clwyd, LL14 5NT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AY5078 Original Permission Number: AH9219	Status: Superseded By Variation Date Approved: 4-6-1997 Effective Date: 4-6-1997
31B	347.0	E	328700, 338200	Address: Kronospan Ltd, Hollyhead Road, Wrexham, Clwyd, LL14 5NT Type: - Permission Number: AB6748 Original Permission Number: AH9219	Status: Superseded By Variation Date Approved: 20-3-1993 Effective Date: 20-3-1993
32B	347.0	E	328700, 338200	Address: Kronospan Ltd, Hollyhead Road, Wrexham, Clwyd, LL14 5NT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AH4578 Original Permission Number: AH9219	Status: Superseded By Variation Date Approved: 2-6-1993 Effective Date: 2-6-1993
33B	347.0	E	328700, 338200	Address: Kronospan Ltd, Hollyhead Road, Wrexham, Clwyd, LL14 5NT Type: - Permission Number: AH9219 Original Permission Number: AH9219	Status: Superseded By Variation Date Approved: 31-3-1991 Effective Date: 31-3-1991

Records of Licensed Discharge Consents within 500m of the study site:

0

Database searched and no data found.

Records of Planning Hazardous Substance Consents within 500m of the study site

1

The following Planning Hazardous Substance Consents records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	Application Reference Number	Application Status	Address	Details
35D	372.0	E	CB/1999/3633	Granted	Kronospan Ltd., Holyhead Road, Chirk	Deemed Hazardous Substance Consent.

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

1

The following COMAH & NIHHS Authorisation records provided by the Health and Safety Executive are represented as polygons or buffered points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Address	Type	Update
34	26.0	E	328700.0, 338200.0	kronospan ltd,chirk,wrexham,ll14 5nt	NIHHS	2001

1.3 Environment Agency Recorded Pollution Incidents

Records of National Incidents Recording System, List 2 within 250m of the study site:

1

The following NIRS List 2 records are represented as points on the Authorisations, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
1	212.0	E	328560,338000	Incident Date: 3/5/2002 Incident Identification: 76313 Pollutant: Other Pollutant Pollutant Description: Other Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

Records of National Incidents Recording System, List 1 within 250m of the study site:

0

Database searched and no data found.

1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990¹

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

Database searched and no data found.

1.5 Planning Hazardous Substance Enforcements

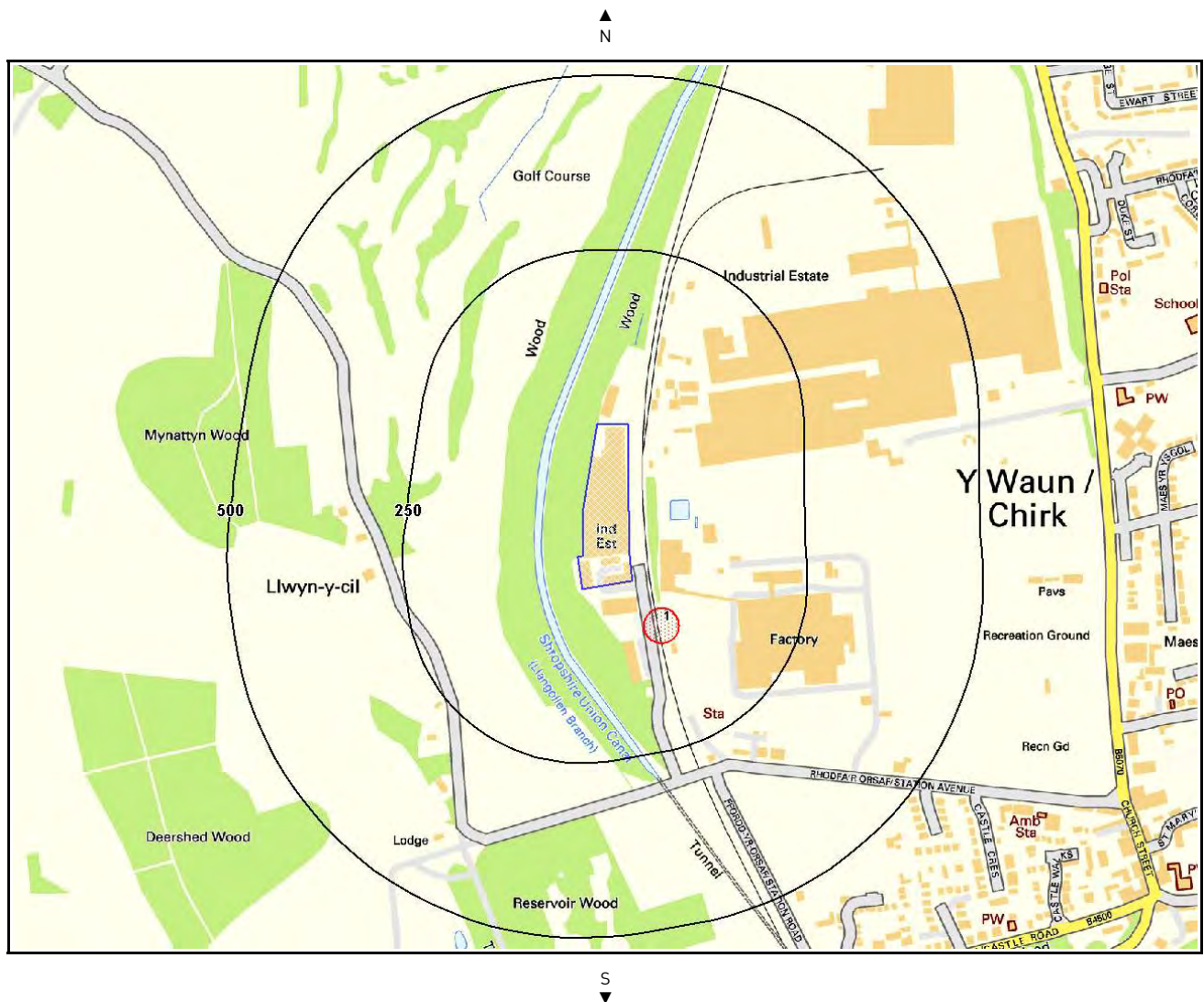
Records of planning hazardous substance enforcements within 500m of the study site:

0

Database searched and no data found.

¹Further information on sites that have been determined under the Contaminated Land Regime is maintained by Local Authorities under Section 78R of the Environmental Protection Act 1990. Information should be available on both sites currently determined as Contaminated Land and Special Sites.

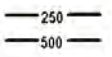
2. Landfill and Other Waste Sites Map



Landfill & Other Waste Sites Legend

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- | | | |
|--|---|--|
|  Site Outline |  E.A. Active Landfill |  Operational Waste Treatment Licence |
|  Search Buffers (m) |  E.A. Historic Landfill (Area Data) |  Closed Waste Treatment Licence |
| |  E.A. Historic Landfill (Point Data) |  REGIS Waste Licence |
| |  BGS / DoE Survey Landfill |  Operational Landfill |
| |  Local Authority Landfill (Area Data) |  Closed Landfill |
| |  Local Authority Landfill (Point Data) | |

2. Landfill and Other Waste Sites

2.1 Landfill Sites

Records from Environment Agency landfill data within 1000m of the study site: 0

Database searched and no data found.

Records of operational landfill sites sourced from Landmark within 1000m of the study site: 0

Database searched and no data found.

Records of Environment Agency historic landfill sites within 1500m of the study site: 1

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR	Details
1	52.0	SE	328400,338000.0	Site Address: Kronospan Railway Cutting, Chirk Waste Licence: - Site Reference: - Waste Type: - Regis Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

Records of non-operational landfill sites sourced from Landmark within 1000m of the study site: 0

Database searched and no data found.

Records of BGS/DoE non-operational landfill sites within 1500m of the study site: 0

Database searched and no data found.

Records of Local Authority landfill sites within 1500m of the study site: 0

Database searched and no data found.

2.2 Other Waste Sites

Records of operational waste treatment, transfer or disposal sites within 500m of the study site: 0

Database searched and no data found.

Records of non-operational waste treatment, transfer or disposal sites within 500m of the study site: 0

Database searched and no data found.

Records of Environment Agency (REGIS) waste sites within 1500m of the study site: 0

Database searched and no data found.

E ▶



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3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

11

The following records are represented as points on the Current Land Uses map.

ID	Distance	Direction	Company	Address	Activity	Category
1	0.0	On Site	Chirk Auto Paints	Unit 12, Canal Wood Industrial Estate, Chirk, Wrexham, LL14 5RL	Vehicle Parts and Accessories	Motoring
2	0.0	On Site	Range Engineering Co	Unit 14, Canal Wood Industrial Estate, Chirk, Wrexham, LL14 5RL	Precision Engineers	Engineering Services
3A	16.0	S	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
4A	34.0	S	K G Coating Ltd	Unit 8-9, Canal Wood Industrial Estate, Chirk, Wrexham, LL14 5RL	Industrial Coatings and Finishings	Industrial Products
5	68.0	E	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
6	69.0	S	Canal Wood Industrial Estate	-	Business Parks and Industrial Estates	Industrial Features
7	73.0	E	Tanks	-	Tanks (Generic)	Industrial Features
8	107.0	NE	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
9	110.0	NE	Tanks	-	Tanks (Generic)	Industrial Features
10	159.0	E	Tanks	-	Tanks (Generic)	Industrial Features
11	248.0	E	Chimney	-	Chimneys	Industrial Features

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

0

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site:

0

Database searched and no data found.

4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
GFDUD-SAGR	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL

[Derived from the BGS 1:50,000 Digital Geological Map of Great Britain]

4.3 Bedrock and Solid Geology

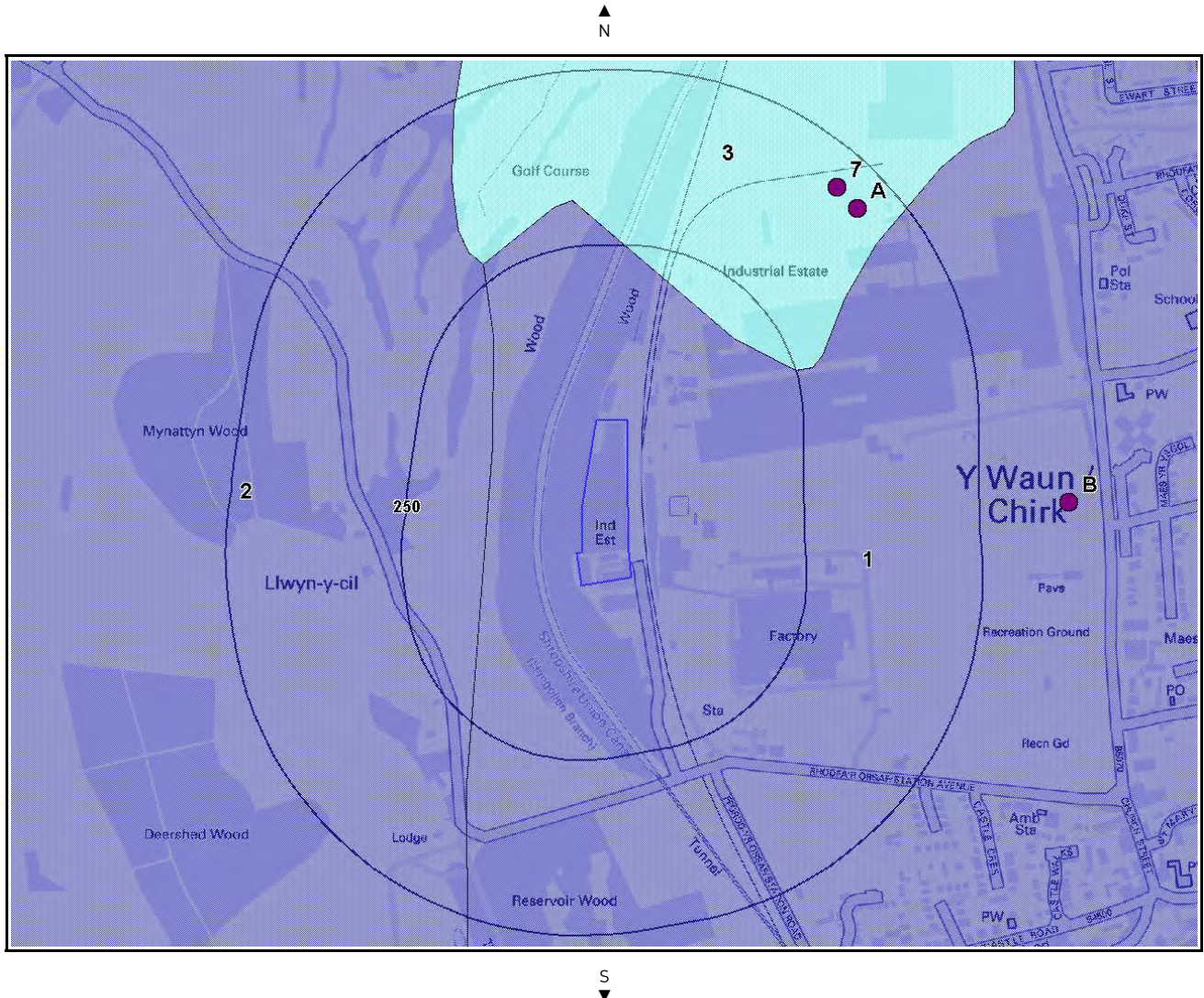
The database has been searched on site, including a 50m buffer.

LEX Code	Description	Rock Type
PLMC-MDSS	PENNINE LOWER COAL MEASURES FORMATION AND PENNINE MIDDLE COAL MEASURES FORMATION (UNDIFFERENTIATED)	MUDSTONE, SILTSTONE AND SANDSTONE

[Derived from the BGS 1:50,000 Digital Geological Map of Great Britain]

For more detailed geological and ground stability data please refer to the "GroundSure GeolInsight". Available from our website.

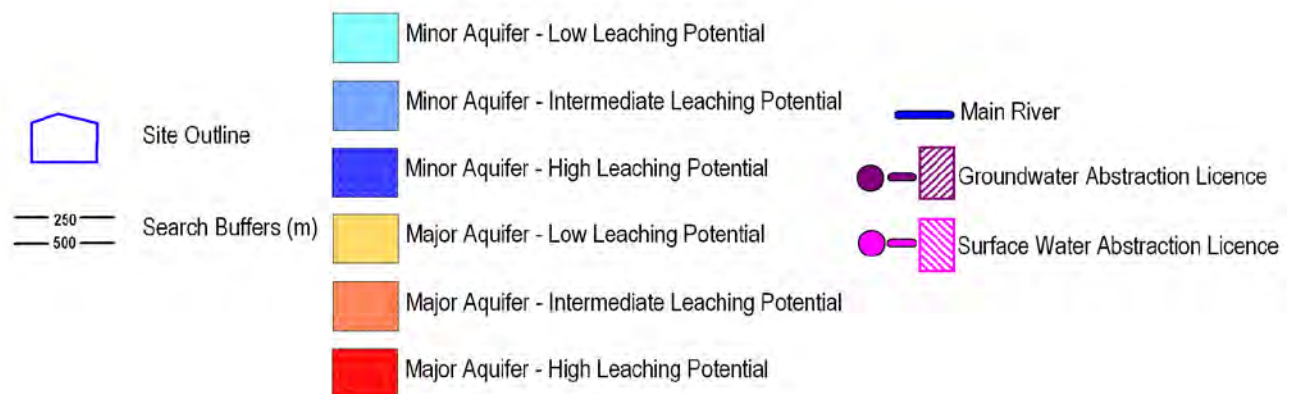
5. Hydrogeology and Hydrology - Aquifer and Abstraction Licence Map



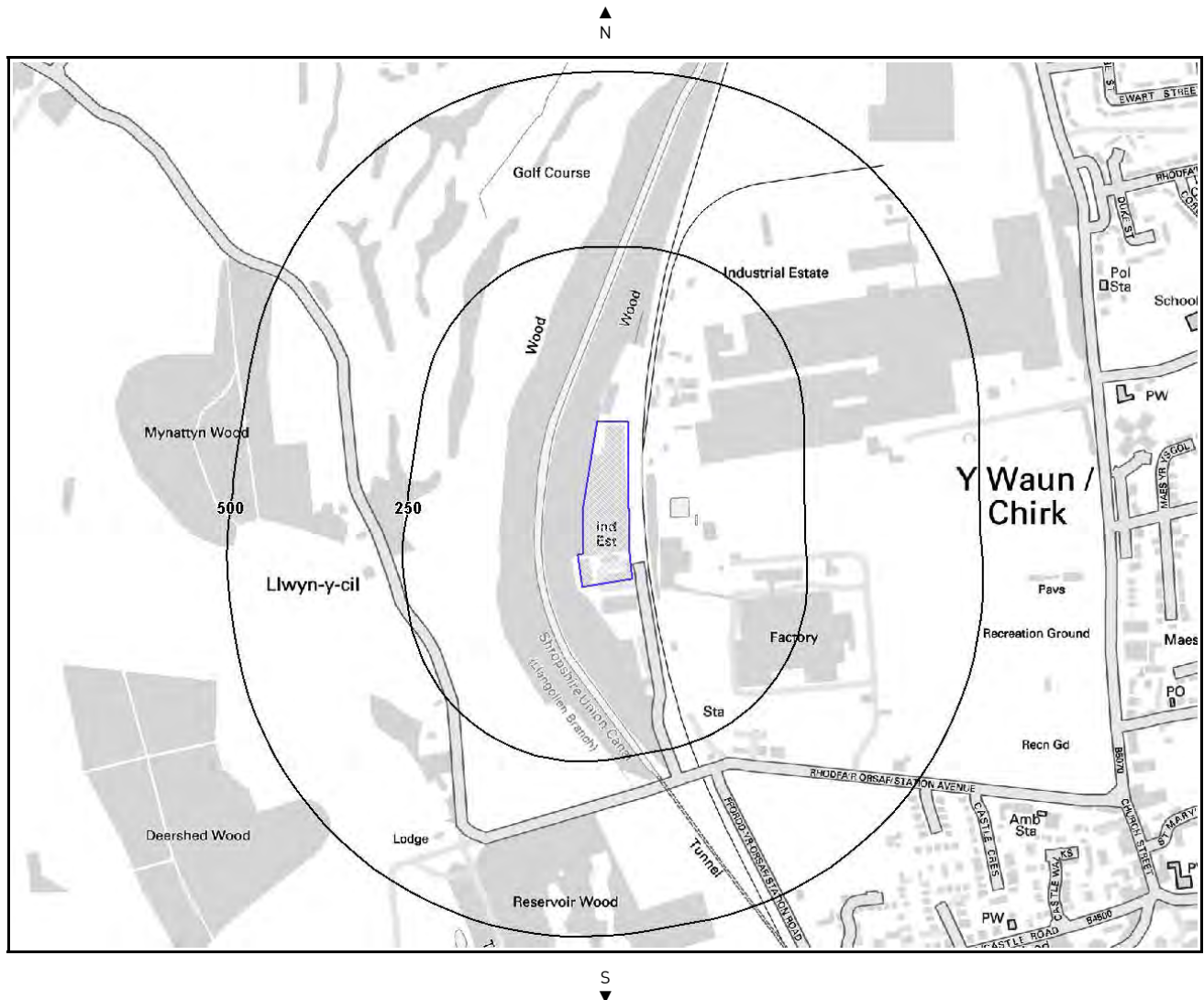
Hydrogeology and Hydrology Legend

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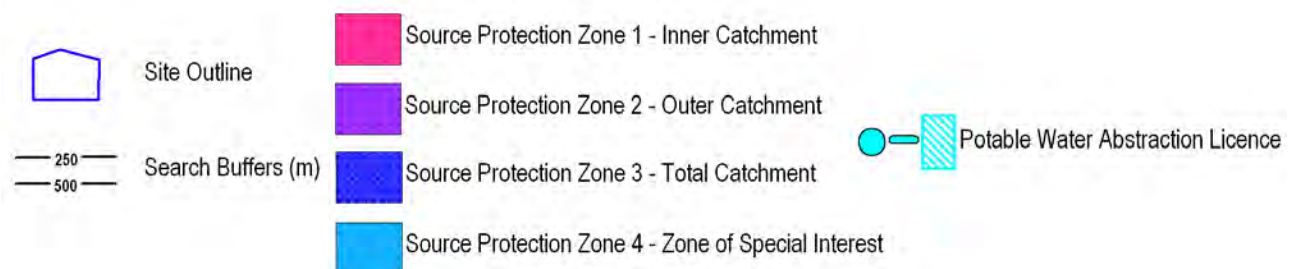
5b. Hydrogeology and Hydrology - SPZ and Potable Water Abstraction Map



Hydrogeology and Hydrology Legend

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5. Hydrogeology and Hydrology

5.1 Groundwater Vulnerability and Soil Classification

Records of aquifer and soil classification within 200m of the study site:

Yes

The following groundwater information is represented as polygons on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	Classification
1	0.0	On Site	Minor Aquifer/High Leaching Potential
2	132.0	W	Minor Aquifer/High Leaching Potential
3	188.0	NE	Minor Aquifer/Low Leaching Potential

5.2 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 1000m of the study site?

Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	NGR	Details	
4A	445.0	NE	328680,338590	Licence No: 24/67/5/0080 Details: Process Water Direct Source: Eaw Groundwater Point: 33m Deep, 250mm Dia. St. steel Casing, Borehole Data Type: Point	Original Application No: Original Start Date: 21/6/2001 Expiry Date: 31/3/2012 Issue No: 1 Version Start Date: 1/4/2006 Version End Date: -
5A	445.0	NE	328680,338590	Licence No: 24/67/5/0080 Details: Evaporative Cooling Direct Source: Eaw Groundwater Point: 33m Deep, 250mm Dia. St. steel Casing, Borehole Data Type: Point	Original Application No: Original Start Date: 21/6/2001 Expiry Date: 31/3/2012 Issue No: 1 Version Start Date: 1/4/2006 Version End Date: -
6A	445.0	NE	328680,338590	Licence No: 24/67/5/0066 Details: Process water Direct Source: Eaw Groundwater Point: 33m Deep, 250mm Dia. St. steel Casing, Borehole Data Type: Point	Original Application No: Original Start Date: 7/8/1989 Expiry Date: - Issue No: 100 Version Start Date: 7/7/1995 Version End Date: -
7	445.0	NE	328650,338620	Licence No: 24/67/5/0066 Details: Process water Direct Source: Eaw Groundwater Point: Borehole Data Type: Point	Original Application No: Original Start Date: 7/8/1989 Expiry Date: - Issue No: 100 Version Start Date: 7/7/1995 Version End Date: -
8B	626.0	E	328980,338170	Licence No: 24/67/5/0083 Details: Evaporative Cooling Direct Source: Eaw Groundwater Point: 55m Deep, 300mm Dia Borehole Data Type: Point	Original Application No: Original Start Date: 1/4/2008 Expiry Date: 31/3/2015 Issue No: 1 Version Start Date: 1/4/2008 Version End Date: -
9B	626.0	E	328980,338170	Licence No: 24/67/5/0083 Details: Process Water Direct Source: Eaw Groundwater Point: 55m Deep, 300mm Dia Borehole Data Type: Point	Original Application No: Original Start Date: 1/4/2008 Expiry Date: 31/3/2015 Issue No: 1 Version Start Date: 1/4/2008 Version End Date: -
10B	626.0	E	328980,338170	Licence No: 24/67/5/0082 Details: Process Water Direct Source: Eaw Groundwater Point: 55m Deep, 300mm Dia Borehole Data Type: Point	Original Application No: Original Start Date: 25/5/2004 Expiry Date: 31/3/2008 Issue No: 1 Version Start Date: 1/4/2006 Version End Date: -

11B	626.0	E	328980,338170	Licence No: 24/67/5/0082 Details: Evaporative Cooling Direct Source: Eaw Groundwater Point: 55m Deep, 300mm Dia Borehole Data Type: Point	Original Application No: Original Start Date: 25/5/2004 Expiry Date: 31/3/2008 Issue No: 1 Version Start Date: 1/4/2006 Version End Date: -
12B	626.0	E	328980,338170	Licence No: 24/67/5/0079 Details: Process water Direct Source: Eaw Groundwater Point: 55m Deep, 300mm Dia Borehole Data Type: Point	Original Application No: Original Start Date: 24/5/2001 Expiry Date: 24/5/2004 Issue No: 1 Version Start Date: 1/4/2003 Version End Date: -

5.3 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 1000m of the study site?

Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	NGR	Details	
Not shown	627.0	N	328490,338900	Licence No: 24/67/5/0081 Details: Process Water Direct Source: Eaw Surface Water Point: Point "b" On Llangollen Canal Data Type: Point	Application No: Original Start Date: 12/8/2003 Expiry Date: 31/3/2015 Issue No: 2 Version Start Date: 18/2/2008 Version End Date: -
Not shown	627.0	N	328490,338900	Licence No: 24/67/5/0081 Details: Evaporative Cooling Direct Source: Eaw Surface Water Point: Point "b" On Llangollen Canal Data Type: Point	Application No: Original Start Date: 12/8/2003 Expiry Date: 31/3/2015 Issue No: 2 Version Start Date: 18/2/2008 Version End Date: -
Not shown	734.0	N	328530,339000	Licence No: 24/67/5/0081 Details: Process Water Direct Source: Eaw Surface Water Point: Point "a" On Llangollen Canal Data Type: Point	Application No: Original Start Date: 12/8/2003 Expiry Date: 31/3/2015 Issue No: 2 Version Start Date: 18/2/2008 Version End Date: -
Not shown	734.0	N	328530,339000	Licence No: 24/67/5/0081 Details: Evaporative Cooling Direct Source: Eaw Surface Water Point: Point "a" On Llangollen Canal Data Type: Point	Application No: Original Start Date: 12/8/2003 Expiry Date: 31/3/2015 Issue No: 2 Version Start Date: 18/2/2008 Version End Date: -
Not shown	842.0	N	328180,339120	Licence No: 24/67/5/0067 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: Chirk Castle Pool And Outlet Stream Data Type: Point	Application No: Original Start Date: 1/6/1989 Expiry Date: - Issue No: 100 Version Start Date: 20/1/1993 Version End Date: -
Not shown	842.0	N	328180,339120	Licence No: 24/67/5/0067 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: Chirk Castle Pool And Outlet Stream Data Type: Point	Application No: Original Start Date: 1/6/1989 Expiry Date: - Issue No: 102 Version Start Date: 31/1/2003 Version End Date: -

5.4 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Map:

ID	Distance	Direction	NGR	Details
----	----------	-----------	-----	---------

Not shown 1026.0 NW 327450,338850

Licence No: 24/67/5/0024
Details: Potable Water Supply - Direct
Direct Source: Eaw Surface Water
Point: Newhallspring
Data Type: Point

Original Application No:
Original Start Date: 23/10/1967
Expiry Date: -
Issue No: 100
Version Start Date: 19/5/1982
Version End Date: -

5.5 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

No

Database searched and no data found.

5.6 River Quality

Is there any Environment Agency information on river quality within 500m of the study site?

Yes

The following river quality records are not represented on mapping:

Distance	Direction	River	Reach	Chemical Grade	Biological Grade
0.0	On Site	Shropshire Union C	St Martin's Moor - Llantysilio	B	0

5.7 Main Rivers

Are there any Main Rivers within 500m of the study site?

No

Database searched and no data found.

5.8 Surface Water Features

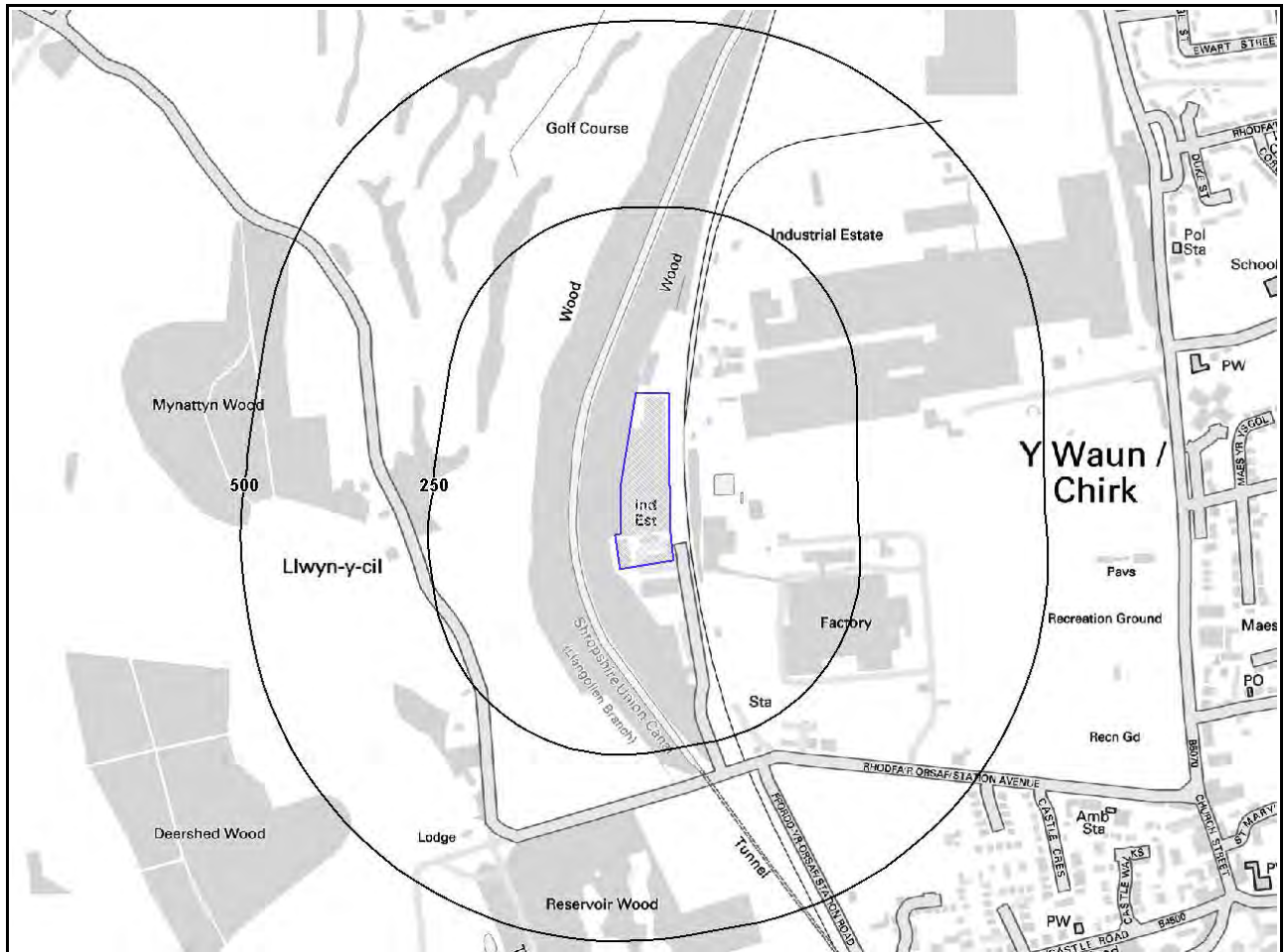
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are not represented on mapping:

Distance to Surface Water (m)	on-site	0-50	51-250
Surface water features within 250m of the study site	No	Yes	Yes

6. Surface Water Flood Map



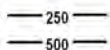
Surface Water Flood Legend

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Site Outline



Search Buffers (m)



Zone 2 Floodplain



Zone 3 Floodplain



Flood Storage Area



Area Benefiting from Flood Defences



Flood Defences

6. Flooding

6.1 Zone 2 Flooding

Zone 2 floodplain estimates the annual probability of flooding as one in one thousand (0.1%) or greater from rivers and the sea but less than 1% from rivers or 0.5% from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 2 floodplain?

No

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

Database searched and no data found.

6.2 Zone 3 Flooding

Zone 3 estimates the annual probability of flooding as one in one hundred (1%) or greater from rivers and a one in two hundred (0.5%) or greater from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 3 floodplain?

No

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

Database searched and no data found.

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site ?

No

6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site?

No

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.5 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?

No

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.6 Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the boundary of the study site?

Yes

What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

High

Guidance: Where high groundwater flooding susceptibility is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

6.7 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?

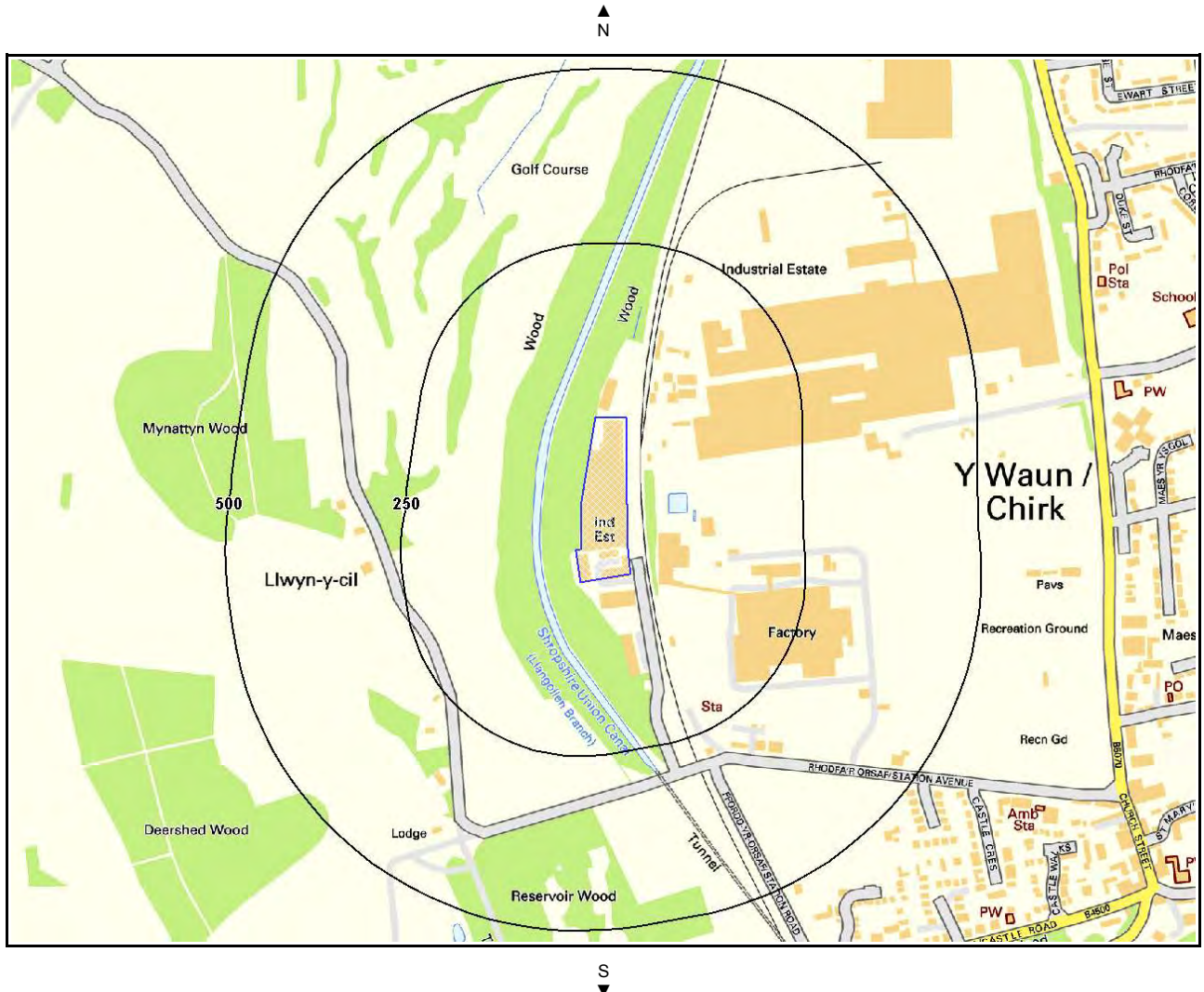
Moderate

Notes:

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a fivefold scale - Low, Moderately Low, Moderate, Moderately High and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

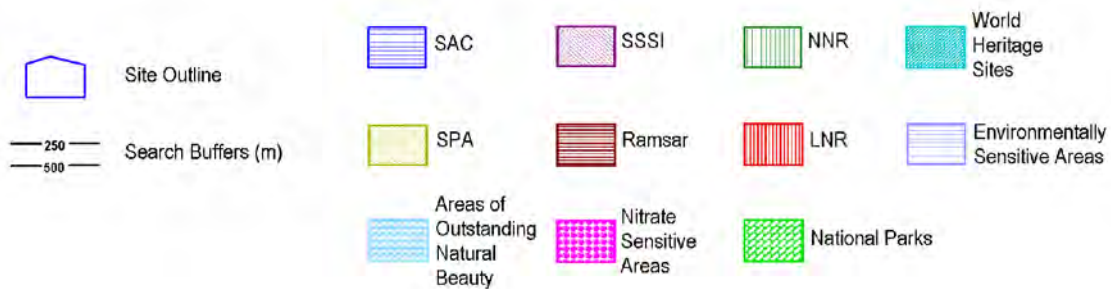
7.Designated Environmentally Sensitive Sites Map



Designated Environmentally Sensitive Sites Legend

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7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 500m of the study site? No

Records of Sites of Special Scientific Interest (SSSI) within 500m of the study site: 0

Database searched and no data found.

Records of National Nature Reserves (NNR) within 500m of the study site: 0

Database searched and no data found.

Records of Special Areas of Conservation (SAC) within 500m of the study site: 0

Database searched and no data found.

Records of Special Protection Areas (SPA) within 500m of the study site: 0

Database searched and no data found.

Records of Ramsar sites within 500m of the study site: 0

Database searched and no data found.

Records of Local Nature Reserves (LNR) within 500m of the study site: 0

Database searched and no data found.

Records of World Heritage Sites within 500m of the study site: 0

Database searched and no data found.

Records of Environmentally Sensitive Areas within 500m of the study site: 0

Database searched and no data found.

Records of Areas of Outstanding Natural Beauty (AONB) within 500m of the study site: 0

Database searched and no data found.

Records of National Parks (NP) within 500m of the study site: 0

Database searched and no data found.

Records of Nitrate Sensitive Areas within 500m of the study site: 0

Database searched and no data found.

Records of Nitrate Vulnerable Zones within 500m of the study site: 0

Database searched and no data found.

8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information, please obtain a GroundSure Geolnsight. Available from our website. The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site?

Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.

8.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site?

Null - Negligible

Soluble rocks are not present in the search area. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

8.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site?

Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site?

Null - Negligible

No indicators for collapsible deposits identified; No special actions required to avoid problems due to collapsible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with collapsible deposits.

8.1.6 Running Sand

What is the maximum Running Sand* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

* This indicates an automatically generated 50m buffer and site.

9. Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site?

Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance	Direction	Details
53.0	S	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

9.2 Shallow Mining

What is the hazard of subsidence relating to shallow mining on-site (including a 150m buffer) ?

Low

Guidance: Where low potential is indicated, this means that the rocks underlying the area are of a type known to have been mined at shallow depth in some parts of the UK, but that it is unlikely to be of significant concern in this area. However, it is recommended that you do obtain a Coal Authority mining search in this area, which will provide a comprehensive search of former mining activity, including coal mining at deeper levels.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site?

No

Database searched and no data found.

10. Contacts

GroundSure Helpline

Telephone: 01273 819700
info @ groundsure.com



British Geological Survey (England & Wales)

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276. Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries



Environment Agency

National Customer Contact Centre
PO Box 544
Rotherham
S60 1BY
Tel: 08708 506 506
Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk



Health Protection Agency

Chilton, Didcot, Oxon, OX11 0RQ
Tel: 01235 822622 www.hpa.org.uk/radiation
Radon measures and general radon information and guidance



The Coal Authority

200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848. DX 716176 Mansfield 5
www.coal-authority.co.uk
Coal mining reports and related enquiries



Ordnance Survey

Romsey Road
Southampton SO16 4GU
Tel: 08456 050505



Local Authority

Authority: Wrexham County Borough Council
Phone: 01978 292000
Web: www.wrexham.gov.uk
Address: The Guildhall, Wrexham, LL11 1AY

Get Mapping PLC

Virginia Villas, High Street, Hartley Witney, Hampshire RG27 8NW
Tel: 01252 845444



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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Report Reference: HMD-283-620813

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GroundSure on (T) 01273 819700, (F) 01273 377902, email: info@groundsurre.com

Standard Terms and Conditions

1 Definitions

In these conditions unless the context otherwise requires:

"Beneficiary" means the Client or the customer of the Client for whom the Client has procured the Services.

"Commission" means an order for Consultancy Services submitted by a Client.

"Consultancy Services" mean consultancy services provided by GroundSure including, without limitation, carrying out interpretation of third party and in-house environmental data, provision of environmental consultancy advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Content" means any data, database or other information contained in a Report or Mapping which is provided to GroundSure by a Data Provider.

"Contract" means the contract between GroundSure and the Client for the performance of the Services which arises upon GroundSure's acceptance of an Order or Commission and which shall incorporate these conditions, the relevant GroundSure User Guide, proposal by GroundSure and the content of any subsequent report, and any agreed amendments in accordance with condition 11.

"Client" means the party that submits an Order or Commission.

"Data Provider" means any third party providing Content to GroundSure.

"Data Report" means reports comprising factual data with no professional interpretation in respect of the level of likely risk and/or liability available from GroundSure.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028 and whose registered office is at Greater London House, Hampstead Road, London NW1 7EJ.

"Home Information Pack" means a combination of reports required when selling a residential property.

"Intellectual Property" means any patent, copyright, design rights, service marks, moral rights, data protection rights, know-how, trade mark or any other intellectual property rights.

"Mapping" an historical map or a combination of historical maps of various ages, time periods and scales available from GroundSure.

"Order" means an order form submitted by the Client requiring Services from GroundSure in respect of a specified Site.

"Order Website" means online platform via which Orders may be placed.

"Report" means a Risk Screening Report or Data Report for commercial or residential property available from GroundSure relating to the Site prepared in accordance with the specifications set out in the relevant User Guide.

"Risk Screening Report" means one of GroundSure's risk screening reports such as GroundSure Homebuyers, GroundSure Home Environmental GroundSure SiteGuard, GroundSure Screening, GroundSure Review, GroundSure Developer Review, or any other risk screening report available from GroundSure.

"Services" means the provision of any Report, Mapping or Consultancy Services which GroundSure has agreed to carry out for the Client/Beneficiary on these terms and conditions in respect of the Site.

"Site" means the landsite in respect of which GroundSure provides the Services.

"User Guide" means the relevant current version of the user guide, available upon request from GroundSure.

2 Scope of Services

2.1 GroundSure agrees to carry out the Services in accordance with the Contract and to the extent set out therein.

2.2 GroundSure shall exercise all the reasonable skill, care and diligence to be expected of experienced environmental consultants in the performance of the Services.

2.3 The Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in the Contract.

2.4 Terms and conditions appearing on a Client's order form, printed stationery or other communication, including invoices, to GroundSure, its employees, servants, agents or other representatives or any terms implied by custom, practice or course of dealing shall be of no effect and these terms and conditions shall prevail over all others.

2.5 In the event that a Client/Beneficiary opts to take out insurance in conjunction with or as a result of the Services, such insurance shall be subject solely to the terms of any policy issued to it in that respect and GroundSure will have no liability therefore.

2.6 GroundSure's quotations/proposals are valid for a period of 30 days only. GroundSure reserves the right to withdraw any quotation at any time before GroundSure accepts an Order or Commission. GroundSure's acceptance of an Order or Commission shall be effective only where such acceptance is in writing and signed by GroundSure's authorised representative or where accepted via GroundSure's Order Website.

3 The Client's obligations

3.1 The Client shall be solely responsible for ensuring that the Report/Mapping ordered is appropriate and suitable for the Beneficiary's needs.

3.2 The Client shall (or shall procure that the Beneficiary shall) supply to GroundSure as soon as practicable and without charge all information necessary and accurate relevant data including any specific and/or unusual environmental information relating to the Site known to the Client/Beneficiary which may pertain to the Services and shall give such assistance as GroundSure shall reasonably require in the performance of the Services (including, without limitation, access to a Site, facilities and equipment as agreed in the Contract).

3.3 Where Client/Beneficiary approval or decision is required, such approval or decision shall be given or procured in reasonable time as not to delay or disrupt the performance of any other part of the Services.

3.4 The Client shall not and shall not knowingly permit the Beneficiary to, save as expressly permitted by these terms and conditions, re-sell, alter, add to, amend or use out of context the content of any Report, Mapping or, in respect of any Services, information given by GroundSure. For the avoidance of doubt, the Client and Beneficiary may make the Report, Mapping or GroundSure's findings available to a third party, but such third party cannot rely on the same unless expressly permitted under condition 4.

3.5 The Client is responsible for maintaining the confidentiality of its user name and password if using GroundSure's internet ordering service and accepts responsibility for all activity that occurs under such account and password.

4 Reliance

4.1 Upon full payment of all relevant fees and subject to the provisions of these terms and conditions, the Client and Beneficiary are granted an irrevocable royalty-free licence to use the information contained in the Report, Mapping or in a report prepared by GroundSure in respect of or arising out of the Consultancy Services. The Services may only be used for the benefit of the Client and those persons listed in conditions 4.2 and 4.3.

4.2 In relation to Data Reports, Mapping and Risk Screening Reports, the Client shall be entitled to make Reports available to (i) the Beneficiary, (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate), (iv) the first purchaser or first tenant of the Site (v) the professional advisers and lenders of the first purchaser or tenant of the Site. For the avoidance of doubt, such persons shall include any entity necessary under the Housing Act 2004 (as amended). Accordingly GroundSure shall have the same duties and obligations to those persons in respect of the Services as it has to the Client and those persons shall have the benefit of any of the Client's rights under the Contract as if those persons were parties to the Contract. For the avoidance of doubt, the limitations of GroundSure's liability as set out in condition 7 shall apply.

4.3 In relation to Consultancy Services, reliance shall be limited to the Client, Beneficiary and named parties on the Report.

4.4 Save as set out in conditions 4.2 and 4.3 and unless otherwise agreed in writing with GroundSure, any other party considering the information supplied by GroundSure as part of the Services, including (but not limited to) insurance underwriters, does so at their own risk and GroundSure has no legal obligations to such party unless otherwise agreed in writing.

4.5 The Client shall not and shall not knowingly permit any person (including the Beneficiary) who is provided with a copy of any Report shall not except as permitted herein or by separate agreement with GroundSure: (a) remove, suppress or modify any trade mark, copyright or other proprietary marking from the Report or Mapping; (b) create any product which is derived directly or indirectly from the data contained in the Report or Mapping; (c) combine the Report or Mapping with, or incorporate the Report or Mapping into any other information data or service; or (d) re-format or otherwise change (whether by modification, addition or enhancement) data or images contained in the Report or Mapping.

4.6 Notwithstanding condition 4.5, if the Client acts in a professional capacity, it may make reasonable use of a Report and/or findings made as a result of Consultancy Services to advise Beneficiaries. However, GroundSure shall have no liability in respect of any opinion or report given to such Beneficiaries by the Client or a third party.

5 Fees and Disbursements

5.1 GroundSure shall charge the Client fees at the rate and frequency specified in the Contract together, in the case of Consultancy Services, with all proper disbursements incurred by GroundSure in performing the Services. For the avoidance of doubt, the fees payable for the Services are as set out in GroundSure's written proposal, Order Website or Order acknowledgement form. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services.

5.2 Unless GroundSure requires prepayment, the Client shall promptly pay all fees disbursements and other monies due to GroundSure in full without deduction, counterclaim or set off together with such value added tax or other tax as may be required within 30 days from the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). GroundSure reserves the right to charge interest which shall accrue on a daily basis from 30 days after the date of Payment Date until the date of payment (whether before or after judgement) at the rate of five per cent per annum above the Bank of England base rate from time to time.

5.3 In the event that the Client disputes the amount payable in respect of GroundSure's invoice it shall notify GroundSure no later than 28 days after the date thereof that it is in dispute. In default of such notification the Client shall be deemed to have agreed the amount thereof. As soon as reasonably practicable following receipt of a notification in respect of any disputed invoice, a member of the management team at GroundSure shall contact the Client and the parties shall use all reasonable endeavours to resolve the dispute.

6 Intellectual Property

6.1 Subject to the provisions of condition 4.1, the Client and the Beneficiary hereby acknowledge that all Intellectual Property in the Services are and shall remain owned by either GroundSure or the Data Providers and nothing in these terms purports to transfer or assign any rights to the Client or the Beneficiary in respect of the Intellectual Property.

6.2 The Client shall acknowledge the ownership of the Content where such Content is incorporated or used in the Client's own documents, reports, systems or services whether or not these are supplied to a third party.

6.3 Data Providers may enforce any breach of condition 6.1 against the Client or Beneficiary.

7 Liability

Report Reference: HMD-283-620813

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- 7.1 Nothing in these terms and conditions shall limit GroundSure's liability for causing death or personal injury through negligence or wilful default.
- 7.2 Save as otherwise set out in these conditions, any information provided by one party ("Disclosing party") to the other party ("Receiving Party") shall be treated as confidential except so far as authorised by the Disclosing Party to provide such information in whole or in part to a third party.
- 7.3 Nothing in these conditions shall affect the statutory rights of a consumer under the applicable consumer protection legislation from time to time.
- 7.4 In relation to Data Reports, Mapping and Risk Screening Reports, GroundSure's liability under the Contract shall cease upon the expiry of six years from the date when the Beneficiary became aware that it may have a claim against GroundSure in respect of the Services provided always that there shall be no liability at the expiration of twelve years from the completion of the Contract. For the avoidance of doubt, any claims in respect of which proceedings are notified to GroundSure in writing prior to the expiry of the time periods referred to in this clause shall survive the expiry of those time periods provided any such claim is actually commenced within six months of notification.
- 7.5 In relation to Consultancy Services GroundSure's liability under the Contract shall cease upon the expiry of six years from the date the Services were completed.
- 7.6 GroundSure shall not be liable to the Client or any person to whom the Client provides a copy of a Data Report, Mapping or Risk Screening Report in any circumstances whatsoever unless arising out of a breach on its part of the obligations set out in the Contract.
- 7.7 GroundSure shall not be liable if the Data Reports, Mapping or Risk Screening Report are used otherwise than as provided or referred to in these conditions and the relevant User Guide.
- 7.8 Subject to the provisions of condition 7.3, GroundSure makes no representation, warranties, express or implied, as to the accuracy, reliability, completeness, validity or fitness for purpose of any Content and shall not be liable for any omission, error or inaccuracy in relation thereto unless GroundSure should reasonably have been alerted to any omission, error or inaccuracy in the Content.
- 7.9 Subject to the provisions of clause 7.1 notwithstanding anything to the contrary contained elsewhere in the Contract, and irrespective of whether multiple parties make use of the same Services, the total liability of GroundSure under or in connection with the Contract, whether in contract in tort for breach of statutory duty or otherwise shall not exceed £5 million per claim or series of connected claims.
- 7.10 Whilst GroundSure will use all reasonable endeavours to maintain operability of its internet ordering service it will not be liable for any loss or damages caused by a delay or loss of use of such service. The Client shall use GroundSure's internet ordering service at its own risk. GroundSure shall not be responsible for any damage to a Client or permitted assignee's computer, software, modem, telephone or other property resulting from the use of GroundSure's internet ordering service.
- 7.11 The Client accepts, and shall use all reasonable endeavours to procure that anyone who is provided with a copy of the Report accepts, that it has no claim or recourse to any Data Provider or to GroundSure in respect of the acts or omissions of such Data Providers including Content supplied by them save for where a Risk Screening Report comprises part of a Home Information Pack:
- (i) the Data Providers set out in the relevant User Guide shall be responsible for the quality and accuracy of the data supplied by them; and
 - (ii) where GroundSure makes an assessment of a Site to determine if it is likely to fall within Part II(A) of the Environmental Protection Act 1990, GroundSure shall be responsible for the interpretation of any Content provided by a Data Provider subject to the limitations set out in these terms and conditions.
- 7.12 GroundSure shall provide the Services using reasonable skill and care, however, GroundSure shall not be liable for any inaccurate statement or risk rating in a Report which resulted from a reasonable interpretation of the Content.
- 7.13 Subject to the provisions of clause 7.1, GroundSure shall not be liable for any losses (whether direct or indirect) and including (but not limited to) loss of profit caused by the suspension or reduction of activity on a Site, business interruption, all third party off-Site claims or any loss in value of a Site, loss of goodwill, loss of business opportunity or other similar losses alleged to be sustained by the Client, the Beneficiary or any third party.
- 7.14 GroundSure undertakes for the duration of the liability periods referred to in conditions 7.4 and 7.5 to maintain professional indemnity insurance in respect of its liabilities in respect of the Contract for £5 million in the aggregate which amount shall first include the whole of any sum payable for death or personal injury provided such insurance is readily available at commercially viable rates or for a lesser amount to be agreed with the Client should the cost of such insurance become commercially unviable. GroundSure shall produce evidence of such insurance if requested by the Client. A greater level of cover may be available upon request and agreement with the Client.
- 8 GroundSure right to suspend or terminate**
- 8.1 In the event that GroundSure reasonably believes that the Client or Beneficiary as applicable has not provided the information or assistance required to enable the proper performance of the Services, GroundSure shall be entitled on fourteen days written notice to suspend all further performance of the Services until such time as any such deficiency has been made good.
- 8.2 GroundSure may additionally terminate the Contract immediately on written notice in the event that:
- (i) the Client shall fail to pay any sum due to GroundSure within 28 days of the due date for payment; or
 - (ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an Administration Order made against it or if a Receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
 - (iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
 - (iv) the Client breaches any material term of the Contract (including, but not limited to, the obligations in condition 4) incapable of remedy or if remediable, is not remedied within 14 days of notice of the breach.
- 9 Client's Right to Terminate and Suspend**
- 9.1 Subject to condition 10.2, the Client may at any time after commencement of the Services by notice in writing to GroundSure require GroundSure to terminate or suspend immediately performance of all or any of the Services.
- 9.2 The Client waives all and any right of cancellation it may have under the Consumer Protection (Distance Selling) Regulations 2000 (as amended) in respect of the Order of a Report/Mapping. This does not affect the Beneficiary's statutory rights.
- 10 Consequences of Withdrawal, Termination or Suspension**
- 10.1 Upon termination or any suspension of the Services, GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client/Beneficiary any property of the Client/ Beneficiary in GroundSure's possession or control.
- 10.2 In the event of termination/suspension of the Contract under conditions 8 or 9, the Client shall pay to GroundSure all and any fees payable in respect of the performance of the Services up to the date of termination/suspension. In respect of any Consultancy Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination/suspension of the Contract.
- 11 General**
- 11.1 The mapping contained in the Services is protected by Crown copyright and must not be used for any purpose outside the context of the Services or as specifically provided in these terms.
- 11.2 GroundSure reserves the right to amend these terms and conditions. No variation to these terms shall be valid unless signed by an authorised representative of GroundSure.
- 11.3 No failure on the part of GroundSure to exercise and no delay in exercising, any right, power or provision under these terms and conditions shall operate as a waiver thereof.
- 11.4 Save as expressly provided in conditions 4.2, 4.3, 6.3 and 11.5, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
- 11.5 The Secretary of State for Communities and Local Government acting through Ordnance Survey, may enforce breach of conditions 6.1 or 11.1 of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
- 11.6 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:
- (i) the Client or Beneficiary's failure to provide facilities, access or information;
 - (ii) fire, storm, flood, tempest or epidemic;
 - (iii) Acts of God or the public enemy;
 - (iv) riot, civil commotion or war;
 - (v) strikes, labour disputes or industrial action;
 - (vi) acts or regulations of any governmental or other agency;
 - (vii) suspension or delay of services at public registries by Data Providers; or
 - (viii) changes in law.
- 11.7 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.
- 11.8 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email and on the second working day after the day of posting if sent by first class post.
- 11.9 The Contract constitutes the entire contract between the parties and shall supersede all previous arrangements between the parties.
- 11.10 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.
- 11.11 These terms and conditions shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with these terms and conditions shall be subject to the exclusive jurisdiction of the English courts.
- 11.12 If the Client or Beneficiary has a complaint about the Services, notice should be given in writing to the Compliance Officer at GroundSure who will respond in a timely manner.

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GroundSure GeoInsight

Address: CANAL WOOD INDUSTRIAL ESTATE, CHIRK, LL14 5RL

Date: Nov 11, 2009

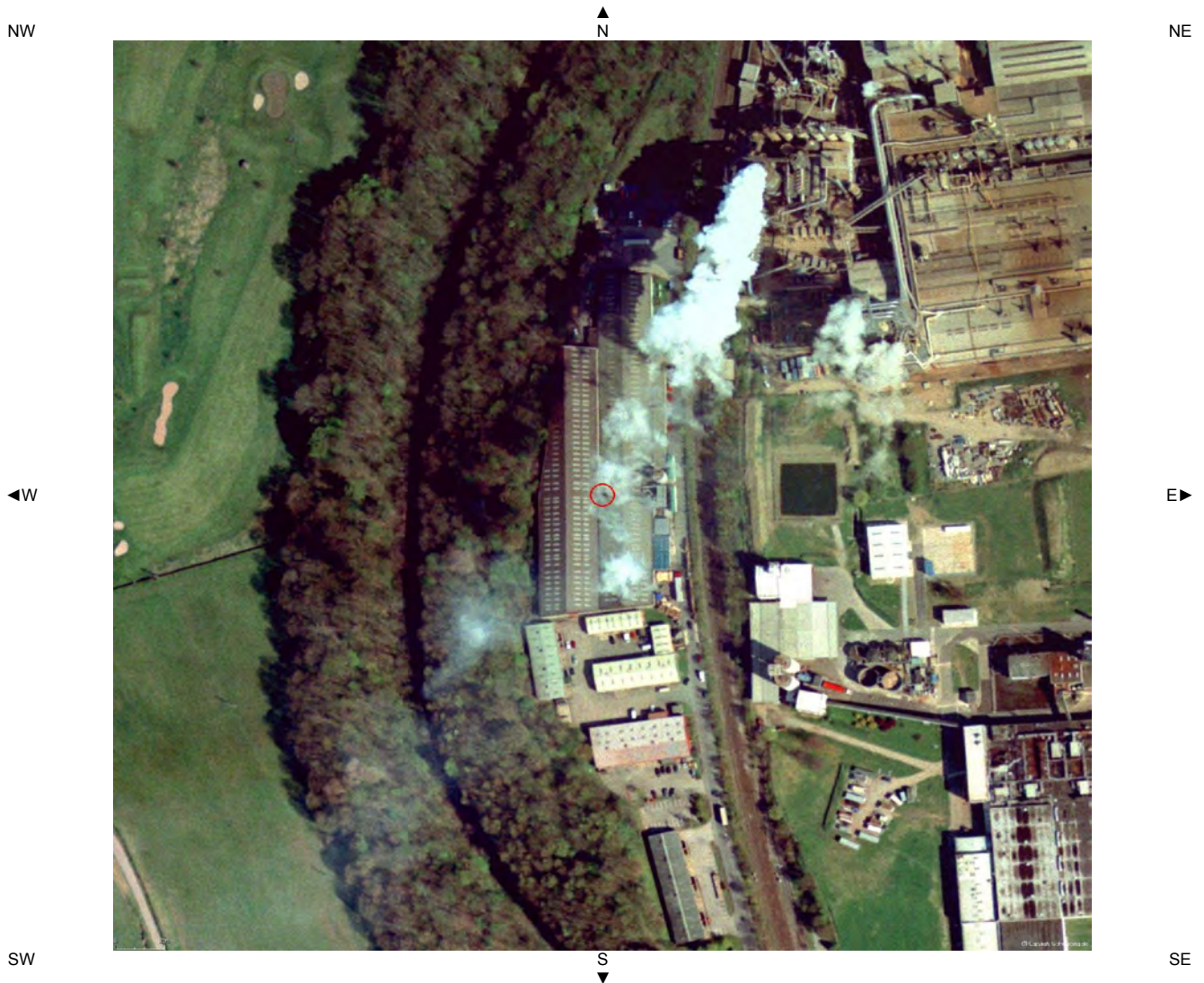
GroundSure Reference: HMD-283-620814

Your Reference: C3584/RIH/1866



Brought to you by GroundSure

Aerial Photograph of Study Site



Aerial photography supplied by Getmapping PLC.
© Copyright Getmapping PLC 2003. All Rights Reserved.

Site Name:CANAL WOOD INDUSTRIAL ESTATE, CHIRK, LL14 5RL
Grid Reference: 328312,338164

[Report Reference: HMD-283-620814](#)

Brought to you by GroundSure

If you would like any further assistance regarding this report then please contact GroundSure on (T) 01273 819700, (F) 01273 377902, email: info@groundsure.com

Overview of Findings

The GroundSure GeolInsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Report Section	Number of records found within (X) m of the study site boundary
1. Geology	Description
1.1 Artificial Ground,	
1.1.1 Is there any Artificial Ground /Made Ground present beneath the study site? *	No
1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology & Landslips	
1.2.1 Is there any Superficial Ground /Drift Geology present beneath the study site? *	Yes
1.2.2 Are there any records relating to permeability of superficial geology within the study site* boundary?	Yes
1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
1.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No
1.3 Bedrock, Solid Geology & Faults	
1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
1.3.2 Are there any records relating to permeability of bedrock within the study site* boundary?	Yes
1.3.3 Are there any records of faults within 500m of the study site boundary?	Yes
1.3.4 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is in a radon Affected Area, as between 10 and 30% of properties are above the Action Level
1.3.5 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	Full radon protective measures are necessary

* This includes an automatically generated 50m buffer zone around the site

Source:Scale 1:50,000 BGS Sheet No:121

2. Ground Workings	on-site	0-50	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	0	8	2	-	-
2.2 Historical Underground Workings Features from Small Scale Mapping	0	0	0	7	1
2.3 Current Ground Workings	0	0	0	0	0

3. Mining, Extraction & Natural Cavities	on-site	0-50	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0
3.2 Coal Mining	0	0	1	0	0
3.3 Shallow Mining*	1	-	-	-	-
3.4 Non – Coal Mining Cavities	0	0	0	0	0
3.5 Natural Cavities	0	0	0	0	0
3.6 Brine Extraction	0	0	0	0	0
3.7 Gypsum Extraction	0	0	0	0	0
3.8 Tin Mining	0	0	0	0	0
3.9 Clay Mining	0	0	0	0	0

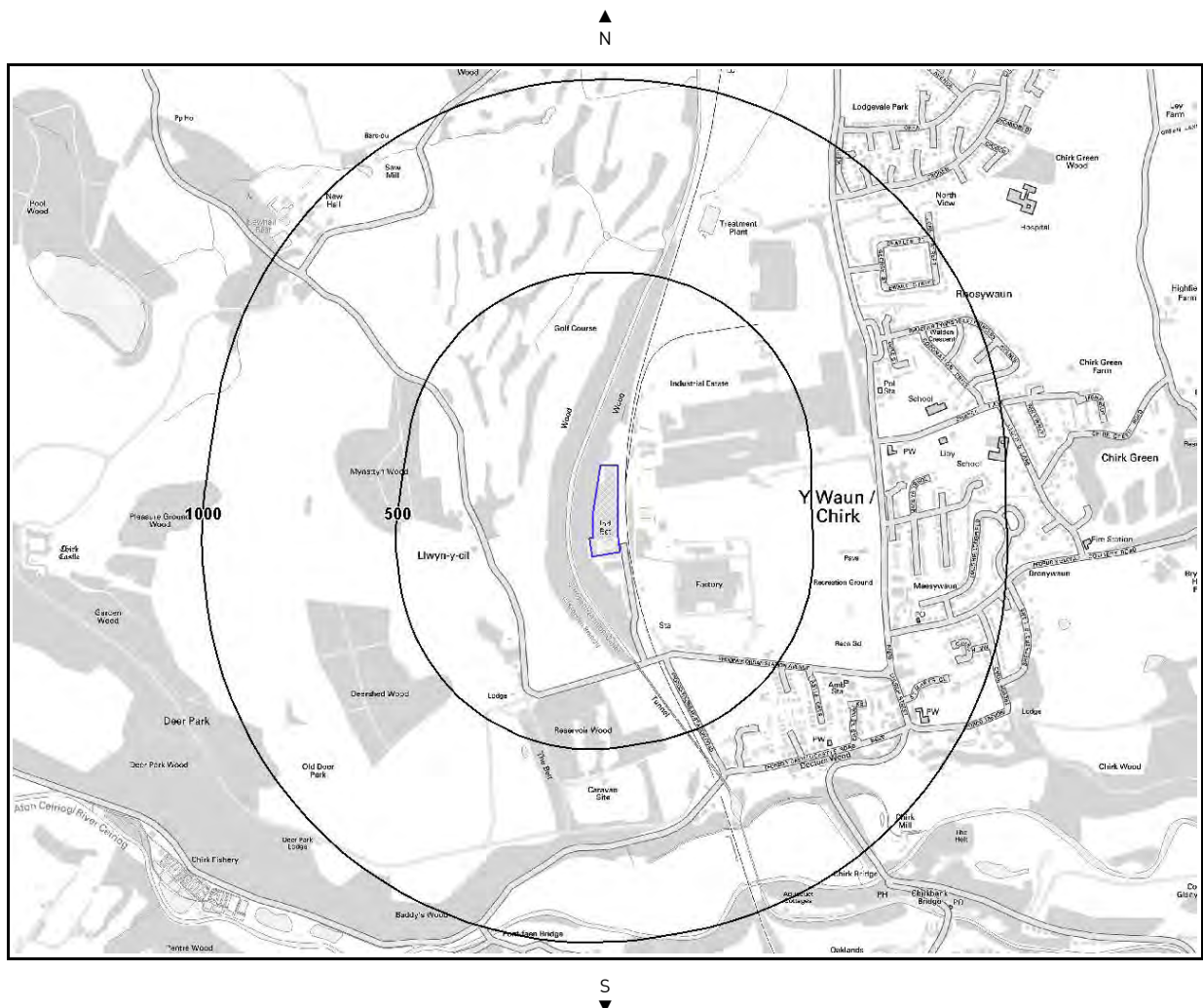
*This includes an automatically generated 150m buffer zone around the site

4. Natural Ground Subsidence	on-site*	0-50	51-250	251-500	501-1000
4.1 Shrink-Swell Clay	Negligible	-	-	-	-
4.2 Landslides	Very Low	-	-	-	-
4.3 Ground Dissolution of Soluble Rocks	Negligible	-	-	-	-
4.4 Compressible Deposits	Negligible	-	-	-	-
4.5 Collapsible Deposits	Negligible	-	-	-	-
4.6 Running Sand	Very Low	-	-	-	-

* This includes an automatically generated 50m buffer zone around the site

5. Borehole Records	on-site	0-50	51-250	251-500	501-1000
5.1 BGS Recorded Boreholes	0	0	3	-	-

1.1 Artificial Ground Map



Artificial Ground Legend

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Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:121

1.1.1 Artificial/Made Ground

Are there any records of Artificial/Made Ground within 500m of the study site boundary: **No**

Database searched and no data found.

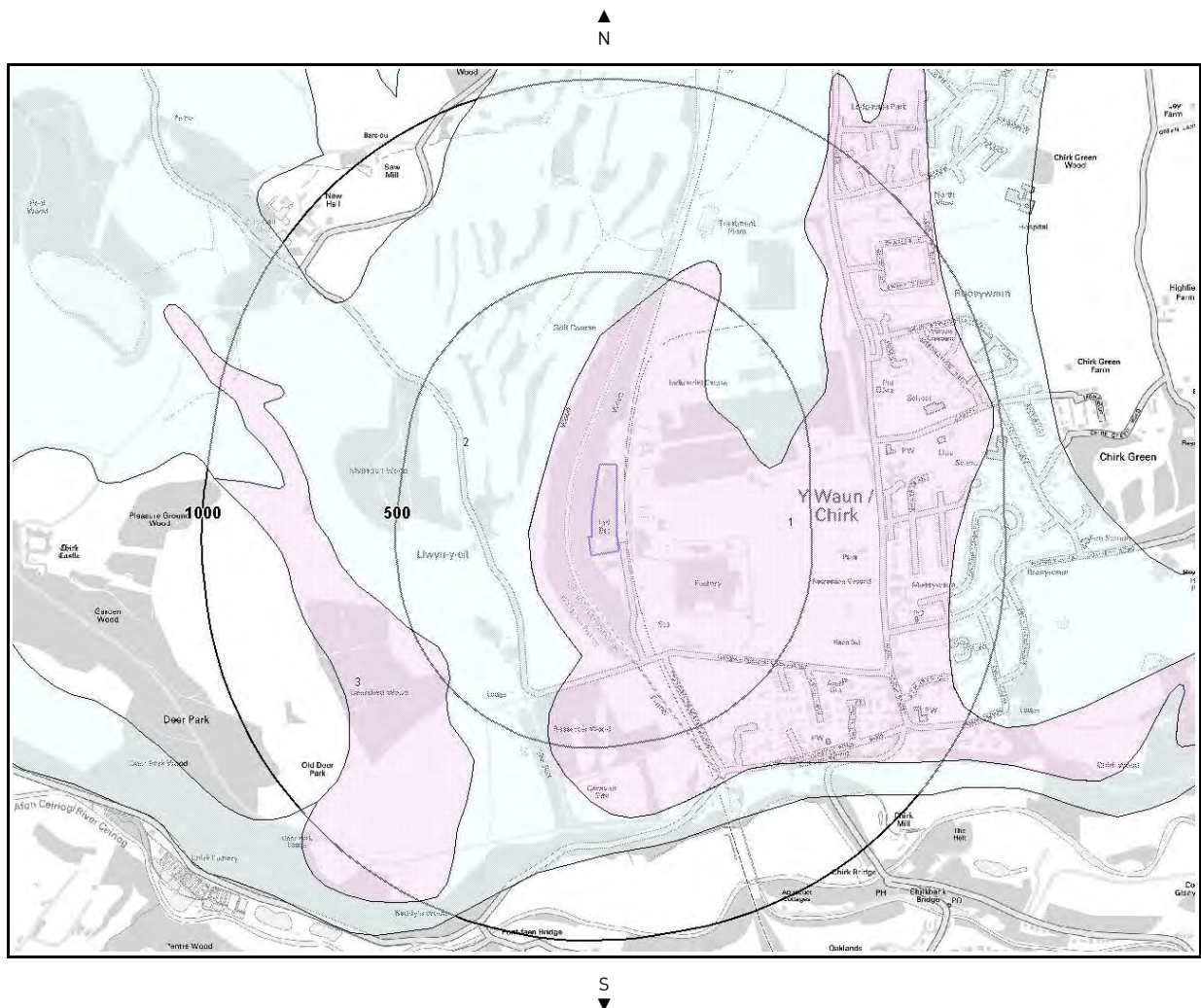
1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site* boundary: **No**

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site.

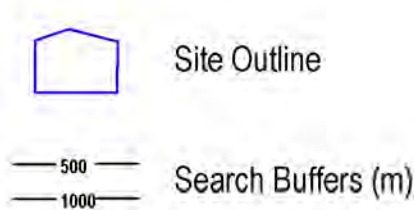
1.2 Superficial Deposits and Landslips Map



Superficial and Landslips Legend



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Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/Drift Geology

Are there any records of Superficial Deposits/Drift Geology within 500m of the study site boundary: **Yes**

ID	Distance (m)	Direction	Lex Code	Description	Rock Description
1	0.0	On Site	GFDUD-SAGR	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
2	132.0	W	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
3	462.0	SW	GFDUD-SAGR	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site* boundary: **Yes**

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	High

1.2.3 Landslip

Database searched and no data found.

Are there any records of Landslip within 500m of the study site boundary? **No**

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discreet layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

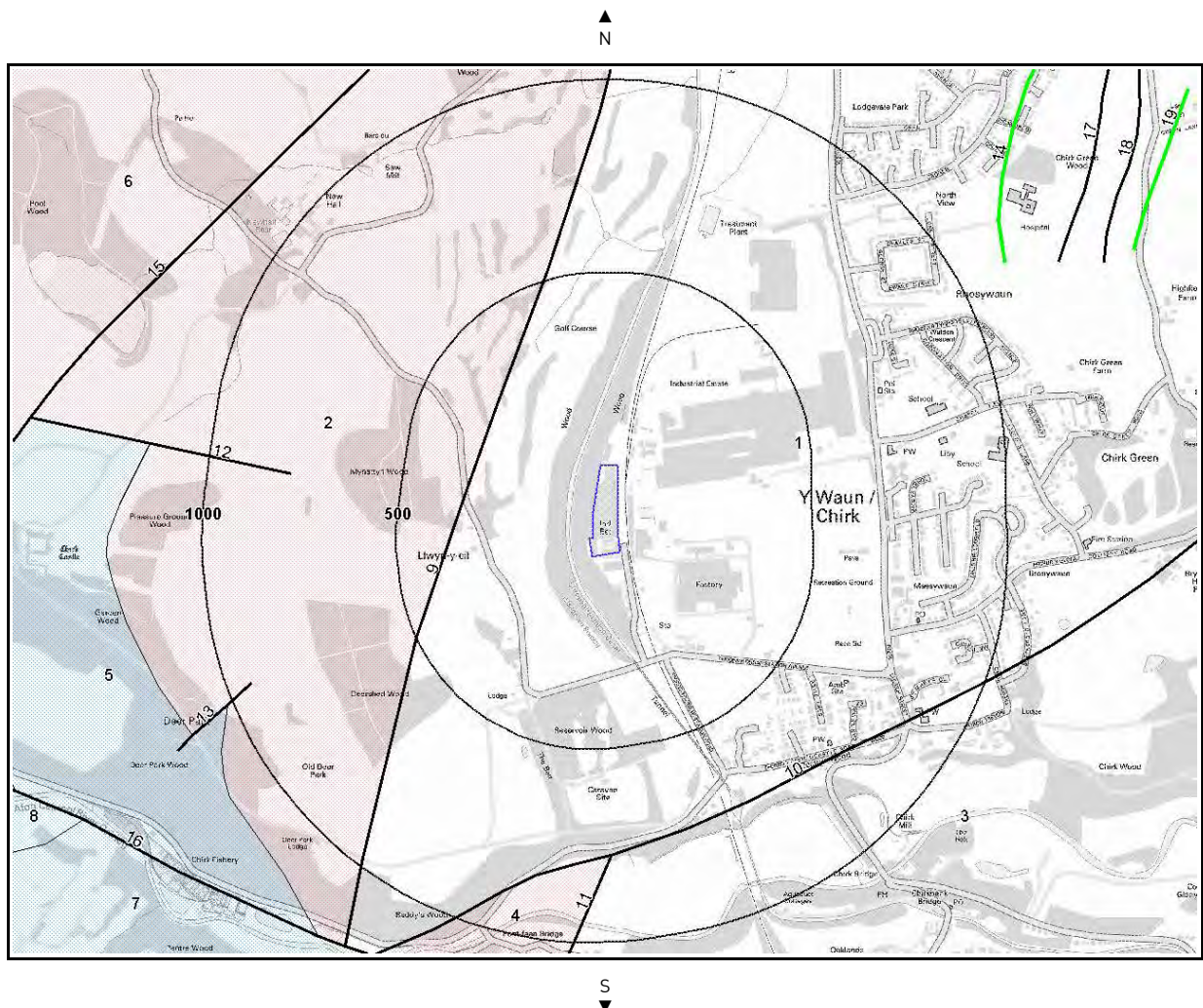
1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site* boundary: **No**

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site.

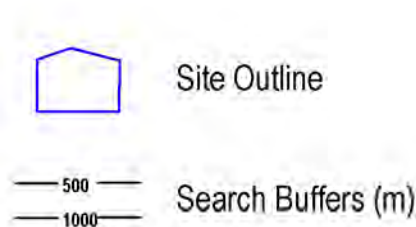
1.3 Bedrock and Faults Map



Bedrock & Faults Deposits Legend



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Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:121

1.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	PLMC-MDSS	Pennine Lower Coal Measures Formation And Pennine Middle Coal Measures Formation (undifferentiated) - Mudstone, Siltston	Bolsovian (westphalian C) / Langsettian (westphalian A)
2	303.0	W	CFS-SDAR	Cefn-y-fedw Sandstone Formation - Sandstone And [subequal/subordinate] Argillaceous Rocks, Interbedded	Marsdenian / Brigantian

1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site* boundary: **Yes**

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Moderate	Low

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? **Yes**

ID	Distance (m)	Direction	Category Description	Feature Description
9	303.0	W	FAULT	Normal fault, inferred

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discreet layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3.4 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is in a radon Affected Area, as between 10 and 30% of properties are above the Action Level

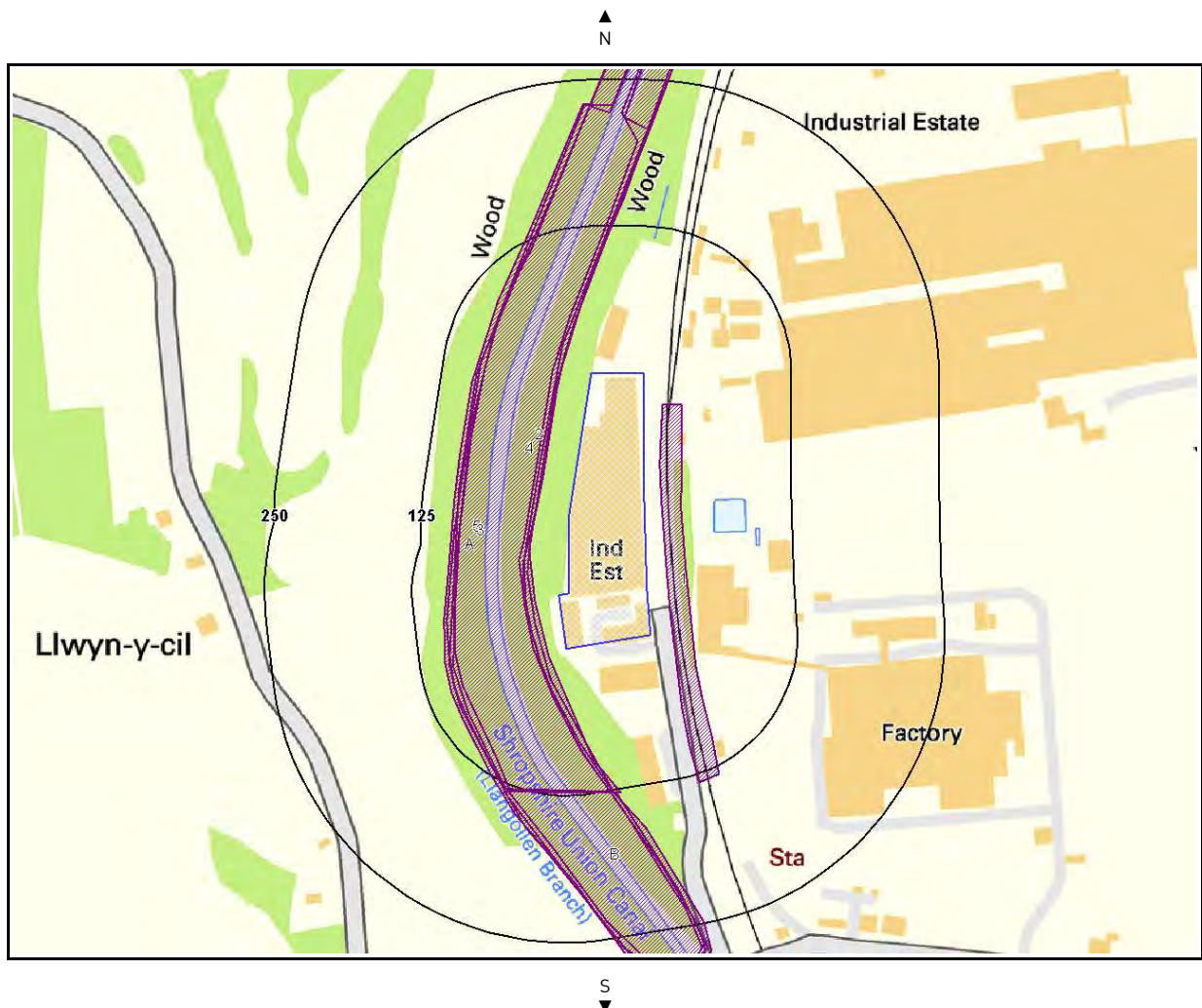
1.3.5 Radon Protection

* This includes an automatically generated 50m buffer zone around the site.

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?

Full radon protective measures are necessary

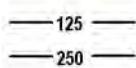
2. Ground Workings Map



Ground Workings Legend



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-  Site Outline
-  Search Buffers (m)
-  Historic Surface Ground Workings
-  Historic Underground Workings
-  Current Ground Workings

2. Ground Workings

2.1 Historical Surface Ground Working Features derived from the Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? **Yes**

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1	13.0	E	328382,338100	Cuttings	1873
2	16.0	W	328552,339547	Canal	1898
3	20.0	W	328480,338885	Canal	1899
4	24.0	W	328553,339549	Canal	1949
5	25.0	W	328565,339168	Canal	1873
6A	26.0	SW	328365,337835	Canal	1992
7A	26.0	SW	328365,337835	Canal	1977
8A	26.0	SW	328365,337835	Canal	1949
9B	121.0	S	329734,336568	Canal	1914
10B	122.0	S	329734,336568	Canal	1898

2.2 Historical Underground Workings Features derived from the Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? **Yes**

The following Historical Underground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	277.0	S	328459,337697	Tunnel	1992
Not shown	277.0	S	328459,337697	Tunnel	1977
Not shown	277.0	S	328459,337697	Tunnel	1949
Not shown	283.0	S	328515,337616	Tunnel	1914
Not shown	283.0	S	328515,337616	Tunnel	1898
Not shown	283.0	S	328498,337651	Tunnel	1899
Not shown	284.0	S	328527,337608	Tunnel	1873
Not shown	632.0	SE	328615,337464	Tunnel	1992

2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? **No**

Database searched and no data found.

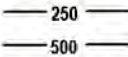
3. Mining, Extraction & Natural Cavities Map



Mining, Extraction & Natural Cavities Legend

Enabled by  Ordnance Survey

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-  Site Outline
-  Historical Mining
-  Non-Coal Mining Cavities
-  Search Buffers (m)
 - 250 —
 - 500 —
-  Natural Cavities

3. Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary?

Yes

The following Coal Mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
53.0	S	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

3.3 Shallow Mining

This dataset refers to the (largely very old) extraction of mineral deposits by means of near surface underground workings.

What is the maximum hazard rating of subsidence relating to shallow mining within the study site* boundary?

Low

*This includes an automatically generated 150m buffer zone around the study site boundary

The following Shallow Mining information provided by the British Geological Survey is not represented on Mapping:

Distance (m)	Direction	Hazard Rating	Details
0.0	On Site	Low	Where low potential is indicated, this means that the rocks underlying the area are of a type known to have been mined at shallow depth in some parts of the UK, but that it is unlikely to be of significant concern in this area. However, it is recommended that you do obtain a Coal Authority mining search in this area, which will provide a comprehensive search of former mining activity, including coal mining at deeper levels.

3.4 Non – Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary?

No

Database searched and no data found.

3.5 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary?

No

Database searched and no data found.

3.6 Brine Extraction

This dataset provides information from the Brine compensation board which has been discontinued and is now covered by the Coal Authority.

Are there any Brine Extraction areas within 1000m of the study site boundary?

No

Database searched and no data found.

3.7 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary?

No

Database searched and no data found.

3.8 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records.

Are there any Tin Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

3.9 Clay Mining

This dataset provides information on Kalin and Ball Clay mining from relevant mining records.

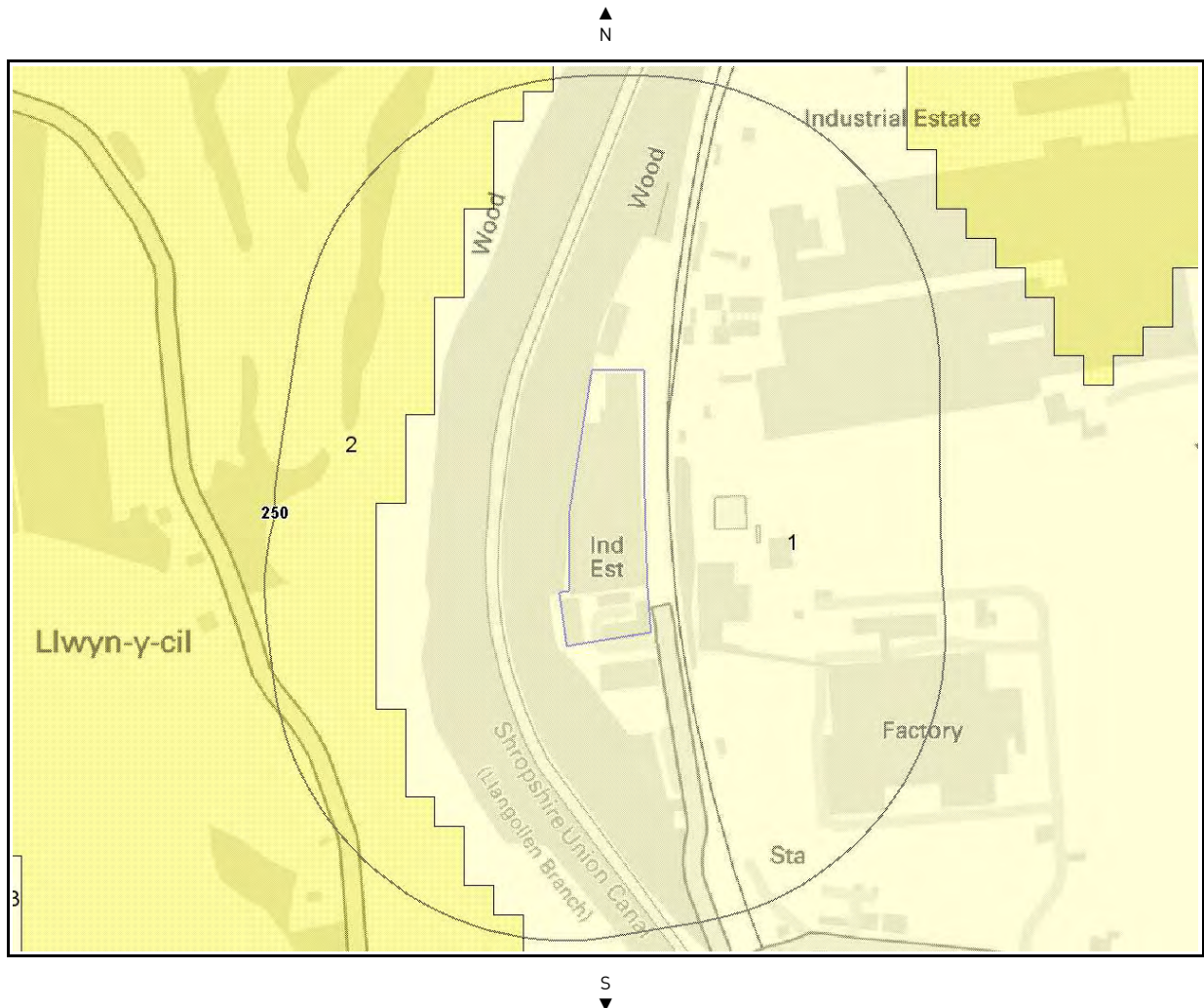
Are there any Clay Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

4. Natural Ground Subsidence

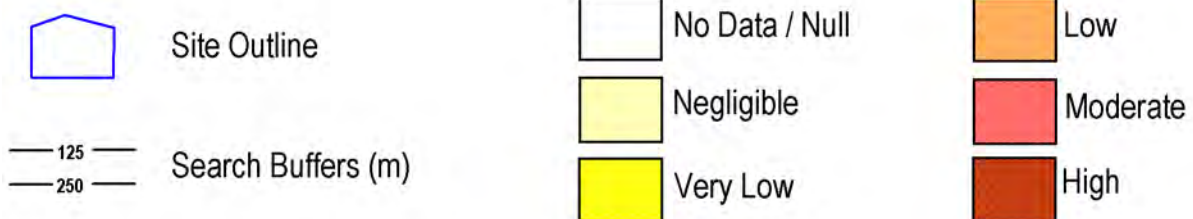
4.1 Shrink-Swell Clay Map



Shrink-Swell Clay Legend



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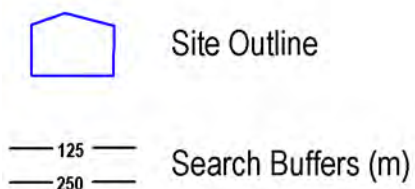
4.2 Landslides Map



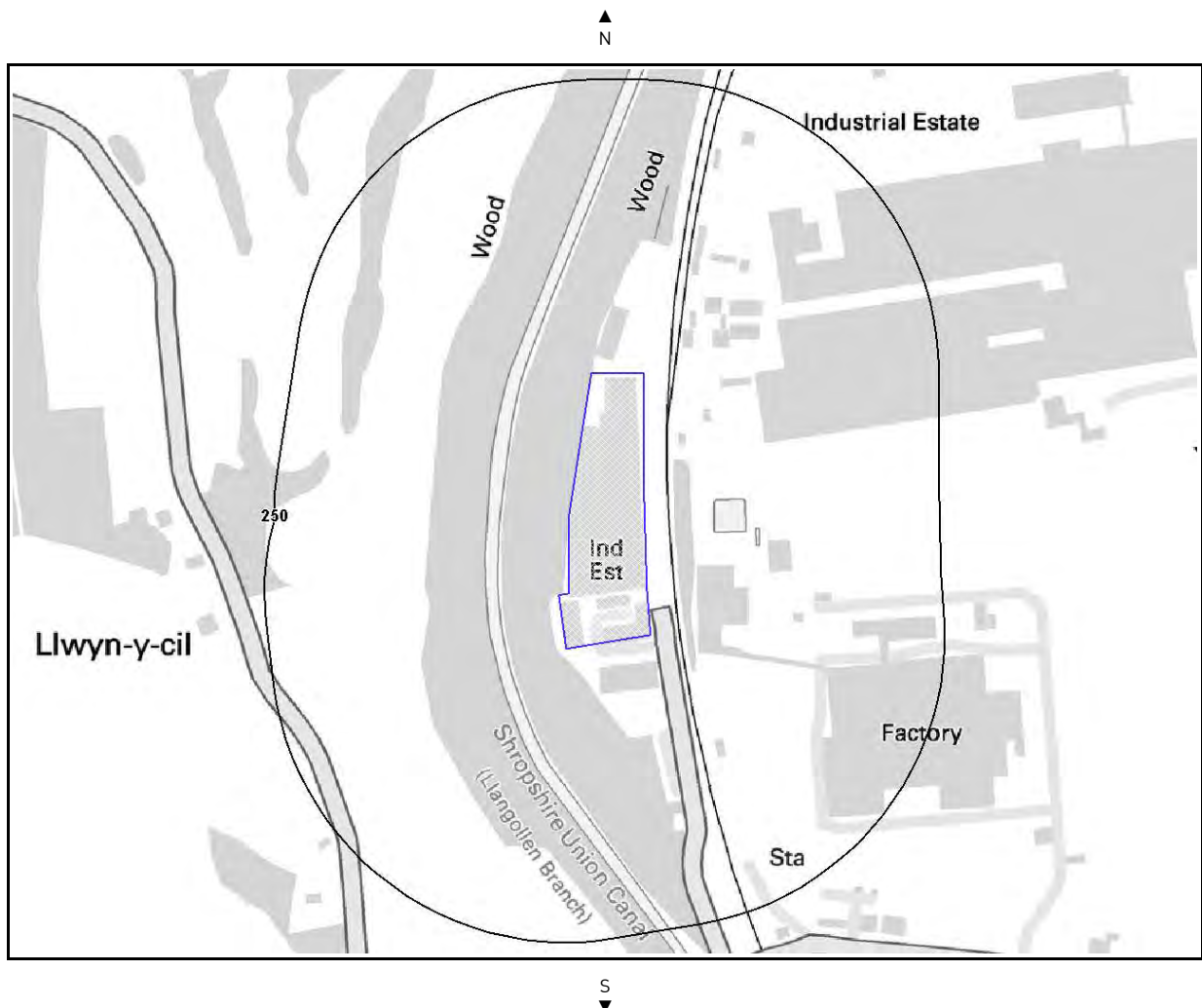
Landslides Legend



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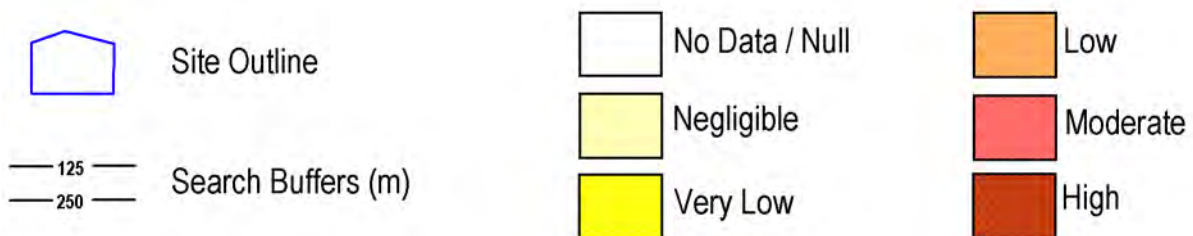
4.3 Ground Dissolution Soluble Rocks Map



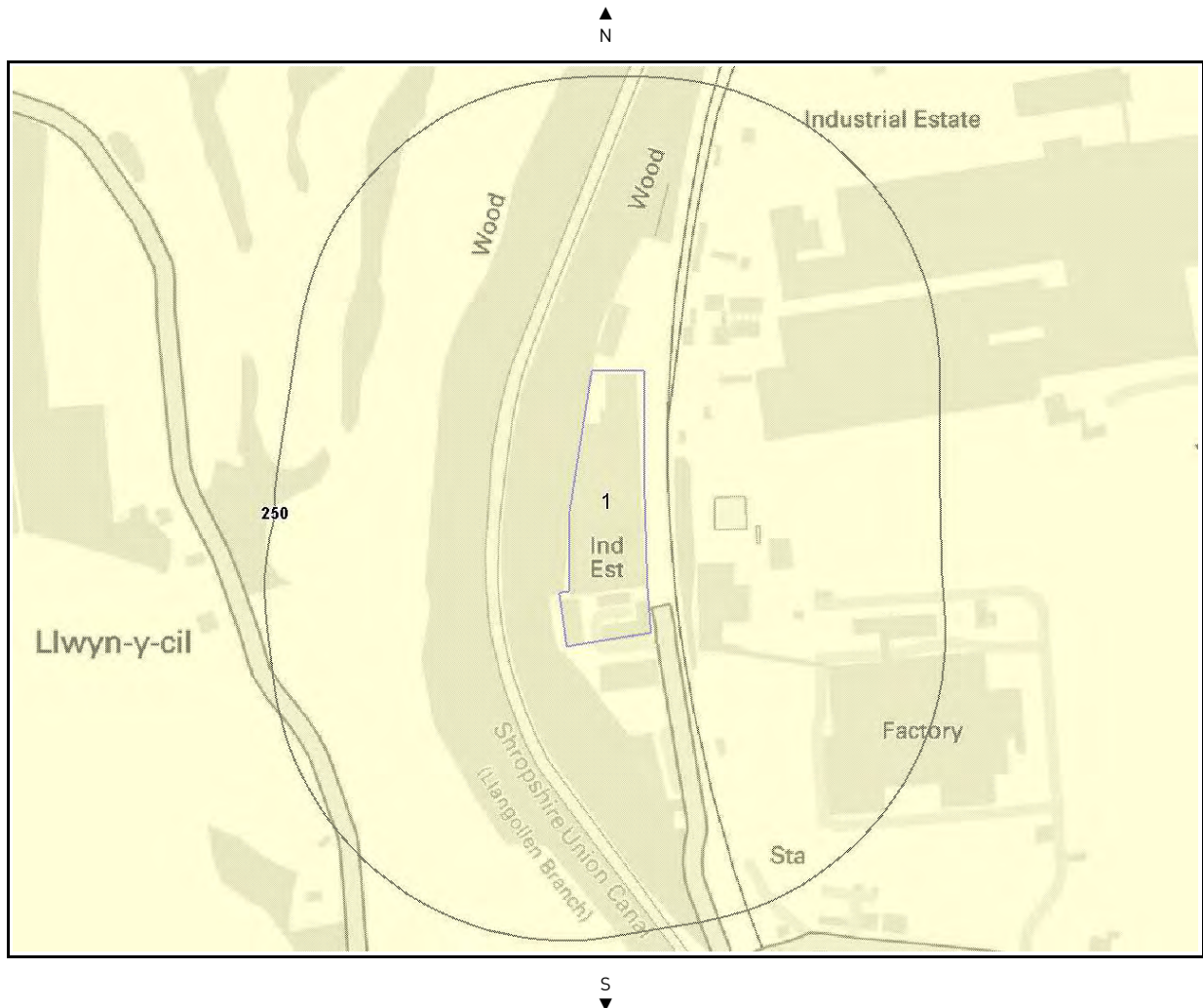
Ground Dissolution Soluble Rocks Legend

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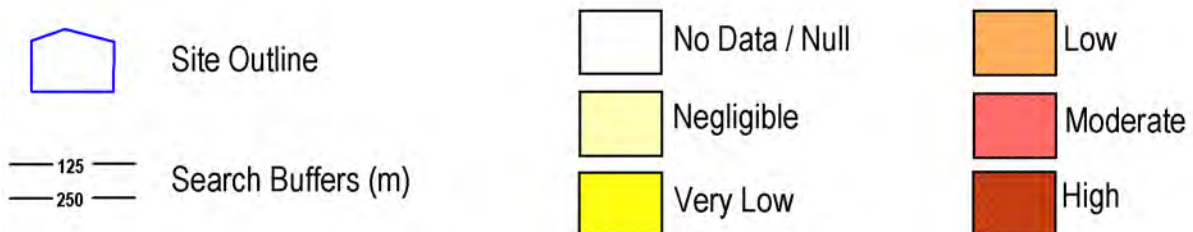
4.4 Compressible Deposits Map



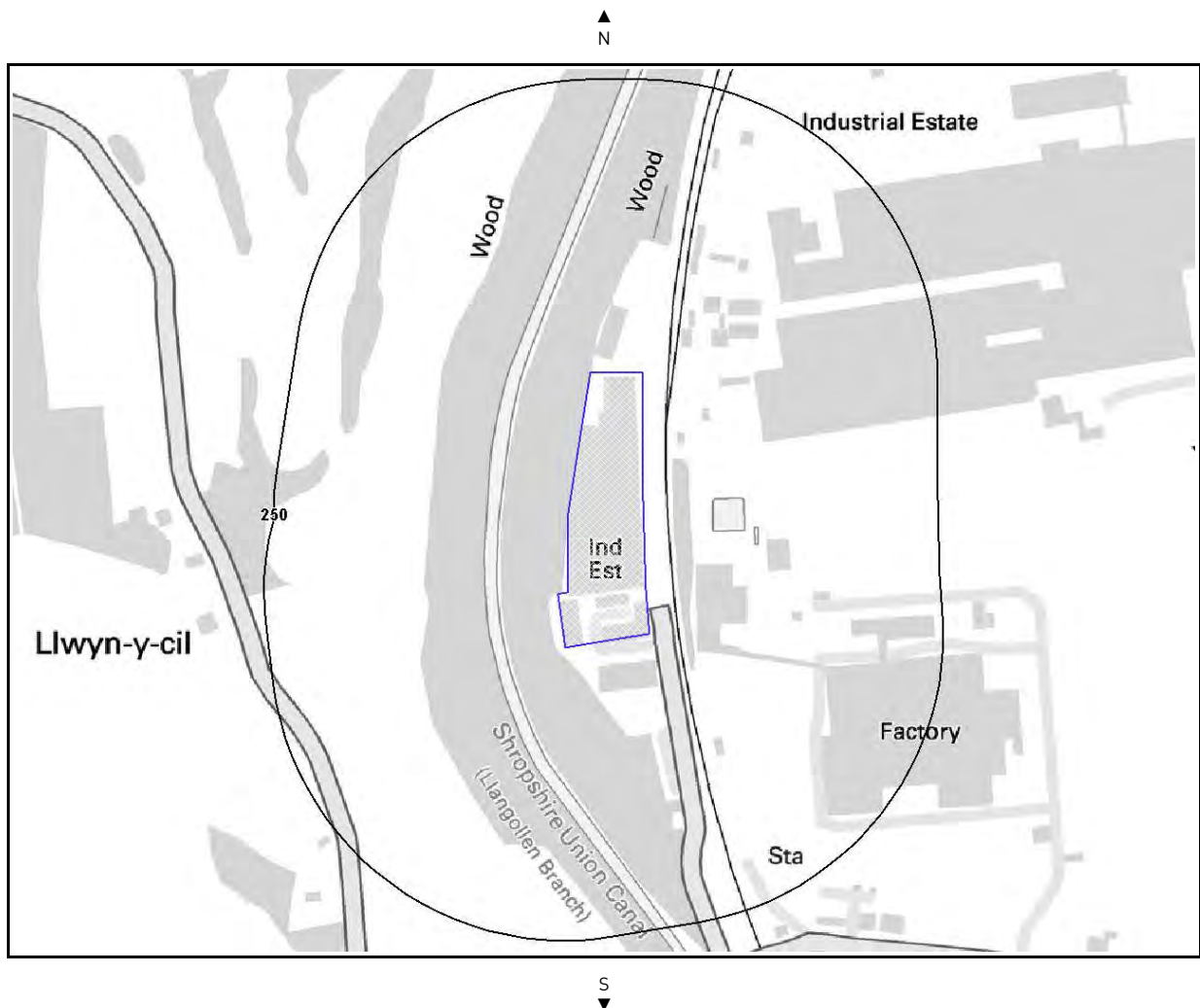
Compressible Deposits Legend



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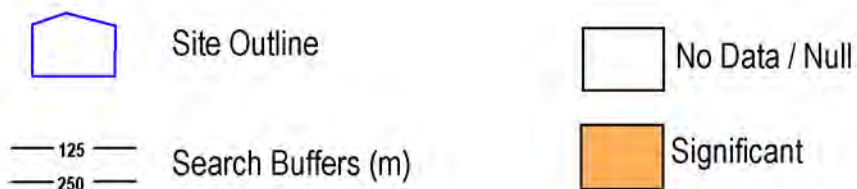
4.5 Collapsible Deposits Map



Collapsible Deposits Legend



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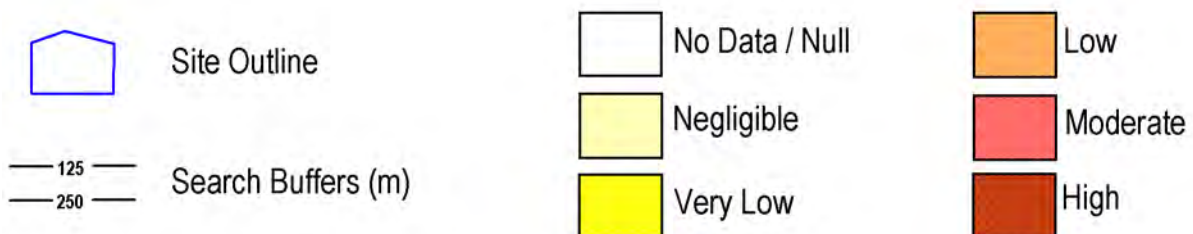
4.6 Running Sand Map



Running Sand Legend

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4. Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS)

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary?

Very Low

*This includes an automatically generated 50m buffer zone around the study site boundary.

4.1 Shrink – Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

4.3 Ground Dissolution of Soluble Rocks

The following Soluble Rocks information provided by the British Geological Survey:

Distance (m)*	Direction	Hazard Rating	Details
0	On site	Null-Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

4.4 Compressible Deposits

The following Compressible Ground information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

4.5 Collapsible Deposits

The following Collapsible Rocks information is provided by the British Geological Survey:

Distance (m)*	Direction	Hazard Rating	Details
---------------	-----------	---------------	---------

Report Reference: [HMD-283-620814](#)

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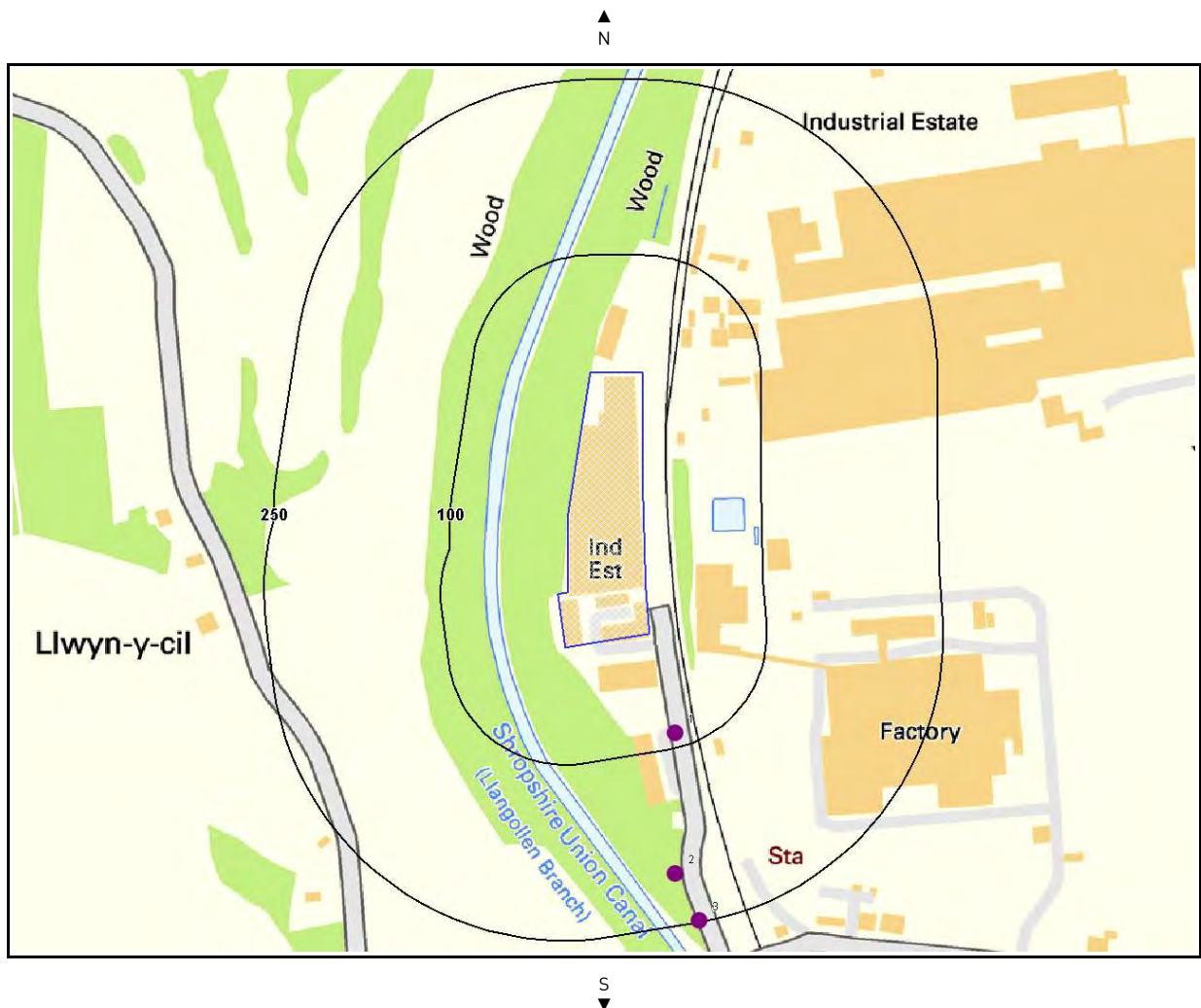
0	On site	Null-Negligible	No Indicators for collapsible deposits identified. No Special actions required to avoid problems due to collapsible deposit.
---	---------	-----------------	--

4.6 Running Sands

The following Running Sands information is provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

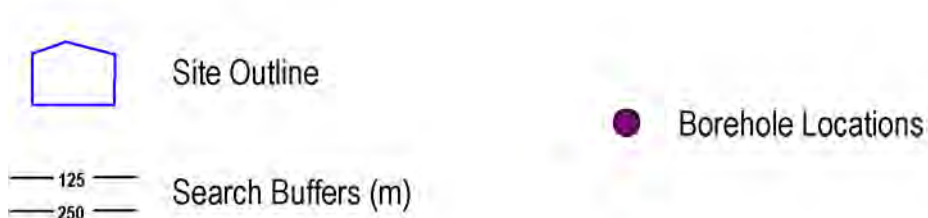
5. Borehole Records Map



Borehole Records Legend



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5. Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary:

3

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length (m)	Borehole Name
1	88.0	S	328380,0337980	SJ23NE271	-1.0	LADY MARGARETS PARK CHIRK 4
2	206.0	S	328380,0337860	SJ23NE270	-1.0	LADY MARGARETS PARK CHIRK 3
3	249.0	S	328400,0337820	SJ23NE269	-1.0	LADY MARGARETS PARK CHIRK 2

3/3

Contacts

GroundSure Helpline

Telephone: 01273 819700
info @ groundsure.com



British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries



British Gypsum

British Gypsum Ltd, East Leake, Loughborough,
Leicestershire, LE12 6HX
Tel: www.british-gypsum.bpb.com



The Coal Authority

200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848
DX 716176 Mansfield 5 www.coal-authority.co.uk



Ordnance Survey

Romsey Road, Southampton SO16 4GU
Tel: 08456 050505



Getmapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444



Peter Brett Associates

Caversham Bridge House, Waterman Place, Reading
Berkshire RG1 8DN
Tel: +44 (0)118 950 0761 E-mail: reading@pba.co.uk



Acknowledgements

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

In these conditions unless the context otherwise requires:

"Beneficiary" means the Client or the customer of the Client for whom the Client has procured the Services.

"Commission" means an order for Consultancy Services submitted by a Client.

"Consultancy Services" mean consultancy services provided by GroundSure including, without limitation, carrying out interpretation of third party and in-house environmental data, provision of environmental consultancy advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Content" means any data, database or other information contained in a Report or Mapping which is provided to GroundSure by a Data Provider.

"Contract" means the contract between GroundSure and the Client for the performance of the Services which arises upon GroundSure's acceptance of an Order or Commission and which shall incorporate these conditions, the relevant GroundSure User Guide, proposal by GroundSure and the content of any subsequent report, and any agreed amendments in accordance with condition 11.

"Client" means the party that submits an Order or Commission.

"Data Provider" means any third party providing Content to GroundSure.

"Data Report" means reports comprising factual data with no professional interpretation in respect of the level of likely risk and/or liability available from GroundSure.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028 and whose registered office is at Greater London House, Hampstead Road, London NW1 7EJ.

"Home Information Pack" means a combination of reports required when selling a residential property.

"Intellectual Property" means any patent, copyright, design rights, service marks, moral rights, data protection rights, know-how, trade mark or any other intellectual property rights.

"Mapping" an historical map or a combination of historical maps of various ages, time periods and scales available from GroundSure.

"Order" means an order form submitted by the Client requiring Services from GroundSure in respect of a specified Site.

"Order Website" means online platform via which Orders may be placed.

"Report" means a Risk Screening Report or Data Report for commercial or residential property available from GroundSure relating to the Site prepared in accordance with the specifications set out in the relevant User Guide.

"Risk Screening Report" means one of GroundSure's risk screening reports such as GroundSure Homebuyers, GroundSure Home Environmental GroundSure SiteGuard, GroundSure Screening, GroundSure Review, GroundSure Developer Review, or any other risk screening report available from GroundSure.

"Services" means the provision of any Report, Mapping or Consultancy Services which GroundSure has agreed to carry out for the Client/Beneficiary on these terms and conditions in respect of the Site.

"Site" means the landsite in respect of which GroundSure provides the Services.

"User Guide" means the relevant current version of the user guide, available upon request from GroundSure.

2 Scope of Services

2.1 GroundSure agrees to carry out the Services in accordance with the Contract and to the extent set out therein.

2.2 GroundSure shall exercise all the reasonable skill, care and diligence to be expected of experienced environmental consultants in the performance of the Services.

2.3 The Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in the Contract.

2.4 Terms and conditions appearing on a Client's order form, printed stationery or other communication, including invoices, to GroundSure, its employees, servants, agents or other representatives or any terms implied by custom, practice or course of dealing shall be of no effect and these terms and conditions shall prevail over all others.

2.5 In the event that a Client/Beneficiary opts to take out insurance in conjunction with or as a result of the Services, such insurance shall be subject solely to the terms of any policy issued to it in that respect and GroundSure will have no liability therefore.

2.6 GroundSure's quotations/proposals are valid for a period of 30 days only. GroundSure reserves the right to withdraw any quotation at any time before GroundSure accepts an Order or Commission. GroundSure's acceptance of an Order or Commission shall be effective only where such acceptance is in writing and signed by GroundSure's authorised representative or where accepted via GroundSure's Order Website.

3 The Client's obligations

3.1 The Client shall be solely responsible for ensuring that the Report/Mapping ordered is appropriate and suitable for the Beneficiary's needs.

3.2 The Client shall (or shall procure that the Beneficiary shall) supply to GroundSure as soon as practicable and without charge all information necessary and accurate relevant data including any specific and/or unusual environmental information relating to the Site known to the Client/Beneficiary which may pertain to the Services and shall give such assistance as GroundSure shall reasonably require in the performance of the Services (including, without limitation, access to a Site, facilities and equipment as agreed in the Contract).

3.3 Where Client/Beneficiary approval or decision is required, such approval or decision shall be given or procured in reasonable time as not to delay or disrupt the performance of any other part of the Services.

3.4 The Client shall not and shall not knowingly permit the Beneficiary to, save as expressly permitted by these terms and conditions, re-sell, alter, add to, amend or use out of context the content of any Report, Mapping or, in respect of any Services, information given by GroundSure. For the avoidance of doubt, the Client and Beneficiary may make the Report, Mapping or GroundSure's findings available to a third party, but such third party cannot rely on the same unless expressly permitted under condition 4.

3.5 The Client is responsible for maintaining the confidentiality of its user name and password if using GroundSure's internet ordering service and accepts responsibility for all activity that occurs under such account and password.

4 Reliance

4.1 Upon full payment of all relevant fees and subject to the provisions of these terms and conditions, the Client and Beneficiary are granted an irrevocable royalty-free licence to use the information contained in the Report, Mapping or in a report prepared by GroundSure in respect of or arising out of the Consultancy Services. The Services may only be used for the benefit of the Client and those persons listed in conditions 4.2 and 4.3.

4.2 In relation to Data Reports, Mapping and Risk Screening Reports, the Client shall be entitled to make Reports available to (i) the Beneficiary, (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate), (iv) the first purchaser or first tenant of the Site (v) the professional advisers and lenders of the first purchaser or tenant of the Site. For the avoidance of doubt, such persons shall include any entity necessary under the Housing Act 2004 (as amended). Accordingly GroundSure shall have the same duties and obligations to those persons in respect of the Services as it has to the Client and those persons shall have the benefit of any of the Client's rights under the Contract as if those persons were parties to the Contract. For the avoidance of doubt, the limitations of GroundSure's liability as set out in condition 7 shall apply.

4.3 In relation to Consultancy Services, reliance shall be limited to the Client, Beneficiary and named parties on the Report.

4.4 Save as set out in conditions 4.2 and 4.3 and unless otherwise agreed in writing with GroundSure, any other party considering the information supplied by GroundSure as part of the Services, including (but not limited to) insurance underwriters, does so at their own risk and GroundSure has no legal obligations to such party unless otherwise agreed in writing.

4.5 The Client shall not and shall not knowingly permit any person (including the Beneficiary) who is provided with a copy of any Report shall not except as permitted herein or by separate agreement with GroundSure: (a) remove, suppress or modify any trade mark, copyright or other proprietary marking from the Report or Mapping; (b) create any product which is derived directly or indirectly from the data contained in the Report or Mapping; (c) combine the Report or Mapping with, or incorporate the Report or Mapping into any other information data or service; or (d) re-format or otherwise change (whether by modification, addition or enhancement) data or images contained in the Report or Mapping.

4.6 Notwithstanding condition 4.5, if the Client acts in a professional capacity, it may make reasonable use of a Report and/or findings made as a result of Consultancy Services to advise Beneficiaries. However, GroundSure shall have no liability in respect of any opinion or report given to such Beneficiaries by the Client or a third party.

5 Fees and Disbursements

5.1 GroundSure shall charge the Client fees at the rate and frequency specified in the Contract together, in the case of Consultancy Services, with all proper disbursements incurred by GroundSure in performing the Services. For the avoidance of doubt, the fees payable for the Services are as set out in GroundSure's written proposal, Order Website or Order acknowledgement form. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services.

5.2 Unless GroundSure requires prepayment, the Client shall promptly pay all fees disbursements and other monies due to GroundSure in full without deduction, counterclaim or set off together with such value added tax or other tax as may be required within 30 days from the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). GroundSure reserves the right to charge interest which shall accrue on a daily basis from 30 days after the date of Payment Date until the date of payment (whether before or after judgement) at the rate of five per cent per annum above the Bank of England base rate from time to time.

5.3 In the event that the Client disputes the amount payable in respect of GroundSure's invoice it shall notify GroundSure no later than 28 days after the date thereof that it is in dispute. In default of such notification the Client shall be deemed to have agreed the amount thereof. As soon as reasonably practicable following receipt of a notification in respect of any disputed invoice, a member of the management team at GroundSure shall contact the Client and the parties shall use all reasonable endeavours to resolve the dispute.

6 Intellectual Property

6.1 Subject to the provisions of condition 4.1, the Client and the Beneficiary hereby acknowledge that all Intellectual Property in the Services are and shall remain owned by either GroundSure or the Data Providers and nothing in these terms purports to transfer or assign any rights to the Client or the Beneficiary in respect of the Intellectual Property.

6.2 The Client shall acknowledge the ownership of the Content where such Content is incorporated or used in the Client's own documents, reports, systems or services whether or not these are supplied to a third party.

6.3 Data Providers may enforce any breach of condition 6.1 against the Client or Beneficiary.

Report Reference: HMD-283-620814

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7. Liability

- 7.1 Nothing in these terms and conditions shall limit GroundSure's liability for causing death or personal injury through negligence or wilful default.
- 7.2 Save as otherwise set out in these conditions, any information provided by one party ("Disclosing party") to the other party ("Receiving Party") shall be treated as confidential except so far as authorised by the Disclosing Party to provide such information in whole or in part to a third party.
- 7.3 Nothing in these conditions shall affect the statutory rights of a consumer under the applicable consumer protection legislation from time to time.
- 7.4 In relation to Data Reports, Mapping and Risk Screening Reports, GroundSure's liability under the Contract shall cease upon the expiry of six years from the date when the Beneficiary became aware that it may have a claim against GroundSure in respect of the Services provided always that there shall be no liability at the expiration of twelve years from the completion of the Contract. For the avoidance of doubt, any claims in respect of which proceedings are notified to GroundSure in writing prior to the expiry of the time periods referred to in this clause shall survive the expiry of those time periods provided any such claim is actually commenced within six months of notification.
- 7.5 In relation to Consultancy Services GroundSure's liability under the Contract shall cease upon the expiry of six years from the date the Services were completed.
- 7.6 GroundSure shall not be liable to the Client or any person to whom the Client provides a copy of a Data Report, Mapping or Risk Screening Report in any circumstances whatsoever unless arising out of a breach on its part of the obligations set out in the Contract.
- 7.7 GroundSure shall not be liable if the Data Reports, Mapping or Risk Screening Report are used otherwise than as provided or referred to in these conditions and the relevant User Guide.
- 7.8 Subject to the provisions of condition 7.3, GroundSure makes no representation, warranties, express or implied, as to the accuracy, reliability, completeness, validity or fitness for purpose of any Content and shall not be liable for any omission, error or inaccuracy in relation thereto unless GroundSure should reasonably have been alerted to any omission, error or inaccuracy in the Content.
- 7.9 Subject to the provisions of clause 7.1 notwithstanding anything to the contrary contained elsewhere in the Contract, and irrespective of whether multiple parties make use of the same Services, the total liability of GroundSure under or in connection with the Contract, whether in contract in tort for breach of statutory duty or otherwise shall not exceed £5 million per claim or series of connected claims.
- 7.10 Whilst GroundSure will use all reasonable endeavours to maintain operability of its internet ordering service it will not be liable for any loss or damages caused by a delay or loss of use of such service. The Client shall use GroundSure's internet ordering service at its own risk. GroundSure shall not be responsible for any damage to a Client or permitted assignee's computer, software, modem, telephone or other property resulting from the use of GroundSure's internet ordering service.
- 7.11 The Client accepts, and shall use all reasonable endeavours to procure that anyone who is provided with a copy of the Report accepts, that it has no claim or recourse to any Data Provider or to GroundSure in respect of the acts or omissions of such Data Providers including Content supplied by them save for where a Risk Screening Report comprises part of a Home Information Pack:
- (i) the Data Providers set out in the relevant User Guide shall be responsible for the quality and accuracy of the data supplied by them; and
 - (ii) where GroundSure makes an assessment of a Site to determine if it is likely to fall within Part II(A) of the Environmental Protection Act 1990, GroundSure shall be responsible for the interpretation of any Content provided by a Data Provider subject to the limitations set out in these terms and conditions.
- 7.12 GroundSure shall provide the Services using reasonable skill and care, however, GroundSure shall not be liable for any inaccurate statement or risk rating in a Report which resulted from a reasonable interpretation of the Content.
- 7.13 Subject to the provisions of clause 7.1, GroundSure shall not be liable for any losses (whether direct or indirect) and including (but not limited to) loss of profit caused by the suspension or reduction of activity on a Site, business interruption, all third party off-Site claims or any loss in value of a Site, loss of goodwill, loss of business opportunity or other similar losses alleged to be sustained by the Client, the Beneficiary or any third party.
- 7.14 GroundSure undertakes for the duration of the liability periods referred to in conditions 7.4 and 7.5 to maintain professional indemnity insurance in respect of its liabilities in respect of the Contract for £5 million in the aggregate which amount shall first include the whole of any sum payable for death or personal injury provided such insurance is readily available at commercially viable rates or for a lesser amount to be agreed with the Client should the cost of such insurance become commercially unviable. GroundSure shall produce evidence of such insurance if requested by the Client. A greater level of cover may be available upon request and agreement with the Client.

8 GroundSure right to suspend or terminate

- 8.1 In the event that GroundSure reasonably believes that the Client or Beneficiary as applicable has not provided the information or assistance required to enable the proper performance of the Services, GroundSure shall be entitled on fourteen days written notice to suspend all further performance of the Services until such time as any such deficiency has been made good.
- 8.2 GroundSure may additionally terminate the Contract immediately on written notice in the event that:
- (i) the Client shall fail to pay any sum due to GroundSure within 28 days of the due date for payment; or
 - (ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an Administration Order made against it or if a Receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
 - (iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
 - (iv) the Client breaches any material term of the Contract (including, but not limited to, the obligations in condition 4) incapable of remedy or if remediable, is not remedied within 14 days of notice of the breach.

9. Client's Right to Terminate and Suspend

- 9.1 Subject to condition 10.2, the Client may at any time after commencement of the Services by notice in writing to GroundSure require GroundSure to terminate or suspend immediately performance of all or any of the Services.
- 9.2 The Client waives all and any right of cancellation it may have under the Consumer Protection (Distance Selling) Regulations 2000 (as amended) in respect of the Order of a Report/Mapping. This does not affect the Beneficiary's statutory rights.

10 Consequences of Withdrawal, Termination or Suspension

- 10.1 Upon termination or any suspension of the Services, GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client/Beneficiary any property of the Client/ Beneficiary in GroundSure's possession or control.
- 10.2 In the event of termination/suspension of the Contract under conditions 8 or 9, the Client shall pay to GroundSure all and any fees payable in respect of the performance of the Services up to the date of termination/suspension. In respect of any Consultancy Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination/suspension of the Contract.

11 General

- 11.1 The mapping contained in the Services is protected by Crown copyright and must not be used for any purpose outside the context of the Services or as specifically provided in these terms.
- 11.2 GroundSure reserves the right to amend these terms and conditions. No variation to these terms shall be valid unless signed by an authorised representative of GroundSure.
- 11.3 No failure on the part of GroundSure to exercise and no delay in exercising, any right, power or provision under these terms and conditions shall operate as a waiver thereof.
- 11.4 Save as expressly provided in conditions 4.2, 4.3, 6.3 and 11.5, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
- 11.5 The Secretary of State for Communities and Local Government acting through Ordnance Survey, may enforce breach of conditions 6.1 or 11.1 of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
- 11.6 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:
- (i) the Client or Beneficiary's failure to provide facilities, access or information;
 - (ii) fire, storm, flood, tempest or epidemic;
 - (iii) Acts of God or the public enemy;
 - (iv) riot, civil commotion or war;
 - (v) strikes, labour disputes or industrial action;
 - (vi) acts or regulations of any governmental or other agency;
 - (vii) suspension or delay of services at public registries by Data Providers; or
 - (viii) changes in law.
- 11.7 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.
- 11.8 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email and on the second working day after the day of posting if sent by first class post.
- 11.9 The Contract constitutes the entire contract between the parties and shall supersede all previous arrangements between the parties.
- 11.10 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.
- 11.11 These terms and conditions shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with these terms and conditions shall be subject to the exclusive jurisdiction of the English courts.
- 11.12 If the Client or Beneficiary has a complaint about the Services, notice should be given in writing to the Compliance Officer at GroundSure who will respond in a timely manner.

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Site Details:

CANAL WOOD INDUSTRIAL
ESTATE, CHIRK, LL14 5RL

Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: MasterMap

Map date: 2008

Scale: 1:2,500

Printed at: 1:2,500



Produced by GroundSure Ltd.
T: 01273 819500
E: groundsurreinsight@groundsure.com
W: www.groundsureinsight.com

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Production date: 11 November 2009





Site Details:

CANAL WOOD INDUSTRIAL
ESTATE, CHIRK, LL14 5RL

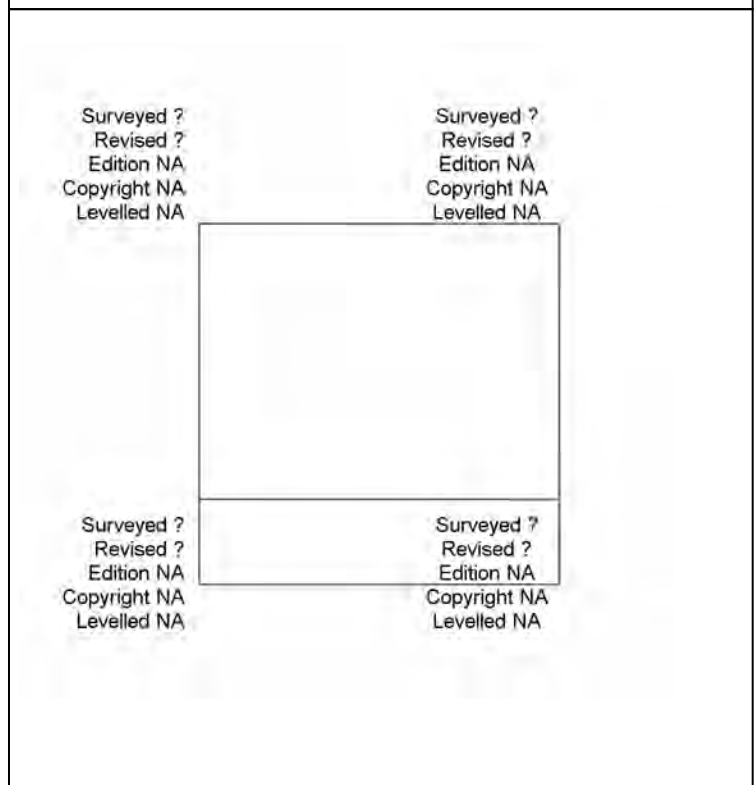
Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: National Grid

Map date: 1994-1995

Scale: 1:2,500

Printed at: 1:2,500



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Site Details:

CANAL WOOD INDUSTRIAL
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Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

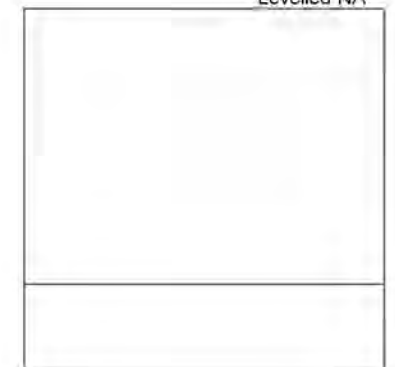
Map Name: National Grid

Map date: 1992

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1992
Revised 1992
Edition NA
Copyright 1992
Levelled NA



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Production date:11 November 2009



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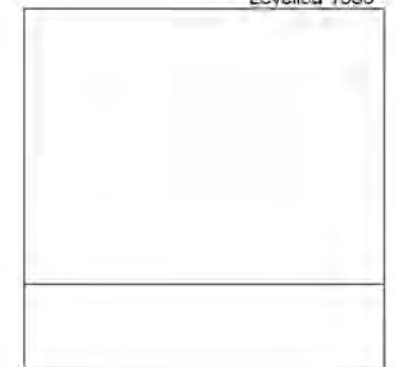
Map Name: National Grid

Map date: 1990

Scale: 1:2,500

Printed at: 1:2,500

Surveyed ?
Revised ?
Edition NA
Copyright 1990
Levelled 1959



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Site Details:

CANAL WOOD INDUSTRIAL
ESTATE, CHIRK, LL14 5RL

Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

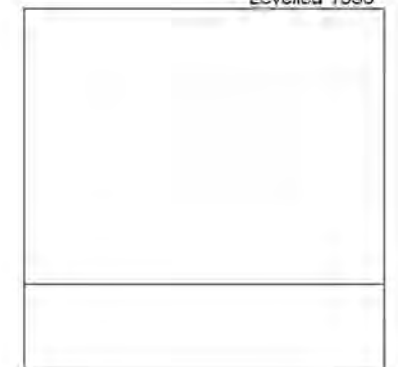
Map Name: National Grid

Map date: 1988

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1959
Revised 1988
Edition NA
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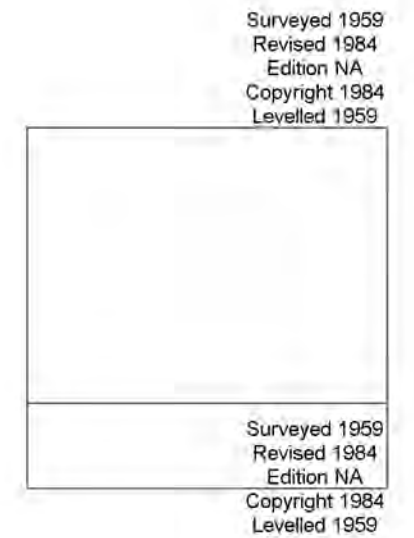
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Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: National Grid

Map date: 1984

Scale: 1:2,500

Printed at: 1:2,500



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Site Details:

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Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: National Grid

Map date: 1973

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1973
Revised 1973
Edition NA
Copyright NA
Levelled 1959

Surveyed 1973
Revised 1973
Edition NA
Copyright 1973
Levelled 1959

Surveyed 1973
Revised 1973
Edition NA
Copyright 1974
Levelled 1959



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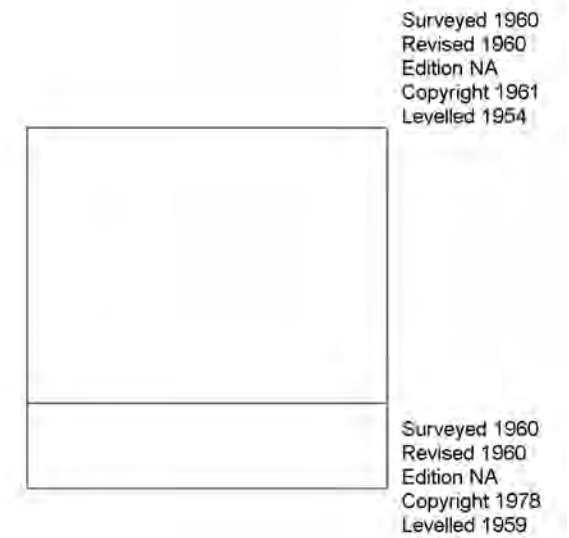
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Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: National Grid

Map date: 1960

Scale: 1:2,500

Printed at: 1:2,500



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Site Details:

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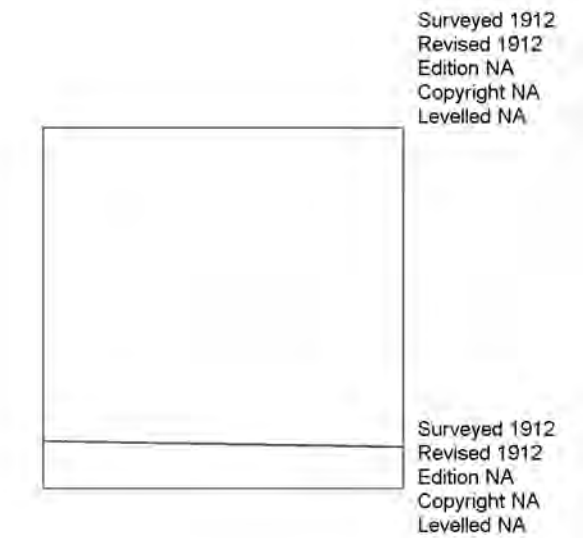
Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: County Series

Map date: 1912

Scale: 1:2,500

Printed at: 1:2,500



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Site Details:

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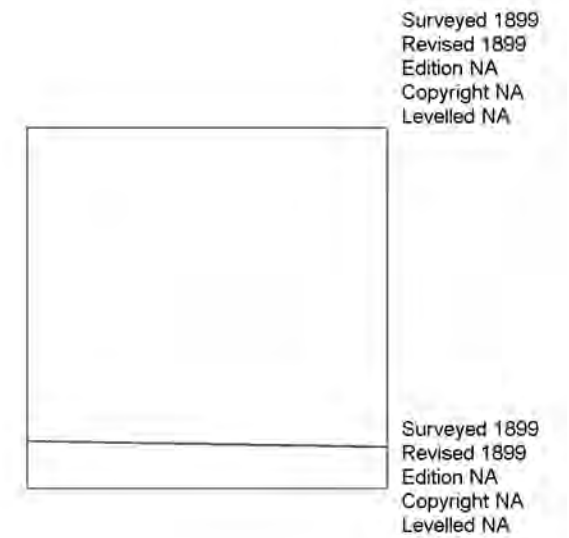
Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: County Series

Map date: 1899

Scale: 1:2,500

Printed at: 1:2,500



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Site Details:

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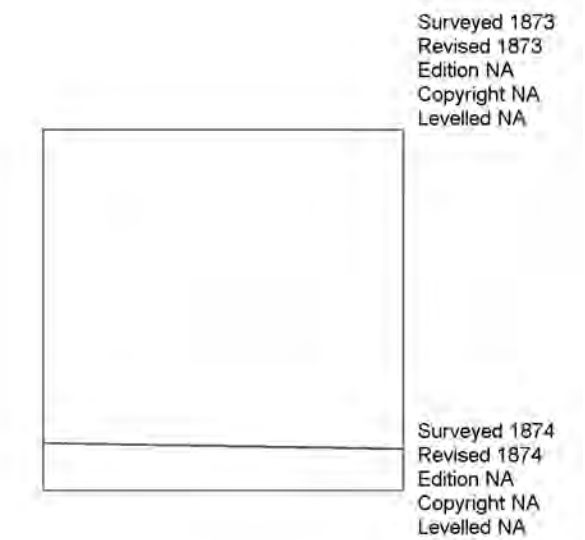
Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: County Series

Map date: 1873-1874

Scale: 1:2,500

Printed at: 1:2,500



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Site Details:

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ESTATE, CHIRK, LL14 5RL

Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: National Grid

Map date: 2008

Scale: 1:10,000

Printed at: 1:10,000



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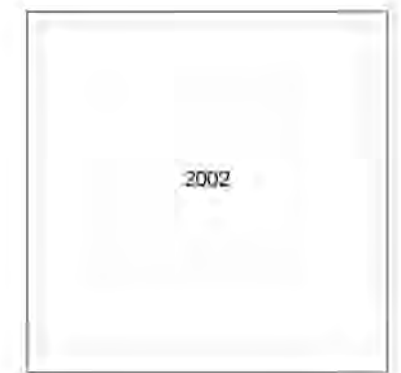
Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



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Site Details:

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ESTATE, CHIRK, LL14 5RL

Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: National Grid

Map date: 1992

Scale: 1:10,000

Printed at: 1:10,000



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Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: National Grid

Map date: 1977

Scale: 1:10,000

Printed at: 1:10,000



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Site Details:

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ESTATE, CHIRK, LL14 5RL

Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

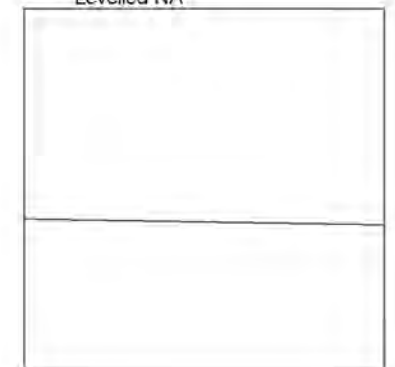
Map Name: County Series

Map date: 1949

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1872
Revised 1949
Edition NA
Copyright NA
Levelled NA



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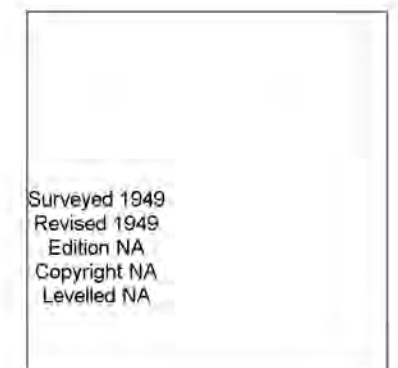
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Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: Provisional

Map date: 1949

Scale: 1:10,560

Printed at: 1:10,560



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Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: County Series

Map date: 1914

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1872
Revised 1914
Edition 1914
Copyright NA
Levelled NA

Surveyed 1872
Revised 1914
Edition 1914
Copyright NA
Levelled NA



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Site Details:

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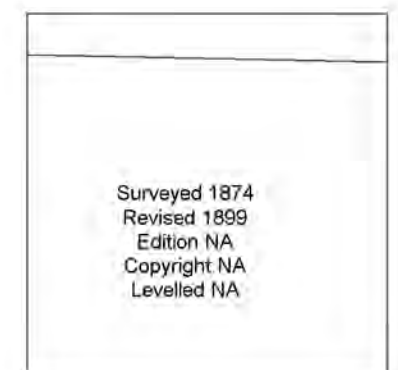
Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: County Series

Map date: 1899

Scale: 1:10,560

Printed at: 1:10,560



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ESTATE, CHIRK, LL14 5RL

Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

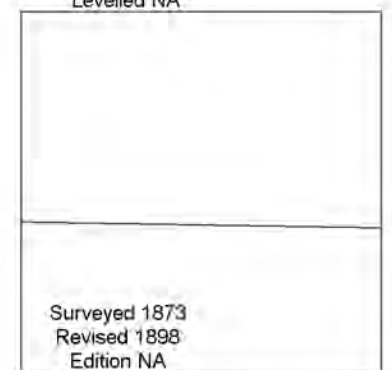
Map Name: County Series

Map date: 1898

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1873
Revised 1898
Edition NA
Copyright NA
Levelled NA



Surveyed 1873
Revised 1898
Edition NA
Copyright NA
Levelled NA



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Site Details:

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ESTATE, CHIRK, LL14 5RL

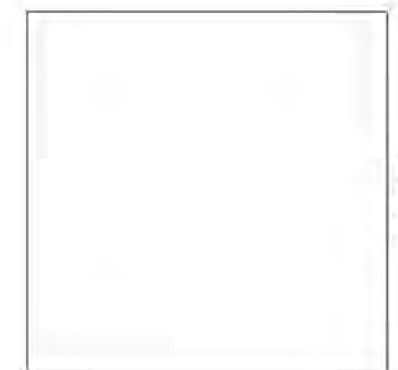
Client Ref: C3584/RIH/1866
Report Ref: HMD-283-620812
Grid Ref: 328312, 338164

Map Name: County Series

Map date: 1873

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1873
Revised 1873
Edition NA
Copyright NA
Levelled NA



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APPENDIX C

COAL AUTHORITY AND REGULATORY AUTHORITY SEARCHES

Chief Housing and Public Protection Officer/Prif Swyddog Tai a Diogelu'r Cyhoedd
Andy Lewis

High Street, Ruabon, Wrexham. LL14 6NH
Stryd Fawr, Rhiwabon, Wrecsam. LL14 6NH
Fax/Ffacs: 01978 813709 BT Text Phone: 01978 292067
www.wrexham.gov.uk www.wrecsam.gov.uk



BY EMAIL

Ms Jodie Cathcart
Sirius Geotechnical and Environmental Ltd.
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

Your Ref/Eich Cyf
Our Ref/Ein Cyf
Date/Dyddiad
Ask for/Gofynner am
Direct Dial/Rhif Union
E-mail/E-bost

SLI/Search382
30 November 2009
Stacey Inglis
01978 813724
stacey.inglis@wrexham.gov.uk

Visit our website at:
www.wrexham.gov.uk

Dear Ms Cathcart

CANALWOOD INDUSTRIAL ESTATE, CHIRK

Thank you for your emails dated 20 November 2009 and 26 November 2009 respectively regarding the above environmental search and the fees associated with it. I can respond to your enquiry as follows.

1. This Department is not aware of any areas of landfilling (closed or operational) on or within a 500m of the site.
2. In terms of known areas of 'contaminated land', as yet this Authority has not determined any sites as 'contaminated land' under Part IIA of the Environmental Protection Act 1990.

This Authority does not yet have a comprehensive database regarding historic land use or contamination. However, the limited information available to the Housing and Public Protection Department confirms that this Department has received no complaints regarding contamination issues at the above site and can confirm that at present there are no specific concerns with respect to historical contamination at the above site or adjacent land.

It should be noted that the above site and adjacent land are currently occupied by industrial activities and if the land were to be re-developed in the future then any potential contamination issues, associated with the current use, will be dealt with via the planning regime. If the sites were to be closed in the future and not re-developed then there is the potential that the land may need to be considered under Part IIA of the Environmental Protection Act 1990.

3. Part A & B Authorised Processes – on site:
Richard Burbridge Ltd, Canalwood Industrial Estate, Chirk
Part B Wood Process, Permit Ref: WCBC/PG6/2(2)
First permitted in 1992

Would you like to receive a copy of this information/correspondence in a different language or format (Braille, Audio Tape etc.)? If so, please contact Public Protection Services on 01978 813700 so arrangements can be made.

A hoffech chi dderbyn copi o'r wybodaeth/gohebiaeth hyn mewn iaith neu ddiwyg gwahanol (braille, tâp sain ac ati)? Os hoffech, yna cysylltwch â Gwasanaethau Diogelu'r Cyhoedd ar 01978 813700 fel y gellir gwneud trefniadau.



Part A & B Authorised Processes – within 250m:

Kronospan Ltd, Wrexham, Chirk

Part A2 Process – manufacture of particle board, Permit Ref: WCBC/PPC/KR/1

First permitted in 1992

Cadbury Ltd, Wrexham, Chirk

Part A1 process regulated by the Environment Agency Wales, please contact them for more information.

4. There have been no instances of nuisance associated with the site in the last three years however there has been one formal notice issued (April 2008) by the Local Authority for Kronospan in relation to noise.
5. This Authority is not aware of and spillages or other incidents associated with the site or neighbouring premises.
6. There are no private water abstractions within a 1km radius of the site.

Should you have any further queries please do not hesitate to contact me on the above number. An invoice for £60 + VAT will be issued shortly.

Yours sincerely



Mrs Stacey Inglis
Contaminated Land Officer



Issued by:

The Coal Authority, Mining Reports Office, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire NG18 4RG
ON-Line Service: www.groundstability.com - Phone: 0845 762 6848 - DX 716176 MANSFIELD 5

JODIE CATHCART OR DENISE BROOMFIELD,
SIRIUS GEOTECHNICAL & ENVIRONMENTAL
LTD,
RUSSELL HOUSE,
LITTLEBURN INDUSTRIAL ESTATE,
LANGLEY MOOR,
DURHAM,
COUNTY DURHAM,
DH7 8HJ

Person dealing with this matter:	Paul Heap
Our reference:	00051459-09
Your reference:	C3584/RIH/1867
Electronic Ref:	EME_00012719490001_005
RRUID:	005.00012719490001
Date of your enquiry:	11 November 2009
Date we received your enquiry:	11 November 2009
Date of issue:	13 November 2009

This report is for the property described in the address below and the attached plan.

Coal and Brine Report

Site At, Canal Wood Industrial Estate, Chirk, Wrexham

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	No
Brine Compensation District	No

Information from the Coal Authority

The property lies outside any defined coalfield area.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional remarks

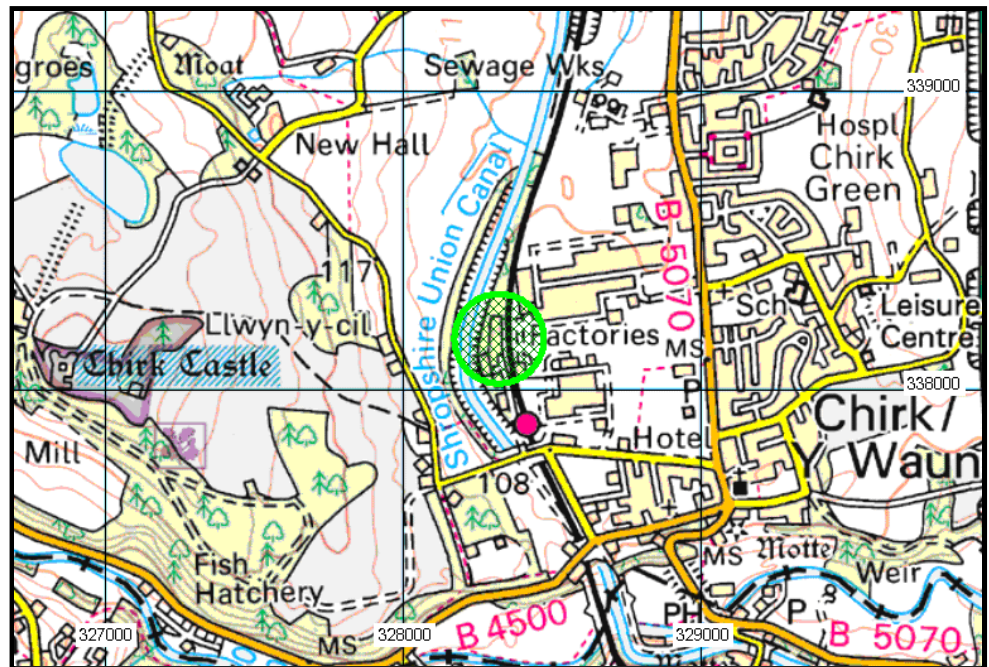
This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions 2006. The report is compliant with Home Information Pack requirements.

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Location map



Approximate
position
of property

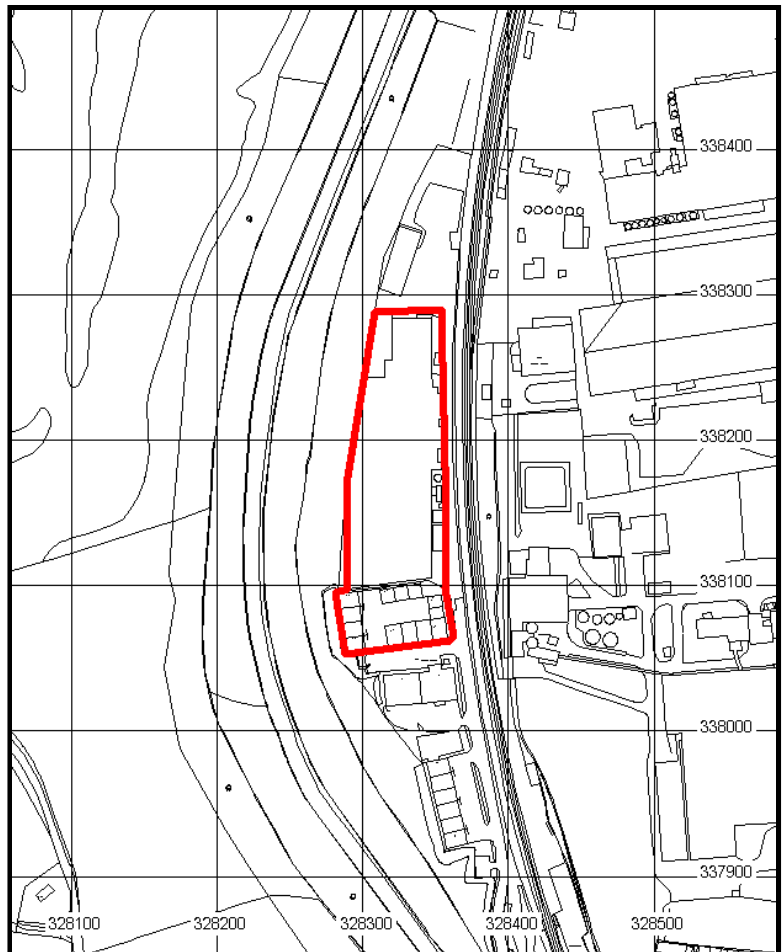


Enquiry boundary

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Key

Approximate position of enquiry boundary shown



David Bellis

CONSULTING SURVEYORS

Our ref: MJP/VL/237081

Your ref: Gemma

Date: 10th February 2010

The Sirius Group
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

Dear Gemma,

Re: Canal Wood Industrial Estate, Chirk, Wrexham.

Further to our telephone discussions regarding the above site and our coal mining search report of the 27th January.

I can confirm that our search of the coal mining records revealed no evidence of past coal workings within influencing distance of the site, indeed the closest workings are recorded to be some 1500m to the east and as such are significantly outside of influencing distance of the site.

On the basis of an assessment of the available information in the coal mining record, it is my opinion that the site represents a low risk with regard to shallow coal workings and as such in the absence of any further information relating to coal mining activities at this locality I do not believe that a borehole investigation into possible past coal mining is necessary.

Should you require any further information or assistance please do not hesitate to contact me.

Yours sincerely

M. J. Peace

M J Peace BSc. P Dip. FGS

8, Mornington Terrace, Harrogate, North Yorkshire, HG1 5DH

Telephone:- (01423) 529911 Fax:- (01423) 529922 Email:- contact@coalsearch.plus.com DX 720352 Harrogate



M.J Peace BSc. P Dip. FGS
Practice Principal
Mining Subsidence and
Building Consultants



CoalSearchPlus+
8, Mornington Terrace
Harrogate
North Yorkshire
HG1 5DH

Tel : 01423 529911
Fax : 01423 529922
DX 720352 Harrogate



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Protecting your investment

By

David Bellis
CONSULTING SURVEYORS

Coal Mining Search Report

Incorporating Cheshire Brine Enquiries



WWW.COALSEARCH.PLUS.COM

Serial Number 237081

Client detail :

Sirius Geotechnical &
Environmental Ltd
Suite 3 Bowcliffe Grange
Bowcliffe Hall Estate
Bramham
Leeds LS23 6LP

CoalSearchPlus+ by David Bellis Consulting
Surveyors
8 Mornington Terrace
Harrogate
North Yorkshire
HG1 5DH
(DX 720352 Harrogate)

Tel 01423 529911
Fax 01423 529922

Practice Principal M JPeace BSc PgDip FGS

Property details:

Site at
Canal Wood Industrial Estate
Chirk
Wrexham

Your ref : GEMMA

Purchaser :

Vendor :

In accordance with your instructions received 18 Dec 2009 we have inspected plans and records of coal mine workings and have made enquiries with respect to Cheshire brine extraction in relation to the above property and can report as follows :

1. **SEAM DETAILS FOR PAST UNDERGROUND COAL MINING** : In relation to the property the undermentioned seam(s) have been worked within the likely zone of physical influence on the surface.

Seam	Depth (m)	Sect (cm)	Date	Remarks
See Remarks				No previous recorded coal workings

2. **SEAM DETAILS FOR CURRENT AND FUTURE UNDERGROUND COAL MINING** : The undermentioned seam(s) are currently being worked, or licenses to work are being determined, or have been granted to work, within the likely zone of physical influence on the surface in relation to the property.

Seam	Depth (m)	Sect (cm)	Date	Remarks
				No future workings likely.

3. **UNDERLYING GEOLOGY :**

The property is situated in an area of Glacial Sand and Gravel over Coal Measures.

There are no faults or abnormal features relevant to the property.

Serial Number 237081

4. OPENCAST COAL MINING :

Past Opencast Workings : The property is not situated within the boundary of a former opencast coal mining site.

Present Opencast Workings : The property is not situated within 200m of the boundary of a currently operating opencast coal mining site.

Future Opencast Workings : The property is not situated within 800m of the boundary of an opencast site for which a license to extract coal by opencast methods has been granted or a license to do so is currently being determined.

5. SHAFTS, ADITS (MINE ENTRIES) AND ADDITIONAL INFORMATION :

We have no knowledge of any shafts or adits within 20 metres of the property or the boundary of the property.

There are no tips or lagoons in the vicinity of the property.

6. NOTICES IN RELATION TO FUTURE COAL MINING ACTIVITY :

We have no knowledge of any intention to work coal by underground methods , within influencing distance on the surface in the vicinity of the property, for which notices have been issued under the Coal Mining Subsidence Act 1991.

7. PAST COAL MINING RELATED SUBSIDENCE :

Our investigations have shown no evidence of coal mining related subsidence claims in relation to the property in the past 10 years.

8. CONCLUSION (COAL MINING) : In the light of the above facts we conclude that in relation to coal mining :

In our opinion it is unlikely that coal will be worked in the foreseeable future.

COAL MINING RISK LEVEL : We recommend that the transaction is treated as :

Where this report is to be used for development purposes particular attention is drawn to the paragraphs below concerning the ownership of in situ coal, coal workings and the risks from mine gases.

Please note that the overall coal mining risk level above is based upon an assessment of the detailed information contained in the body of the report. The risk assessment must be used in conjunction with the detailed report.

Serial Number 237081

If development of the property is being considered then all necessary enquiries and investigations should be completed prior to the commencement of works to ensure that proposals follow good engineering practice for development in mining areas. The Coal Authority has ownership of in situ coal, coal mines (both current and disused) and coal mine shafts and adits. Activities that intersect, enter or disturb any of the Coal Authority's interests require the written permission of the Authority.

Any development proposals should consider risks to the development, or adjacent property, of generating or displacing underground gases where coal seams or former mining works are disturbed. The need for effective measures to prevent gases entering public properties should be assessed and properly addressed. These actions are necessary due to the public safety implications of development in these circumstances.

CHESHIRE BRINE EXTRACTION INFORMATION :

The property lies outside the Cheshire Brine Compensation District as prescribed by the Cheshire Brine Pumping (Compensation for Subsidence) Act 1952.

With respect to coal mining there is nothing to prevent a claim being made under the provisions of the Coal Mining Subsidence Act 1991 and subsequent legislation, but it must not be inferred that the Coal Authority or their licensees will necessarily accept that any damage has been caused as a result of mining subsidence.

If you require any further information or amplification please contact CoalSearchPlus+ on 01423 529911 or via our website www.coalsearch.plus.com.

This report is prepared in accordance with the CoalSearchPlus+ terms and conditions as published on the CoalSearchPlus+ website (www.coalsearch.plus.com) on the date of issue of this report.

This is a Coal Mining Search Report and is not to be interpreted as being part of an Environmental Assessment of the property.

We cannot be held responsible for the accuracy of the information provided to us by third party organisations.

The information and/or material supplied is composed from data based in many cases on measurements and records of various standards of reliability and age. We cannot be held responsible for the accuracy of such information.

This search report is based upon the privately owned CoalSearchPlus+ mining record database and plans and records publicly available at the time of inspection from the Coal Authority, including British Geological Survey and Ordnance Survey data. Organisations reserve the right to vary their proposals and intentions as to their future mining operations without prior notice save as provided in the Coal Mining (subsidence) Act 1991 and the Coal Industry Act 1994.

Coal Authority Address : The Coal Authority, 200 Lichfield Lane Berry Hill, Mansfield, Nottinghamshire, HG18 4RG
British Geological Survey Address : British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham NG12 5GG

The information contained in this report relates to the property address given by the individual or organisation ordering the report. Where a plan indicating the property location and boundary is supplied with the instruction the report is based on that information. Where no plan is supplied the report is based on the property location as defined in publicly available mapping data. At all times it remains the responsibility of the instructing organisation or individual to define the boundary of the property.

Additional notes applicable to Residential Coal Mining Reports only :

This report is compliant with Home Information Pack requirements.

David Bellis Consulting Surveyors is not aware of any personal or business relationship between the person conducting or preparing the search and any person involved in the sale of the property.

This report is a desk study of existing published geological and coal mining records and the CoalSearchPlus+ coal mining database. In order to compile this report enquiries have been made relating to the following :

Serial Number 237081

Past Coal Mining – the existence of any previously worked seams of coal within influencing distance on the surface in relation to the property including an indication of the location, depth and age of the workings,

Present Coal Mining - the existence of any currently worked seams of coal within influencing distance on the surface in relation to the property including an indication of the location, depth and age of the workings. The existence of coal that could be worked at some time in the future will be enquired into and detail of any relevant licenses disclosed where available.

Underlying Geology - the underlying geology of the property will be reviewed and briefly described in relation to coal mining.

Opencast Coal Mining - the existence of past present and future opencast coal mining, specifically :

- if the property is situated within the boundary of a former opencast site. In the case of old opencast workings it must be understood that records are often unclear regarding the site boundary and/or worked areas. Published records will be reviewed to give our opinion of the existence of relevant former opencast coal workings.
- if the property is situated within 200m of the boundary of a currently operating opencast site.
- if the property is situated within 800m of the boundary of an opencast for which either a license to extract coal by opencast methods has been granted or a license to do so is currently being determined.

Shafts, Adits (Mine Entries) and Additional Information – the existence of any mine entries within 20m of the property or the boundary of the property and its associated land and buildings (the definition of the boundary of the property is the responsibility of the individual or organisation ordering this report). Where a mine entry is found to exist the approximate location of the mine entry will be indicated on a plan to be provided by the instructing organisation or individual. The existence of unworked coal will be enquired into and our opinion regarding the likelihood of it being worked at some time in the past will be given where relevant. Any other relevant coal mining related features discovered will be noted.

Notices in relation to future coal mining activity – the existence of notices indicating an intention to work coal by underground methods in the future.

Past coal mining related subsidence – if any publicly available records indicate coal mining related subsidence affecting the property in the past 10 years.

Coal Mining Risk Level – the opinion of David Bellis Consulting Surveyors of the risk posed to the property from coal mining given all the information contained in the report. The risk to the property is given in relation to the majority of the housing stock in the immediate area.

Cheshire Brine – the location of the property in relation to the Cheshire Brine Compensation District and any relevant information to the property regarding brine extraction.

Any queries or complaints, with respect to the attached report, should be addressed to:

M J Peace, Practice Principal
David Bellis Consulting Surveyors, 8 Mornington Terrace, Harrogate, North Yorkshire HG1 5DH (DX 720352 Harrogate)
Tel 01423 529911 Fax 01423 529922

Additional information, including answers to many frequently asked questions, can be found on the CoalSearchPlus+ website, www.coalsearch.plus.com

If you wish to make a complaint, it will be handled as follows:

- The complaint will be acknowledged within 5 working days of its receipt.
- A complaint will normally be dealt with fully within 4 weeks of the date of its receipt. If there are valid reasons for the consideration taking longer, you will be kept fully informed in writing or via telephone or email as you prefer and receive a response at the very latest within 8 weeks.
- At your request, we will liaise with counselling organisations acting on your behalf.
- A final decision will be in writing.

If you are not satisfied with the final outcome, you may refer the complaint to the Independent Property Codes Adjudication Scheme and we will give you contact details. We will co-operate fully with the independent adjudicator during the consideration of a complaint and comply with any decision.

IPCAS can be contacted at:

IDRS Ltd, 24 Angel Gate, City Road, London EC1V 2PT
Phone : 020 7520 3800 Fax 020 7520 3829 E-mail : info@idrs.ltd.uk

Date : 27 Jan 2010

Signed : *M. J. Peace*

27 Jan 10

Coal Mining Search Report

Incorporating Cheshire Brine Enquiries

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Serial Number 237081

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Serial Number 237081**Important Consumer Protection Information**

This search has been produced by David Bellis Consulting Surveyors which is registered with the Property Codes Compliance Board as a subscriber to the Search Code.

The Search Code provides protection for homebuyers, sellers, conveyancers and mortgage lenders, who rely on property search reports carried out on residential property within the United Kingdom. It sets out minimum standards which organisations compiling and/or selling search reports have to meet. This information is designed to introduce the Search Code to you.

By giving you this information, your search organisation is confirming that they keep to the principles of the Search Code. This provides important protection for you.

The Code's main commitments

The Search Code's key commitments say that search organisations will:

Provide search reports which include the most up-to-date available information when compiled and an accurate report of the risks associated with the property.

- Deal promptly with queries raised on search reports.
- Handle complaints speedily and fairly.
- At all times maintain adequate and appropriate insurance cover to protect you.
- Act with integrity and ensure that all search services comply with relevant laws, regulations and industry standards.
- Keeping to the Search Code.

How search organisations maintain compliance with the Search Code is monitored independently by the Property Codes Compliance Board (PCCB). If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for your complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final resolution after your complaint has been formally considered or if the firm has exceeded the response timescales, you may refer your complaint to the Independent Property Codes Adjudication Scheme (IPCAS). IPCAS can award compensation of up to £5,000 to you if it finds that you have suffered loss as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to IPCAS.

IPCAS Contact Details: Telephone: 020 7520 3800 Email: info@idrs.ltd.uk

You can also get more information about the Property Codes Compliance Board from our website at: www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH ORGANISATION IF YOU WOULD LIKE A COPY OF THE FULL SEARCH CODE



APPENDIX D

EXPLORATORY HOLE LOGS

			WINDOW SAMPLING RECORD		BH No. WS1																						
			Site: Canal Wood Industrial Estate, Chirk		Sheet 1 of 1																						
			Client: Richard Burbidge Ltd		Contract No: C3584																						
			Method: Tracked window sampling rig.		Dates: 23/02/2010																						
					Scale 1:50																						
SAMPLE DETAILS			STRATA RECORD		Logged By: GH Checked By: SB																						
Groundwater <table><thead><tr><th>Type</th><th>Depth From - To(m)</th><th>(N) Shear vane</th></tr></thead><tbody><tr><td>D</td><td>0.50m</td><td></td></tr><tr><td>D</td><td>1.50m</td><td>N=7 (2,1/2,2,1,2)</td></tr><tr><td>D</td><td>2.50m</td><td>N=13 (5,2/3,3,3,4)</td></tr><tr><td>D</td><td>3.60m</td><td>N=7 (2,2/1,2,2,2)</td></tr><tr><td>D</td><td>3.60m</td><td>N=7 (2,1/2,1,2,2)</td></tr><tr><td></td><td></td><td>N=10 (2,2/2,2,3,3)</td></tr></tbody></table>					Type	Depth From - To(m)	(N) Shear vane	D	0.50m		D	1.50m	N=7 (2,1/2,2,1,2)	D	2.50m	N=13 (5,2/3,3,3,4)	D	3.60m	N=7 (2,2/1,2,2,2)	D	3.60m	N=7 (2,1/2,1,2,2)			N=10 (2,2/2,2,3,3)	Driller: RP	
					Type	Depth From - To(m)	(N) Shear vane																				
D	0.50m																										
D	1.50m	N=7 (2,1/2,2,1,2)																									
D	2.50m	N=13 (5,2/3,3,3,4)																									
D	3.60m	N=7 (2,2/1,2,2,2)																									
D	3.60m	N=7 (2,1/2,1,2,2)																									
		N=10 (2,2/2,2,3,3)																									
Depth (m)		Level (mAOD)	Legend	Well																							
			MADE GROUND: Firm [low plasticity] low and medium strength, brown-grey, silty, very sandy, very gravelly CLAY. Gravel is fine to coarse of angular to subrounded mudstone, sandstone, limestone and occasional white chalk like material (Partly very clayey, silty sandy GRAVEL).																								
			POSSIBLE MADE GROUND: Soft [low plasticity], low strength grey, very silty, very sandy gravelly CLAY with occasional rootlets. Gravel is fine to coarse of angular to subrounded sandstone and mudstone. Damp from 3.6m depth. Groundwater ingress at 4.0m depth.																								
			Grey-black medium to coarse SAND.		3.60																						
			Soft [low plasticity], medium strength grey SILT.		4.90																						
			End of Window Sample at 5.00 m		4.95																						
					5.00																						

Remarks and Water Observations

- 1.Hand dug pit excavated to 1.2m bgl.
- 2.Groundwater ingress noted at 4.0m bgl.
- 3.Borehole backfilled with arisings upon completion.
- 4.Plasticities denoted [] indicate field observations only.

GL (mAOD)

-

Easting:

-

Northing:

-

Fig. No.

WS1

			WINDOW SAMPLING RECORD		BH No. WS2												
			Site: Canal Wood Industrial Estate, Chirk		Sheet 1 of 1												
			Client: Richard Burbidge Ltd		Contract No: C3584												
			Method: Tracked window sampling rig.		Dates: 23/02/2010												
					Scale 1:50												
SAMPLE DETAILS			STRATA RECORD	Logged By: GH Checked By: SB													
<table><tr><th>Type</th><th>Depth From - To(m)</th><th>(N) Shear vane</th></tr><tr><td>J</td><td>0.50m</td><td></td></tr><tr><td>J</td><td>1.10m</td><td></td></tr><tr><td>D</td><td>2.20m</td><td></td></tr></table>				Type	Depth From - To(m)	(N) Shear vane	J	0.50m		J	1.10m		D	2.20m		Driller: RP	
				Type	Depth From - To(m)	(N) Shear vane											
J	0.50m																
J	1.10m																
D	2.20m																
			Depth (m)	Level (mAOD)	Legend	Well											
			0.10														
			0.20														
			1.00														
			1.40														
																	
																	
																	
																	
																	
			4.10														
																	
			5.00														
																	

Remarks and Water Observations

- 1.Hand dug pit excavated to 1.2m bgl.
- 2.Groundwater ingress noted at 3.0m bgl.
- 3.Borehole backfilled with arisings upon completion.
- 4.Plasticities denoted [] indicate field observations only.

GL (mAOD)

-

Easting:

-

Northing:

-

Fig. No.

WS2



WINDOW SAMPLING RECORD

BH No. **WS3**
Sheet 1 of 1
Contract No: **C3584**
Dates:
23/02/2010
Scale 1:50

Site: Canal Wood Industrial Estate, Chirk

Client: Richard Burbidge Ltd

Method: Tracked window sampling rig.

STRATA RECORD

Description

Logged By: GH Checked By: SB

Driller: RP

Depth
(m)

Level
(mAOD)

Legend

Well

MADE GROUND: TARMAC

MADE GROUND: Green SAND and GRAVEL of fine to coarse angular concrete and limestone (sub-base).

Stiff intermediate plasticity high strength, brown-orange, silty, sandy, gravelly, friable CLAY. (Partly clayey, silty, sandy GRAVEL).

Medium dense grey-blue silty, slightly clayey, SAND and GRAVEL of fine to coarse, angular to subrounded mudstone, sandstone and quartz. Occasional firm [low plasticity] silt lenses.

Groundwater ingress noted at 2.6m depth.

Firm [low plasticity], low becoming medium strength grey-blue SILT.
Becoming higher plasticity below 3.0m depth.

Becoming medium strength below 4.0m depth.

Fine sandy lens between 4.9m and 5.0m depth.

Becoming lighter grey-blue in colour below 5.6m depth.

End of Window Sample at 7.00 m

SAMPLE DETAILS

Type Depth From - To(m) (N) Shear vane

J+D 0.50m

J 1.20m N=16 (4,4/4,4,4,4)

D 1.70m

D 2.50m N=24 (12,10/7,6,5,6)

D 3.50m N=6 (2,2/2,2,1,1)

D 4.50m N=14 (5,7/4,4,3,3)

N=11 (4,3/2,2,3,4)

N=9 (3,2/3,2,2,2)

N=12 (5,4/3,3,3,3)

Groundwater



Remarks and Water Observations

- 1.Hand dug pit excavated to 1.2m bgl.
- 2.Groundwater ingress noted at 2.6m bgl.
- 3.Gas and groundwater monitoring well installed as shown.
- 4.Plasticities denoted [] indicate field observations only.

GL (mAOD)

- Easting:

- Northing:

-

Fig. No.

WS3



WINDOW SAMPLING RECORD

BH No. **WS4**
Sheet 1 of 1

Site: Canal Wood Industrial Estate, Chirk

Contract No: **C3584**

Client: Richard Burbidge Ltd

Dates:
23/02/2010

Method: Tracked window sampling rig.

Scale 1:50

SAMPLE DETAILS

Groundwater

STRATA RECORD

Logged By: GH Checked By: SB

Driller: RP

Type Depth From - To(m) (N) Shear vane

Description

Depth (m) Level (mAOD) Legend Well

J+D 0.50m

MADE GROUND: TARMAC

0.10
0.20

MADE GROUND: Green-grey sandy GRAVEL of fine to coarse angular limestone and concrete (sub-base).

J
D 1.35m
1.50m

N=11
(2,2/2,3,3,3)

Grey-brown very clayey, silty, sandy GRAVEL with low cobble content of fine to coarse angular limestone. Gravel is fine to coarse of subrounded to angular sandstone, limestone and mudstone.

1.30
1.40

Medium dense brown, silty, slightly gravelly fine to coarse SAND. Gravel is fine to coarse of angular limestone and mudstone.

D 3.00m

N=16
(1,2/2,2,5,7)

Stiff high plasticity high strength, brown-grey, silty, sandy, slightly gravelly CLAY, with occasional brown medium sand lenses. Gravel is fine to coarse of angular to subrounded sandstone and mudstone.

2.50

Medium dense, blue-grey, silty SAND and GRAVEL of fine to coarse angular to subrounded mudstone and sandstone. Groundwater ingress below 2.5m depth.

D 4.00m

N=44
(8,8/12,12,10,10)

Firm [low plasticity] high to very high strength, blue-grey SILT.

3.80

Only 10% recovery between 5.0m and 6.0m depth.

N=28
(7,6/6,6,8,8)

N=25
(7,7/5,6,7,7)

End of Window Sample at 6.00 m

6.00

Remarks and Water Observations

- 1.Hand dug pit excavated to 1.2m bgl.
- 2.Groundwater ingress noted at 2.5m bgl.
- 3.Gas and groundwater monitoring well installed as shown.
- 4.Plasticities denoted [] indicate field observations only.

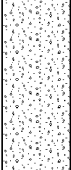
GL (mAOD)

Easting:

Northing:

Fig. No.

WS4

			WINDOW SAMPLING RECORD		BH No. WS5														
			Site: Canal Wood Industrial Estate, Chirk		Sheet 1 of 1														
			Client: Richard Burbidge Ltd		Contract No: C3584														
			Method: Tracked window sampling rig.		Dates: 23/02/2010														
					Scale 1:50														
SAMPLE DETAILS			STRATA RECORD		Logged By: GH Checked By: SB														
Groundwater <table><thead><tr><th>Type</th><th>Depth From - To(m)</th><th>(N) Shear vane</th></tr></thead><tbody><tr><td>J+D</td><td>0.50m</td><td></td></tr><tr><td>D</td><td>1.50m</td><td>50 (12,13 for 60mm/17,16,17 for 60m)</td></tr><tr><td>D</td><td>1.80m</td><td></td></tr><tr><td>D</td><td>2.20m</td><td>50 (16,9 for 40mm/20,20,10 for 40mm)</td></tr></tbody></table>					Type	Depth From - To(m)	(N) Shear vane	J+D	0.50m		D	1.50m	50 (12,13 for 60mm/17,16,17 for 60m)	D	1.80m		D	2.20m	50 (16,9 for 40mm/20,20,10 for 40mm)
					Type	Depth From - To(m)	(N) Shear vane												
J+D	0.50m																		
D	1.50m	50 (12,13 for 60mm/17,16,17 for 60m)																	
D	1.80m																		
D	2.20m	50 (16,9 for 40mm/20,20,10 for 40mm)																	
Driller: RP																			
			Description		Depth (m)	Level (mAOD)	Legend	Well											
			MADE GROUND: TARMAC		0.20														
			MADE GROUND: Yellow-brown sandy GRAVEL of fine to coarse angular sandstone and limestone (compacted sub-base).		0.40														
			Brown-grey slightly silty SAND and GRAVEL of fine to coarse, angular to subrounded sandstone, limestone and quartz. Low to moderate cobble content of fine to coarse subrounded sandstone and quartz. SPT refusal likely on a cobble obstruction.																
			Stiff low plasticity, light brown, clayey, sandy, gravelly SILT. Damp below 1.7m depth.		1.70														
			Brown-grey slightly silty SAND and GRAVEL of fine to coarse, angular to subrounded sandstone, limestone and quartz. Low to moderate cobble content of fine to coarse subrounded sandstone and quartz. SPT refusal likely on a cobble obstruction. Becoming grey-brown-blue in colour below 2.2m depth. Refusal at 2.5m depth, likely on a cobble obstruction.		2.00														
			End of Window Sample at 2.50 m		2.50														

Remarks and Water Observations

- 1.Hand dug pit excavated to 1.2m bgl.
- 2.Groundwater noted as dampness at 1.7m bgl.
- 3.Gas and groundwater monitoring well installed as shown.
- 4.Plasticities denoted [] indicate field observations only.

GL (mAOD)

- Easting:

- Northing:

-

Fig. No.

WS5



WINDOW SAMPLING RECORD

BH No. **WS6**
Sheet 1 of 1

Site: Canal Wood Industrial Estate, Chirk

Contract No: **C3584**

Client: Richard Burbidge Ltd

Dates:
23/02/2010

Method: Tracked window sampling rig.

Scale 1:50

SAMPLE DETAILS

Groundwater

STRATA RECORD

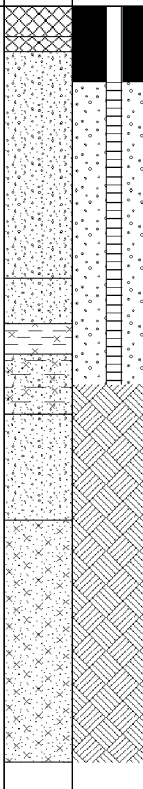
Logged By: GH Checked By: SB

Driller: RP

Type Depth From - To(m) (N) Shear vane

Description

Depth (m) Level (mAOD) Legend Well

J	0.50m			MADE GROUND: TARMAC	0.20	
				MADE GROUND: Yellow-brown sandy GRAVEL of fine to coarse angular sandstone and limestone.	0.30	
D	1.50m	50 (12,12/13,13,1 7,7 for 20mm)		Brown-grey SAND and GRAVEL of fine to coarse angular to subrounded sandstone, mudstone, limestone and quartz. Low cobble content of fine to coarse angular sandstone and quartz.		
D	2.20m	N=35 (12,12/10,11,1 0,4)		Orange-brown gravelly medium to coarse SAND. Gravel is fine to medium of subangular sandstone. Groundwater ingress noted at 2.0m bgl.	1.80	
				Firm [high plasticity] high strength, light brown, slightly silty CLAY.	2.10	
D	3.00m	N=12 (3,3/2,2,4,4)		Light grey-brown slightly clayey, silty, gravelly fine to coarse SAND. Gravel is fine to medium of subrounded mudstone and sandstone.	2.30	
				Medium dense, light grey-brown, gravelly, medium to coarse SAND. Gravel is fine to coarse of subangular sandstone. Lens of black medium sand between 2.71m and 2.73m depth.	2.70	
D	3.70m	N=11 (4,4/2,3,3,3)		Medium dense, light brown-grey, very silty fine SAND. Collapse of strata back into hole between 4.0m and 5.0m depth.	3.40	
		N=26 (7,6/7,6,6,7)		End of Window Sample at 5.00 m	5.00	

Remarks and Water Observations

- 1.Hand dug pit excavated to 1.2m bgl.
- 2.Groundwater ingress noted at 2.0m bgl.
- 3.Gas and groundwater monitoring well installed as shown.
- 4.Plasticities denoted [] indicate field observations only.

GL (mAOD)

-

Easting:

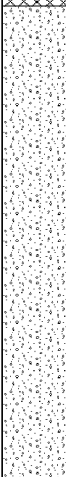
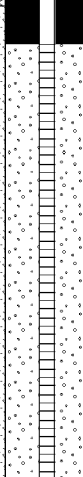
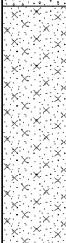
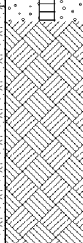
-

Northing:

-

Fig. No.

WS6

			WINDOW SAMPLING RECORD		BH No. WS7 Sheet 1 of 1					
			Site: Canal Wood Industrial Estate, Chirk		Contract No: C3584					
			Client: Richard Burbidge Ltd		Dates: 23/02/2010					
			Method: Tracked window sampling rig.		Scale 1:50					
SAMPLE DETAILS			Groundwater	STRATA RECORD		Logged By: GH		Checked By: SB		
Type		Depth From - To(m)				(N) Shear vane		Driller: RP		
				Description	Depth (m)	Level (mAOD)	Legend	Well		
J			0.50m		MADE GROUND: TARMAC	0.25				
D			1.50m		Grey-brown SAND and GRAVEL of fine to coarse angular to subrounded mudstone and sandstone. Low cobble content of fine to coarse angular to subrounded sandstone and mudstone.					
D			2.50m							
D			4.00m		Becoming damp below 2.7m depth.					
					Light brown, very silty fine SAND.	3.40				
					Becoming grey-blue below 3.7m and higher plasticity.					
					End of Window Sample at 5.00 m	5.00				

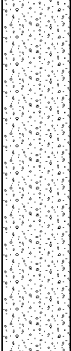
Remarks and Water Observations

1.Hand dug pit excavated to 1.2m bgl.
2.Groundwater noted as dampness at 2.7m bgl.
3.Gas and groundwater monitoring well installed as shown.
4.Plasticities denoted [] indicate field observations only.

GL (mAOD)
-
Easting:
-
Northing:
-

Fig. No.

WS7

			WINDOW SAMPLING RECORD		BH No. WS8				
			Site: Canal Wood Industrial Estate, Chirk		Sheet 1 of 1				
			Client: Richard Burbidge Ltd		Contract No: C3584				
			Method: Tracked window sampling rig.		Dates: 23/02/2010				
					Scale 1:50				
SAMPLE DETAILS			Groundwater	STRATA RECORD		Logged By: GH		Checked By: SB	
						Driller: RP			
Type	Depth From - To(m)	(N) Shear vane				Description	Depth (m)	Level (mAOD)	Legend
J	0.30m		MADE GROUND: TARMAC	0.20					
J	0.60m		MADE GROUND: Light brown SAND and GRAVEL of fine to coarse subangular limestone and sandstone.	0.40					
D	1.50m	N=34 (9,8/9,8,8,9)	Dense brown-grey SAND and GRAVEL of fine to coarse subangular to subrounded sandstone, limestone and mudstone. Moderate cobble content of subrounded sandstone and limestone.						
D	2.50m	N=35 (16,9 for 50mm/10,10,8,7)	Slightly damp below 2.0m depth.						
D	2.90m	N=14 (3,4/3,3,4,4)	Firm [low plasticity] medium strength, light brown-orange, fine sandy SILT.	2.80					
D	3.70m	N=12 (4,2/3,3,3,3)	Medium dense brown orange silty fine SAND.	3.50					
		N=18 (5,4/4,4,5,5)	End of Window Sample at 5.00 m	5.00					

Remarks and Water Observations

- 1.Hand dug pit excavated to 1.2m bgl.
- 2.Groundwater noted as dampness at 2.0m bgl.
- 3.Borehole backfilled with arisings upon completion.
- 4.Plasticities denoted [] indicate field observations only.

GL (mAOD)

Easting:

Northing:

Fig. No.

WS8



APPENDIX E

LABORATORY TEST RESULTS



2139

Certificate of Analysis



Date: 12/03/2010

Client: Sirius Geotechnical & Environmental
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

Our Reference: 10-36048

Client Reference: C3584

Contract Title: Canal Wood Industrial Estate, Chirk

Description: 13 soil samples, 3 leachate samples

Date Received: 01/03/2010

Date Started: 02/03/2010

Date Completed: 12/03/2010

Test Procedures: Identified by prefix DETSn, details available upon request.

Notes: Observations and interpretations are outside the scope of UKAS accreditation
* denotes test not included in laboratory scope of accreditation
denotes test that holds MCERT accreditation
\$ denotes tests completed by an approved subcontractor
I/S denotes insufficient sample to carry out test
N/S denotes that the sample is not suitable for testing
DETSM denotes tests carried out by DETS Midlands laboratory
Solid samples will be disposed 1 month and liquids 2 weeks
after the date of issue of this test certificate
Asbestos subsamples will be kept for 6 months

Approved By:



Authorised Signatories: Rob Brown
Business Manager

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Our Ref: 10-36048
Client Ref: C3584
Contract Title: Canal Wood Industrial Estate, Chirk

Sample Details

<u>Sample ID</u>	<u>Depth</u>	<u>DETS Ref</u>	<u>Matrix Description</u>	<u>Date Sampled</u>	<u>Time Sampled</u>	<u>Preservation</u>	<u>Analysis Complete</u>
WS1	1.50	245459	brown gravelly sandy CLAY	Not Provided	Not Provided	None	12/03/2010
WS2	1.20	245460	brown/grey sandy CLAY	Not Provided	Not Provided	None	12/03/2010
WS3	0.50	245461	light brown sandy CLAY	Not Provided	Not Provided	None	12/03/2010
WS3	1.70	245462	grey sandy GRAVEL	Not Provided	Not Provided	None	12/03/2010
WS4	0.50	245463	grey/brown clayey sandy GRAVEL	Not Provided	Not Provided	None	12/03/2010
WS4	3.00	245464	grey sandy GRAVEL	Not Provided	Not Provided	None	12/03/2010
WS5	0.50	245465	light brown sandy GRAVEL	Not Provided	Not Provided	None	12/03/2010
WS5	2.20	245466	grey/brown sandy GRAVEL	Not Provided	Not Provided	None	12/03/2010
WS6	1.50	245467	brown sandy GRAVEL	Not Provided	Not Provided	None	12/03/2010
WS7	0.50	245468	brown gravelly sandy CLAY	Not Provided	Not Provided	None	12/03/2010
WS8	0.30	245469	brown sandy GRAVEL	Not Provided	Not Provided	None	12/03/2010
WS8	2.50	245470	brown gravelly sandy CLAY	Not Provided	Not Provided	None	12/03/2010

Summary of Chemical Analysis

Soil Samples

Our Ref: 10-36048

Client Ref: C3584

Contract Title: Canal Wood Industrial Estate, Chirk

			Lab No.	245459	245460	245461	245462	245463
			Sample Ref	WS1	WS2	WS3	WS3	WS4
			Depth	1.50	1.20	0.50	1.70	0.50
			Other Ref					
			Sample Type	D	J	J	D	J/D
Test	Units	DETSxx						
Arsenic	mg/kg	DETS 042#	9			10		6
Cadmium	mg/kg	DETS 042#	0.5			0.6		0.6
Chromium	mg/kg	DETS 042#	17			28		24
Copper	mg/kg	DETS 042#	21			14		36
Lead	mg/kg	DETS 042#	11			16		8
Mercury	mg/kg	DETS 081#	< 0.05			< 0.05		< 0.05
Nickel	mg/kg	DETS 042#	16			28		23
Selenium	mg/kg	DETS 042#	< 0.5			< 0.5		< 0.5
Zinc	mg/kg	DETS 042#	47			52		51
Total Sulphate as SO4	%	DETS 075#	0.04			0.10		0.22
Sulphate Aqueous Extract as SO4	mg/l	DETS 076#	71		73	68	59	67
Total Organic Carbon	%	DETS 002	0.7			0.4		1.1
pH		DETS 008#	8.9		8.8	8.7	8.8	9.0
Aliphatic C5-C6	mg/kg	DETS 072*	< 0.01					< 0.01
Aliphatic C6-C8	mg/kg	DETS 072*	< 0.01					0.07
Aliphatic C8-C10	mg/kg	DETS 072*	0.03					22
Aliphatic C10-C12	mg/kg	DETS 072#	< 1.5					< 1.5
Aliphatic C12-C16	mg/kg	DETS 072#	< 1.2					< 1.2
Aliphatic C16-C21	mg/kg	DETS 072#	< 1.5					< 1.5
Aliphatic C21-C35	mg/kg	DETS 072#	< 3.4					5.3
Aromatic C5-C7	mg/kg	DETS 072*	< 0.01					< 0.01
Aromatic C7-C8	mg/kg	DETS 072*	< 0.01					< 0.01
Aromatic C8-C10	mg/kg	DETS 072*	0.03					4.2
Aromatic C10-C12	mg/kg	DETS 072#	< 0.9					1.1
Aromatic C12-C16	mg/kg	DETS 072#	1.8					2.7
Aromatic C16-C21	mg/kg	DETS 072#	2.8					3.4
Aromatic C21-C35	mg/kg	DETS 072#	10					19
Aliphatic C5-C35	mg/kg	DETS 072*	< 10					30
Aromatic C5-C35	mg/kg	DETS 072*	15					30
TPH Ali/Aro	mg/kg	DETS 072*	20					60

Summary of Chemical Analysis

Soil Samples

Our Ref: 10-36048

Client Ref: C3584

Contract Title: Canal Wood Industrial Estate, Chirk

			Lab No.	245459	245460	245461	245462	245463
			Sample Ref	WS1	WS2	WS3	WS3	WS4
			Depth	1.50	1.20	0.50	1.70	0.50
			Other Ref					
			Sample Type	D	J	J	D	J/D
Test	Units	DETSxx						
Acenaphthene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Acenaphthylene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Anthracene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Benzo(a)anthracene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Benzo(a)pyrene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Benzo(b)fluoranthene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Benzo(k)fluoranthene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Benzo(g,h,i)perylene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Chrysene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Dibenzo(a,h)anthracene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Fluoranthene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Fluorene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Naphthalene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Phenanthrene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
Pyrene	mg/kg	DETS 050	< 0.1			< 0.1		< 0.1
PAH	mg/kg	DETS 050	< 1.6			< 1.6		< 1.6
Phenol - Monohydric	mg/kg	DETS 067#	< 0.3			< 0.3		< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref: 10-36048

Client Ref: C3584

Contract Title: Canal Wood Industrial Estate, Chirk

			Lab No.	245464	245465	245466	245467	245468
			Sample Ref	WS4	WS5	WS5	WS6	WS7
			Depth	3.00	0.50	2.20	1.50	0.50
			Other Ref					
			Sample Type	D	J/D	D	D	J
Test	Units	DETSxx						
Arsenic	mg/kg	DETS 042#			11			9
Cadmium	mg/kg	DETS 042#			0.8			1.5
Chromium	mg/kg	DETS 042#			20			27
Copper	mg/kg	DETS 042#			18			29
Lead	mg/kg	DETS 042#			17			18
Mercury	mg/kg	DETS 081#			< 0.05			< 0.05
Nickel	mg/kg	DETS 042#			24			28
Selenium	mg/kg	DETS 042#			< 0.5			< 0.5
Zinc	mg/kg	DETS 042#			63			78
Total Sulphate as SO4	%	DETS 075#			0.07			0.18
Sulphate Aqueous Extract as SO4	mg/l	DETS 076#	69	52	48	140	58	
Total Organic Carbon	%	DETS 002			0.3			0.4
pH		DETS 008#	9.0	8.9	8.8	8.9	8.8	
Aliphatic C5-C6	mg/kg	DETS 072*			< 0.01			
Aliphatic C6-C8	mg/kg	DETS 072*			< 0.01			
Aliphatic C8-C10	mg/kg	DETS 072*			< 0.01			
Aliphatic C10-C12	mg/kg	DETS 072#			< 1.5			
Aliphatic C12-C16	mg/kg	DETS 072#			1.5			
Aliphatic C16-C21	mg/kg	DETS 072#			4.7			
Aliphatic C21-C35	mg/kg	DETS 072#			40			
Aromatic C5-C7	mg/kg	DETS 072*			< 0.01			
Aromatic C7-C8	mg/kg	DETS 072*			< 0.01			
Aromatic C8-C10	mg/kg	DETS 072*			< 0.01			
Aromatic C10-C12	mg/kg	DETS 072#			1			
Aromatic C12-C16	mg/kg	DETS 072#			2.6			
Aromatic C16-C21	mg/kg	DETS 072#			4.1			
Aromatic C21-C35	mg/kg	DETS 072#			26			
Aliphatic C5-C35	mg/kg	DETS 072*			47			
Aromatic C5-C35	mg/kg	DETS 072*			34			
TPH Ali/Aro	mg/kg	DETS 072*			81			

Summary of Chemical Analysis

Soil Samples

Our Ref: 10-36048

Client Ref: C3584

Contract Title: Canal Wood Industrial Estate, Chirk

		Lab No.	245464	245465	245466	245467	245468
		Sample Ref	WS4	WS5	WS5	WS6	WS7
		Depth	3.00	0.50	2.20	1.50	0.50
		Other Ref					
		Sample Type	D	J/D	D	D	J
Test	Units	DETSxx					
Acenaphthene	mg/kg	DETS 050		< 0.1			< 0.1
Acenaphthylene	mg/kg	DETS 050		< 0.1			< 0.1
Anthracene	mg/kg	DETS 050		< 0.1			< 0.1
Benzo(a)anthracene	mg/kg	DETS 050		< 0.1			< 0.1
Benzo(a)pyrene	mg/kg	DETS 050		< 0.1			< 0.1
Benzo(b)fluoranthene	mg/kg	DETS 050		< 0.1			< 0.1
Benzo(k)fluoranthene	mg/kg	DETS 050		< 0.1			< 0.1
Benzo(g,h,i)perylene	mg/kg	DETS 050		< 0.1			< 0.1
Chrysene	mg/kg	DETS 050		< 0.1			< 0.1
Dibenzo(a,h)anthracene	mg/kg	DETS 050		< 0.1			< 0.1
Fluoranthene	mg/kg	DETS 050		< 0.1			< 0.1
Fluorene	mg/kg	DETS 050		< 0.1			< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETS 050		< 0.1			< 0.1
Naphthalene	mg/kg	DETS 050		< 0.1			< 0.1
Phenanthrene	mg/kg	DETS 050		< 0.1			< 0.1
Pyrene	mg/kg	DETS 050		< 0.1			< 0.1
PAH	mg/kg	DETS 050		< 1.6			< 1.6
Phenol - Monohydric	mg/kg	DETS 067#		< 0.3			< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref: 10-36048

Client Ref: C3584

Contract Title: Canal Wood Industrial Estate, Chirk

			Lab No.	245469	245470
			Sample Ref	WS8	WS8
			Depth	0.30	2.50
			Other Ref		
			Sample Type	J	D
Test	Units	DETSxx			
Arsenic	mg/kg	DETS 042#	6		
Cadmium	mg/kg	DETS 042#	0.3		
Chromium	mg/kg	DETS 042#	7		
Copper	mg/kg	DETS 042#	29		
Lead	mg/kg	DETS 042#	12		
Mercury	mg/kg	DETS 081#	< 0.05		
Nickel	mg/kg	DETS 042#	8		
Selenium	mg/kg	DETS 042#	< 0.5		
Zinc	mg/kg	DETS 042#	56		
Total Sulphate as SO4	%	DETS 075#	0.04		
Sulphate Aqueous Extract as SO4	mg/l	DETS 076#	57		47
Total Organic Carbon	%	DETS 002	0.4		
pH		DETS 008#	9.0		9.0
Aliphatic C5-C6	mg/kg	DETS 072*			
Aliphatic C6-C8	mg/kg	DETS 072*			
Aliphatic C8-C10	mg/kg	DETS 072*			
Aliphatic C10-C12	mg/kg	DETS 072#			
Aliphatic C12-C16	mg/kg	DETS 072#			
Aliphatic C16-C21	mg/kg	DETS 072#			
Aliphatic C21-C35	mg/kg	DETS 072#			
Aromatic C5-C7	mg/kg	DETS 072*			
Aromatic C7-C8	mg/kg	DETS 072*			
Aromatic C8-C10	mg/kg	DETS 072*			
Aromatic C10-C12	mg/kg	DETS 072#			
Aromatic C12-C16	mg/kg	DETS 072#			
Aromatic C16-C21	mg/kg	DETS 072#			
Aromatic C21-C35	mg/kg	DETS 072#			
Aliphatic C5-C35	mg/kg	DETS 072*			
Aromatic C5-C35	mg/kg	DETS 072*			
TPH Ali/Aro	mg/kg	DETS 072*			

Summary of Chemical Analysis

Soil Samples

Our Ref: 10-36048

Client Ref: C3584

Contract Title: Canal Wood Industrial Estate, Chirk

			Lab No.	245469	245470
			Sample Ref	WS8	WS8
			Depth	0.30	2.50
			Other Ref		
			Sample Type	J	D
Test	Units	DETSxx			
Acenaphthene	mg/kg	DETS 050	< 0.1		
Acenaphthylene	mg/kg	DETS 050	< 0.1		
Anthracene	mg/kg	DETS 050	< 0.1		
Benzo(a)anthracene	mg/kg	DETS 050	< 0.1		
Benzo(a)pyrene	mg/kg	DETS 050	< 0.1		
Benzo(b)fluoranthene	mg/kg	DETS 050	< 0.1		
Benzo(k)fluoranthene	mg/kg	DETS 050	< 0.1		
Benzo(g,h,i)perylene	mg/kg	DETS 050	< 0.1		
Chrysene	mg/kg	DETS 050	< 0.1		
Dibenzo(a,h)anthracene	mg/kg	DETS 050	< 0.1		
Fluoranthene	mg/kg	DETS 050	< 0.1		
Fluorene	mg/kg	DETS 050	< 0.1		
Indeno(1,2,3-c,d)pyrene	mg/kg	DETS 050	< 0.1		
Naphthalene	mg/kg	DETS 050	< 0.1		
Phenanthrene	mg/kg	DETS 050	< 0.1		
Pyrene	mg/kg	DETS 050	< 0.1		
PAH	mg/kg	DETS 050	< 1.6		
Phenol - Monohydric	mg/kg	DETS 067#	< 0.3		

Summary of Asbestos Analysis

Soil Samples

Our Ref: 10-36048

Client Ref: C3584

Contract Title: Canal Wood Industrial Estate, Chirk

Laboratory Number	Sample Ref	Depth	Other Ref	Material	Result
245458	WS1	0.50	D	Soil	NAD
245459	WS1	1.50	D	Soil	NAD
245469	WS8	0.30	J	Soil	NAD

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos

NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos

Samples are analysed using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Summary of Chemical Analysis

Leachate Samples

Our Ref: 10-36048

Client Ref: C3584

Contract Title: Canal Wood Industrial Estate, Chirk

		Lab No.	245471	245472	245473
		Sample Ref	WS4	WS5	WS7
		Depth	0.50	0.50	0.50
		Other Ref			
		Sample Type	J/D	J/D	J
Test	Units	DETSxx			
Arsenic Dissolved	ug/l	DETS 010	< 1	< 1	< 1
Cadmium Dissolved	ug/l	DETS 042	< 2	< 2	< 2
Chromium Dissolved	ug/l	DETS 042	8	< 5	< 5
Copper Dissolved	ug/l	DETS 042	3	< 2	< 2
Lead Dissolved	ug/l	DETS 042	< 4	< 4	< 4
Mercury Dissolved	ug/l	DETS 078	< 0.05	< 0.05	< 0.05
Nickel Dissolved	ug/l	DETS 042	< 10	< 10	< 10
Selenium Dissolved	ug/l	DETS 017	< 3	< 3	< 3
Zinc Dissolved	ug/l	DETS 042	3	2	2
pH		DETS 008	7.2	8.1	7.4
Acenaphthene	ug/l	DETS 074*	< 0.01	< 0.01	0.03
Acenaphthylene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Anthracene	ug/l	DETS 074*	< 0.01	< 0.01	0.02
Benzo(a)anthracene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	DETS 074*	< 0.01	0.01	0.02
Fluorene	ug/l	DETS 074*	< 0.01	< 0.01	0.05
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Naphthalene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Phenanthrene	ug/l	DETS 074*	< 0.01	< 0.01	0.06
Pyrene	ug/l	DETS 074*	< 0.01	0.04	< 0.01
PAH	ug/l	DETS 074*	< 0.20	< 0.20	< 0.20
Phenol	ug/l	DETS 079*	< 0.50	< 0.50	< 0.50

Appendix A - Details of Analysis

Method details are shown only for those determinants listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS.

No Recovery Factors are used in the determination of results. Results reported assume 100% recovery

Full method statements are available on request.

<u>Method</u>	<u>Name of Parameter</u>	<u>Units</u>	<u>Limit of Detection</u>	<u>Sample Preparation</u>	<u>Sub-Contracted</u>	<u>UKAS</u>	<u>MCERTS</u>
DETS 002	Organic Matter	%	0.01	Air Dried	No	Yes	Yes
DETS 003	Loss on Ignition	%	0.01	Air Dried	No	Yes	Yes
DETS 004	Total Sulphate	%	0.01	Air Dried	No	Yes	Yes
DETS 075	Total Sulphate	%	0.01	Air Dried	No	Yes	Yes
DETS 004	Water Soluble Sulphate	mg/l	10.00	Air Dried	No	Yes	Yes
DETS 076	Water Soluble Sulphate	mg/l	10.00	Air Dried	No	Yes	Yes
DETS 006	Chloride	mg/kg	0.01	Air Dried	No	Yes	Yes
DETS 008	pH	pH Units	0.10	Air Dried	No	Yes	Yes
DETS 042	Selenium	mg/kg	0.50	Air Dried	No	Yes	Yes
DETS 019	Ammonia	mg/kg	0.02	Air Dried	No	Yes	Yes
DETS 020	Boron (Water Soluble)	mg/kg	0.20	Air Dried	No	Yes	Yes
DETS 024	Sulphide	mg/kg	10.00	Air Dried	No	Yes	Yes
DETS 042	Antimony	mg/kg	1.00	Air Dried	No	No	No
DETS 042	Arsenic	mg/kg	0.20	Air Dried	No	Yes	Yes
DETS 042	Barium	mg/kg	1.50	Air Dried	No	Yes	Yes
DET S 042	Beryllium	mg/kg	0.20	Air Dried	No	Yes	Yes
DETS 042	Cadmium	mg/kg	0.10	Air Dried	No	Yes	Yes

Appendix A - Details of Analysis

Method details are shown only for those determinants listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS.

No Recovery Factors are used in the determination of results. Results reported assume 100% recovery

Full method statements are available on request.

<u>Method</u>	<u>Name of Parameter</u>	<u>Units</u>	<u>Limit of Detection</u>	<u>Sample Preparation</u>	<u>Sub-Contracted</u>	<u>UKAS</u>	<u>MCERTS</u>
DETS 042	Cobalt	mg/kg	0.70	Air Dried	No	Yes	Yes
DETS 042	Copper	mg/kg	0.20	Air Dried	No	Yes	Yes
DETS 042	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETS 042	Iron	mg/kg	1.00	Air Dried	No	Yes	No
DETS 042	Lead	mg/kg	0.30	Air Dried	No	Yes	Yes
DETS 042	Manganese	mg/kg	20.00	Air Dried	No	Yes	Yes
DETS 081	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETS 042	Molybdenum	mg/kg	0.40	Air Dried	No	Yes	Yes
DETS 042	Nickel	mg/kg	0.20	Air Dried	No	Yes	Yes
DETS 042	Thallium	mg/kg	1.00	Air Dried	No	No	No
DETS 042	Vanadium	mg/kg	0.80	Air Dried	No	Yes	Yes
DETS 042	Zinc	mg/kg	1.00	Air Dried	No	Yes	Yes
DETS 049	Sulphur (Free)	mg/kg	0.50	As Received	No	Yes	Yes
DETS 050	PAH	mg/kg	0.10	As Received	No	Yes	No
DETS 051	TPH (C10 - C40)	mg/kg	20.00	As Received	No	Yes	Yes
DETS 052	PCB	mg/kg	0.01	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method details are shown only for those determinants listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS.

No Recovery Factors are used in the determination of results. Results reported assume 100% recovery

Full method statements are available on request.

<u>Method</u>	<u>Name of Parameter</u>	<u>Units</u>	<u>Limit of Detection</u>	<u>Sample Preparation</u>	<u>Sub-Contracted</u>	<u>UKAS</u>	<u>MCERTS</u>
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzne	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 067	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETS 067	Easily Liberatable Cyanide	mg/kg	0.1	Air Dried	No	Yes	Yes
DETS 067	Complex Cyanide	mg/kg	0.30	Air Dried	No	Yes	No
DETS 067	Total Cyanide	mg/kg	0.40	Air Dried	No	Yes	Yes
DETS 067	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETS 068	VOC	mg/kg	0.01	As Received	No	No	No



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Certificate of Analysis

Date: 24/03/2010

Certificate Number: 10-36212

Client: Sirius Geotechnical & Environmental
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

Our Reference: 10-36212

Client Reference: C3584

Contract Title: Canal Wood Industrial Estate Chirk

Description: 3 water samples

Date Received: 05/03/2010

Date Started: 05/03/2010

Date Completed: 24/03/2010

Test Procedures: Identified by prefix DETSn, details available upon request.

Notes: Observations and interpretations are outside the scope of UKAS accreditation
* denotes test not included in laboratory scope of accreditation
denotes test that holds MCERT accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
\$ denotes tests completed by an approved subcontractor
I/S denotes insufficient sample to carry out test
U/S denotes that the sample is not suitable for testing
DETSM denotes tests carried out by DETS Midlands laboratory
Solid samples will be disposed 1 month and liquids 2 weeks after the date of issue of this test certificate
Asbestos subsamples will be kept for 6 months

Approved By:



Authorised Signatories: Rob Brown
Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Summary of Chemical Analysis

Water Samples

Our Ref: 10-36212

Client Ref: C3584

Contract Title: Canal Wood Industrial Estate Chirk

		Lab No.	246499	246500	246501
		Sample Ref	WS3	WS4	WS6
		Depth			
		Other Ref			
		Sample Type			
Test	Units	DETSxx			
Arsenic Dissolved	ug/l	DETS 010	< 1	< 1	< 1
Cadmium Dissolved	ug/l	DETS 042	< 2	< 2	< 2
Chromium Dissolved	ug/l	DETS 042	< 5	< 5	< 5
Copper Dissolved	ug/l	DETS 042	2	2	2
Lead Dissolved	ug/l	DETS 042	< 4	< 4	< 4
Mercury Dissolved	ug/l	DETS 078	< 0.05	< 0.05	< 0.05
Nickel Dissolved	ug/l	DETS 042	< 10	< 10	< 10
Selenium Dissolved	ug/l	DETS 017	< 3	< 3	< 3
Zinc Dissolved	ug/l	DETS 042	< 1	< 1	< 1
Sulphate	mg/l	DETS 055	11	21	46
Conductivity	uS/cm	DETS 009	659	1170	279
Hardness	mg/l	DETS 043*	260	330	110
Ammoniacal Nitrogen as N	mg/l	DETSC2207	0.76	0.77	2.5
pH		DETS 008	7.2	7.4	7.8
Acenaphthene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Acenaphthylene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Anthracene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	DETS 074*	< 0.01	0.01	< 0.01
Fluorene	ug/l	DETS 074*	0.01	< 0.01	0.01
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	< 0.01	< 0.01	< 0.01
Naphthalene	ug/l	DETS 074*	0.04	< 0.01	< 0.01
Phenanthrene	ug/l	DETS 074*	0.02	0.01	0.03
Pyrene	ug/l	DETS 074*	< 0.01	0.02	0.02
PAH	ug/l	DETS 074*	< 0.20	< 0.20	< 0.20
PRO (C6-C10)	ug/l	DETS 062*	< 1	< 1	< 1
DRO (C10-C24)	ug/l	DETS 051	< 10	16	16
Mineral Oils	ug/l	DETS 051	< 10	< 10	< 10
Phenol	ug/l	DETS 079*	0.97	< 0.50	0.53

Contract Number: PSL10/0346

Client's Reference:

Report Date: 04 March 2010

Client Name: Sirius Leeds
4245 Park Approach
Century Way
Thorpe Park
Leeds
LS15 8GB

For the attention of: Gemma Halliday

Contract Title: Canal Wood Industrial Estate, Chirk

Date Received: 1-Mar-10

Date Commenced: 1-Mar-10

Date Completed: 4-Mar-10

Notes: Observations and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:



R Gunson
(Director)

A Watkins
(Director)

D Lambe
(Senior Technician)

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

 Professional Soils Laboratory					<table border="1"> <tr> <td>Compiled by</td> <td>Date</td> <td>Checked by</td> <td>Date</td> <td>Approved by</td> <td>Date</td> </tr> <tr> <td><i>Mat</i></td> <td>3/3/10</td> <td><i>RC</i></td> <td>3/3/10</td> <td><i>RC</i></td> <td>3/3/10</td> </tr> </table>					Compiled by	Date	Checked by	Date	Approved by	Date	<i>Mat</i>	3/3/10	<i>RC</i>	3/3/10	<i>RC</i>	3/3/10
Compiled by	Date	Checked by	Date	Approved by	Date																
<i>Mat</i>	3/3/10	<i>RC</i>	3/3/10	<i>RC</i>	3/3/10																
CANAL WOOD INDUSTRIAL ESTATE, CHIRK.						Contract No:	PSL10/0346														
						Client Ref:	C3584														

(B.S. 1377 : PART 2 : 1990)

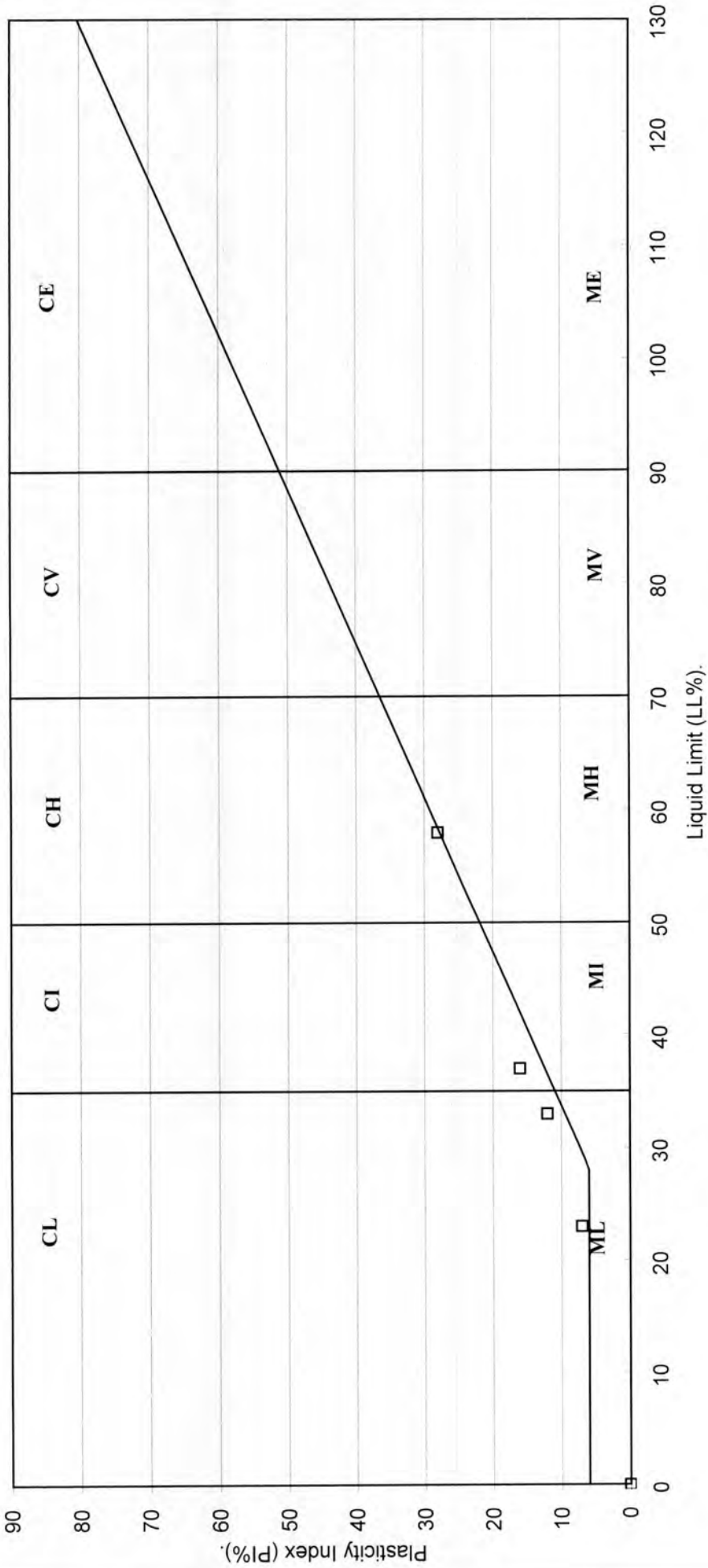
SYMBOLS: NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

PSI R002 Issue 1

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



PSL

Professional Soils Laboratory

Compiled by <i>Mar</i>	Date 3/3/10	Checked by <i>RC</i>	Date 3/3/10	Approved by <i>RC</i>	Date 3/3/10
CANAL WOOD INDUSTRIAL ESTATE, CHIRK.				Contract No: PSL10/0346	
				Client Ref: C3584	



APPENDIX F

GROUND GAS AND GROUNDWATER MONITORING RESULTS

Ground Gas and Groundwater Monitoring Record Sheet



JOB DETAILS:

Client: Richard Burbidge Ltd
Site: Canal Side Industrial Estate, Chirk
Date: 03/03/2010

Job No: C3584
Visit No: 1 of 4
Operator: GH

Project Manager: RH

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Initial	Steady			Peak	Steady								
WS3	ND	ND	ND	ND	ND	ND	3	3	ND	ND	20.2	20.2	0.5	NR	0.5	0.5	2		2.56	4.00				
WS4	ND	ND	ND	ND	0.1	0.1	1	1	ND	ND	20.2	20.2	65.0	NR	1.0	ND			2.20	4.00				
WS5	ND	ND	ND	ND	0.2	0.1	3	3	ND	ND	20.1	20.1	ND	NR	-0.5	ND			2.47	2.53				
WS6	ND	ND	ND	ND	0.1	0.1	3	3	ND	ND	20.2	20.2	ND	NR	ND	ND			2.10	2.54				
WS7	ND	ND	ND	ND	0.1	0.1	1	1	ND	ND	20.2	20.2	0.2	NR	0.5	ND			DRY	3.53				
Max	0	0	0	0	0.2	0.1	3	3	0	0	20.2	20.2	65	NR	1.0	0.5			2.56	4.00				
Min	0	0	0	0	0	0	1	1	0	0	20.1	20.1	0	NR	0	0			DRY	2.53				
GSV (l/hr)	0				0.0005																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground: ☒ Dry ☐ Moist ☐ Wet ☐ Snow ☐ Frozen
Wind: ☒ Calm ☐ Light ☐ Moderate ☐ Strong
Cloud cover: ☐ None ☒ Slight ☐ Cloudy ☐ Overcast
Precipitation: ☒ None ☐ Slight ☐ Moderate ☐ Heavy
Barometric pressure (mbar): ☐ 1010 Before ☐ 1010 After
Pressure trend: ☐ Falling ☐ Steady ☒ Rising

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GFM94
Gas concentration: **CH₄** 0.2% at 5%, 1.0% at 30%, 3.0% at 100% **CO₂** 0.1% at 10%, 3.0% at 30%, 3.0% at 100% **O₂** 0.50%
Gas Range: **CH₄** 0-100% **CO₂** 0-100% **O₂** 0-25%
Gas Flow range: +100 to -100 litres per hour
Differential Pressure: +1000 / -1000pb
Date of last calibration: 20/11/2009
Date of next calibration: 20/11/2010
PID: PhoCheck 3000
Calibrated range: 0.1 - 10,000 ppm
Calibration gas: i - C₂H₆
Response time: < 1 sec
Accuracy: (+/-) 5%
Date of last calibration: 03/11/2009
Date of next calibration: 03/11/2010

Ground Gas and Groundwater Monitoring Record Sheet



JOB DETAILS:

Client: Richard Burbidge Ltd
Site: Canal Side Industrial Estate, Chirk
Date: 10/03/2010

Job No: C3584
Visit No: 2 of 4
Operator: GH

Project Manager: RH

	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments	
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone		
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Initial	Steady			Peak	Steady									
WS3	ND	ND	ND	ND	0.5	0.5	1	1	ND	ND	20.6	20.6	0.9	NR	ND	ND			2.67	3.80					
WS4	ND	ND	ND	ND	1.5	1.5	1	1	ND	ND	17.3	17.3	120	NR	ND	ND			2.32	4.00					
WS5	ND	ND	ND	ND	0.1	0.1	1	1	ND	ND	20.9	21.0	ND	NR	ND	ND			2.47	2.52					
WS6	ND	ND	ND	ND	0.2	0.2	ND	ND	ND	ND	20.0	20.0	ND	NR	ND	ND			2.13	2.52					
WS7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	21.0	21.0	ND	NR	ND	ND			DRY	3.51					
Max	0	0	0	0	1.5	1.5	1	1	0	0	21.0	21.0	120	NR	0	0			2.67	4.00					
Min	0	0	0	0	0	0	0	0	0	0	17.3	17.3	0	NR	0	0			2.13	2.52					
GSV (l/hr)	0				0.0015																				

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground: ☒ Dry ☐ Moist ☐ Wet ☐ Snow ☐ Frozen
Wind: ☒ Calm ☐ Light ☐ Moderate ☐ Strong
Cloud cover: ☐ None ☐ Slight ☒ Cloudy ☐ Overcast
Precipitation: ☒ None ☐ Slight ☐ Moderate ☐ Heavy
Barometric pressure (mbar): ☐ 1018 Before ☐ 1015 After
Pressure trend: ☐ Falling ☒ Steady ☐ Rising

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GFM94
Gas concentration: **CH₄** 0.2% at 5%, 1.0% at 30%, 3.0% at 100% **CO₂** 0.1% at 10%, 3.0% at 30%, 3.0% at 100% **O₂** 0.50%
Gas Range: **CH₄** 0-100% **CO₂** 0-100% **O₂** 0-25%
Gas Flow range: +100 to -100 litres per hour
Differential Pressure: +1000 / -1000pb
Date of last calibration: 20/11/2009
Date of next calibration: 20/11/2010

PID: PhoCheck 3000
Calibrated range: 0.1 - 10,000 ppm
Calibration gas: i - C₂H₈
Response time: < 1 sec
Accuracy: (+/-) 5%
Date of last calibration: 03/11/2009
Date of next calibration: 03/11/2010

Ground Gas and Groundwater Monitoring Record Sheet



JOB DETAILS:

Client: Richard Burbidge Ltd
Site: Canal Side Industrial Estate, Chirk
Date: 18/03/2010

Job No: C3584
Visit No: 3 of 4
Operator: AC

Project Manager: RH

	GAS CONCENTRATIONS												VOLATILES		FLOW DATA			WELL AND WATER DATA					Comments	
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)		Response Zone
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Initial	Steady			Peak	Steady								
WS3	ND	ND	ND	ND	2.2	2.2	ND	ND	ND	ND	17.2	17.2	NR	NR	ND	ND			2.70	3.79				
WS4	ND	ND	ND	ND	2.0	2.0	ND	ND	ND	ND	15.7	15.7	NR	NR	ND	ND			2.30	3.86				
WS5	ND	ND	ND	ND	0.3	0.3	ND	ND	ND	ND	20.3	20.3	NR	NR	ND	ND			2.46	2.52				
WS6	ND	ND	ND	ND	0.3	0.3	ND	ND	ND	ND	20.2	20.2	NR	NR	ND	ND			2.10	2.50				
WS7	ND	ND	ND	ND	0.3	0.3	ND	ND	ND	ND	19.1	19.1	NR	NR	ND	ND			DRY	3.50				
Max	0	0	0	0	2.2	2.2	0	0	0	0	20.3	20.3	NR	NR	0	0			2.70	3.86				
Min	0	0	0	0	0.3	0.3	0	0	0	0	15.7	15.7	NR	NR	0	0			DRY	2.50				
GSV (l/hr)	0				0.0022																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground: ☒ Dry ☐ Moist ☐ Wet ☐ Snow ☐ Frozen
Wind: ☒ Calm ☒ Light ☐ Moderate ☐ Strong
Cloud cover: ☐ None ☒ Slight ☐ Cloudy ☐ Overcast
Precipitation: ☒ None ☐ Slight ☐ Moderate ☐ Heavy
Barometric pressure (mbar): ☐ 997 Before ☐ 997 After
Pressure trend: ☒ Falling ☐ Steady ☐ Rising

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GFM94
Gas concentration: **CH₄** 0.2% at 5%, 1.0% at 30%, 3.0% at 100% **CO₂** 0.1% at 10%, 3.0% at 30%, 3.0% at 100% **O₂** 0.50%
Gas Range: **CH₄** 0-100% **CO₂** 0-100% **O₂** 0-25%
Gas Flow range: +100 to -100 litres per hour
Differential Pressure: +1000 / -1000pb
Date of last calibration: 20/11/2009
Date of next calibration: 20/11/2010

Ground Gas and Groundwater Monitoring Record Sheet



JOB DETAILS:

Client: Richard Burbidge Ltd
Site: Canal Side Industrial Estate, Chirk
Date: 29/03/2010

Job No: C3584
Visit No: 4 of 4
Operator: JCC **Project Manager:** RH

	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Initial	Steady			Peak	Steady								
WS3	ND	ND	ND	ND	0.9	0.9	ND	ND	ND	ND	19.4	19.4	0.7	NR	ND	ND	ND	NA	2.53	3.70				
WS4	ND	ND	ND	ND	0.8	0.8	ND	ND	ND	ND	17.7	17.7	15.9	NR	ND	ND	ND	NA	1.97	3.80				
WS5	ND	ND	ND	ND	0.2	0.2	ND	ND	ND	ND	20.8	20.8	0.4	NR	ND	ND	ND	NA	2.48	2.52				
WS6	ND	ND	ND	ND	0.2	0.2	ND	ND	ND	ND	20.8	20.8	ND	NR	-4.3	ND	-27	5	2.08	2.50				
WS7	ND	ND	ND	ND	0.1	0.1	ND	ND	ND	ND	20.8	20.8	ND	NR	ND	ND	ND	NA	DRY	3.53				
Max	0	0	0	0	0.8	0.8	0	0	0	0	20.8	20.8	15.9	NR	-4.3	0			2.53	NR				
Min	0	0	0	0	0	0.1	0	0	0	0	17.7	17.7	0	NR	-4.3	0			1.97	NR				
GSV (l/hr)	0				0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground: ☐ Dry ☐ Moist ☒ Wet ☐ Snow ☐ Frozen
Wind: ☒ Calm ☐ Light ☐ Moderate
Cloud cover: ☐ None ☐ Slight ☐ Cloudy ☒ Overcast
Precipitation: ☐ None ☒ Slight ☐ Moderate
Barometric pressure (mbar): ☐ 983 Before ☐ 980 After
Pressure trend: ☒ Falling ☐ Steady ☐ Rising

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GFM94
Gas concentration: **CH₄** 0.2% at 5%, 1.0% at 30%, 3.0% at 100% **CO₂** 0.1% at 10%, 3.0% at 30%, 3.0% at 100% **O₂** 0.50%
Gas Range: **CH₄** 0-100% **CO₂** 0-100% **O₂** 0-25%
Gas Flow range: +100 to -100 litres per hour
Differential Pressure: +1000 / -1000pb
Date of last calibration: 24/11/2009
Date of next calibration: 24/11/2010

PID: PhoCheck 3000
Calibrated range: 0.1 - 10,000 ppm
Calibration gas: i - C₂H₆
Response time: < 1 sec
Accuracy: (+/-) 5%
Date of last calibration: 03/11/2009
Date of next calibration: 03/11/2010



APPENDIX G

SIRIUS GENERIC ASSESSMENT CRITERIA

SIRIUS GENERIC ASSESSMENT CRITERIA

LEGISLATIVE AND RISK ASSESSMENT FRAMEWORK

Under the Town and Country Planning Legislation, in order that a site may be redeveloped, the site needs to be suitable for its intended use. Part IIA of the Environmental Protection Act 1990 (EPA) provides a legal framework for identifying and dealing with contaminated land.

The Contaminated Land (England) Regulations 2000 were issued in accordance with the provision with the EPA. The regulations define Contaminated Land as land “in such condition, by reason of substances in, on, or under the land, that: significant harm is being caused, or pollution of controlled waters is being or is likely to be caused”.

In the UK the determination of whether land can be classified as contaminated land and whether land is suitable for its intended use are both based upon risk assessment. The methodology for undertaking such risk assessments has been published by DEFRA and the Environment Agency. This is based upon the concept of potential source-pathway-receptor relationships to determine whether there are pollutant linkages operating in a particular end use.

The framework for conducting site investigations, risk assessments and undertaking any necessary remedial works is presented in the Environment Agency report CLR11 “Model Procedures for the Management of Contaminated Land”. This presents a tiered approach to risk assessment: analysis of potential pollutant linkages via a Conceptual Site Model; comparison of contaminant concentrations with Soil Guideline Values or other Generic Assessment Criteria (Generic Quantitative Risk Assessment; GQRA); and, if required, a Detailed Quantitative Risk Assessment (DQRA) based on site-specific conditions.

Human Health

Where Soil Guideline Values (SGV) have been published by the Environment Agency, these have been used by Sirius as the basis for human health Generic Assessment Criteria (GAC).

For metals and metalloids, SGVs have been applied directly for the “Residential With Plant Uptake” and “Commercial” land uses as the SGVs are not sensitive to soil type nor soil organic matter content. For the “Residential Without Plant Uptake” land use, GAC values have been derived by Sirius using CLEA versions 1.04 and 1.06, the contaminant parameter values presented in the SGV reports and the relevant guidance presented in the Environment Agency Science Report SC050021 series. For organics, GAC values have been derived using the same approach for a sandy soil type at a range of SOM contents. The sandy soil type is conservative for the majority of soils (including made ground) encountered on historically contaminated sites.

In the absence of published SGVs, Sirius has normally derived GAC values using CLEA versions 1.04 and 1.06 and the authoritative parameter data presented in Nathanail *et al.* (2009) “The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment”, 2nd edition, Land Quality Press, Nottingham.

Where neither SGVs nor authoritative third party reports were available, GAC values were derived by Sirius using the CLEA version 1.04 and 1.06 models in accordance with the guidance published by the Environment Agency in the SC050021 report series. Full details of the derivation of these GAC values can be provided upon request.

Controlled Waters

The Environment Agency’s “Methodology for the Derivation of Remedial Targets for Soil and Groundwater to Protect Water Resources”, R&D Publication 20, provides a framework for assessing the potential for pollution of controlled waters and for deriving remedial target concentrations in soil and groundwater. In relation to the standards for controlled waters, there are currently no generic groundwater nor surface water standards that are applicable to all sites. However, the UK Drinking Water Standards and the Environment Agency’s national Environmental Quality Standards (EQS) are considered appropriate assessment criteria for many cases.

Soil Leachability

A screening assessment has been carried out using leachability data obtained from tests performed on soils at the site, to assess the potential risks to local controlled waters, including groundwater. The Environment Agency’s Remedial Targets

Methodology recommends the use of the BS EN 12475 leachate methods and this is adopted by Sirius.

The results of the leachate analysis have been compared to relevant criteria derived from Environment Agency (2002) "Technical Advice to Third Parties on Pollution of Controlled Waters for Part IIA, EPA1990" and The Water Supply (Water Quality) Regulations 1989, as amended (2001 and 2007).

Buried Concrete

A generic assessment is made in relation to the potential impact on buried concrete by reference to BRE Special Digest No. 1; 3rd Edition (2005) "Concrete in Aggressive Ground".

SIRIUS HUMAN HEALTH GENERIC ASSESSMENT CRITERIA – SOILS

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Source
	With Plant Uptake			Without Plant Uptake						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Metals/Metalloids										
Arsenic (inorganic)	32			35			640			Arsenic SGV ^(a)
Boron	290			10300			190000			Sirius/LQM/CIEH ^(b)
Cadmium ^(c)	10			18			230			Cadmium SGV
Chromium (III) ^(d)	3000			3000			30000			Sirius/LQM/CIEH
Copper	200 ^(a)			6200			72000			See note ^(a)
Lead	450			450			750			SGV10 ^(f)
Mercury (inorganic) ^(g)	170			240			3600			Mercury SGV
Nickel	130			130			1800			Nickel SGV
Selenium	350			600			13000			Selenium SGV
Vanadium	74			190			3200			Sirius/LQM/CIEH
Zinc	450 ^(a)			40000			600000			See note ^(a)
Other Inorganics										
pH	<5			<5			<5			
Total Sulphate	2400			2400			2400			BRE (2005) ^(h)
Water-Soluble Sulphate	0.5 g/l			0.5 g/l			0.5 g/l			BRE (2005)
Free Cyanide	34			34			1400			Acute risk calc. ⁽ⁱ⁾
Organics										
PAHs										
Acenaphthene	200	460	840	1400	2400	3200	77000	93000	100000	Sirius/LQM/CIEH
Acenaphthylene	160	380	710	1400	2400	3200	77000	93000	100000	Sirius/LQM/CIEH
Anthracene	2200	4900	8200	19000	22000	23000	520000	540000	540000	Sirius/LQM/CIEH
Benzo(a)anthracene	3.3	4.9	5.8	4.1	5.5	6.2	91	96	98	Sirius/LQM/CIEH
Benzo(a)pyrene	0.83	0.94	1.0	1.0	1.0	1.0	14	14	15	Sirius/LQM/CIEH
Benzo(b)fluoranthene	5.6	6.5	7.0	7.0	7.3	7.4	100	100	100	Sirius/LQM/CIEH
Benzo(g,h,i)perylene	44	46	47	47	47	48	660	660	660	Sirius/LQM/CIEH
Benzo(k)fluoranthene	8.5	9.6	10	10	10	10	140	140	140	Sirius/LQM/CIEH

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Source
	With Plant Uptake			Without Plant Uptake						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Chrysene	6.1	8.1	9.1	9.0	9.8	10	140	140	140	Sirius/LQM/CIEH
Dibenz(a,h)anthracene	0.77	0.86	0.90	0.87	0.91	0.93	13	13	13	Sirius/LQM/CIEH
Fluoranthene	260	460	630	980	1000	1000	23000	23000	23000	Sirius/LQM/CIEH
Fluorene	160	370	660	1500	2200	2600	61000	67000	70000	Sirius/LQM/CIEH
Indeno(1,2,3-cd)pyrene	3.2	3.9	4.1	4.2	4.4	4.4	61	62	62	Sirius/LQM/CIEH
Naphthalene	0.68	1.6	3.2	0.7	1.7	3.3	110	270	540	Sirius/LQM/CIEH
Phenanthrene	92	200	330	820	920	960	22000	22000	23000	Sirius/LQM/CIEH
Pyrene	560	1000	1500	2300	2400	2400	54000	54000	55000	Sirius/LQM/CIEH
BTEX and related										
Benzene	0.054	0.11	0.20	0.11	0.21	0.38	16	30	52	Sirius/CLEA ^{II}
Toluene	92	210	410	260	570	1070	840	1900	3600	Sirius/CLEA
Ethylbenzene	42	100	200	70	160	320	510	1200	2400	Sirius/CLEA
Xylenes (total) ^{III}	20	47	92	22	52	100	470	1100	2200	Sirius/CLEA
1,2,4-Trimethylbenzene	0.16	0.39	0.76	0.17	0.41	0.81	23	55	110	Sirius/CLEA/EIC ^{III}
Iso-propylbenzene	4.7	11	23	4.8	12	23	750	1800	3600	Sirius/CLEA/EIC
Propylbenzene	15	37	54	16	40	79	2200	5400	10400	Sirius/CLEA/EIC
Styrene	6.1	14	28	15	34	65	2000	4100	6900	Sirius/CLEA/EIC
TPH										
Aliphatic EC 5-6	17	28	47	29	53	93	2500	4300	7200	Sirius/LQM/CIEH
Aliphatic EC >6-8	36	77	150	70	160	300	5500	12000	22000	Sirius/LQM/CIEH
Aliphatic EC >8-10	8.8	22	42	18	44	88	1300	3200	6300	Sirius/LQM/CIEH
Aliphatic EC >10-12	43	110	210	90	220	440	6400	15000	29000	Sirius/LQM/CIEH
Aliphatic EC >12-16	350	850	1600	720	1600	2700	44000	73000	85000	Sirius/LQM/CIEH
Aliphatic EC >16-35	29000	48000	62000	44000	64000	74000	No GAC ^{III}	No GAC	No GAC	Sirius/LQM/CIEH
Aliphatic EC >35-44	29000	48000	62000	44000	64000	74000	No GAC	No GAC	No GAC	Sirius/LQM/CIEH
Aromatic EC >5-7	0.054	0.11	0.20	0.11	0.21	0.38	16	30	52	Set as benzene
Aromatic EC >7-8	92	210	410	610	1290	2300	35000	71000	120000	Sirius/LQM/CIEH

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Source
	With Plant Uptake			Without Plant Uptake			1% SOM	2.5% SOM	5% SOM	
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM				
Aromatic EC >8-10	14	34	68	32	78	150	2300	5400	10000	Sirius/LQM/CIEH
Aromatic EC >10-12	54	130	260	170	400	730	11000	23000	30000	Sirius/LQM/CIEH
Aromatic EC >12-16	140	300	520	1200	1600	1700	35000	37000	38000	Sirius/LQM/CIEH
Aromatic EC >16-21	250	480	710	1300	1300	1300	28000	28000	28000	Sirius/LQM/CIEH
Aromatic EC >21-35	890	1100	1200	1300	1300	1300	28000	28000	28000	Sirius/LQM/CIEH
Aromatic EC >35-44	890	1100	1200	1300	1300	1300	28000	28000	28000	Sirius/LQM/CIEH
Chlorinated Organics										
Chlorobenzene	0.14	0.31	0.61	0.14	0.31	0.61	33	75	150	Sirius/LQM/CIEH
Dichloromethane (DCM)	0.41	0.7	1.0	0.83	1.2	1.7	140	200	290	Sirius/CLEA/EIC
1,1-dichloroethane (DCA)	1.0	1.7	2.8	1.0	1.7	2.9	150	250	420	Sirius/CLEA/EIC
1,2-dichloroethane (DCA)	0.0022	0.0035	0.0055	0.0024	0.0037	0.0059	0.36	0.55	0.86	Sirius/LQM/CIEH
1,1-dichloroethene (DCE)	0.10	0.18	0.32	0.10	0.18	0.32	15	28	48	Sirius/CLEA/EIC
cis-1,2-dichloroethene (DCE)	0.05	0.08	0.14	0.05	0.09	0.19	7.7	14	24	Sirius/CLEA/EIC
trans-1,2-dichloroethene (DCE)	0.08	0.15	0.27	0.08	0.15	0.27	12	23	41	Sirius/CLEA/EIC
Pentachlorophenol	0.54	1.3	2.5	23	31	35	1200	1300	1400	Sirius/LQM/CIEH
1,1,1,2-tetrachloroethane	0.41	0.96	1.9	0.44	1.0	2	63	150	280	Sirius/LQM/CIEH
1,1,2,2-tetrachloroethane	0.78	1.7	3.2	1.1	2.4	4.4	160	330	600	Sirius/LQM/CIEH
Tetrachloroethene (PCE)	0.41	0.94	1.8	0.43	0.96	1.9	72	163	310	Sirius/LQM/CIEH
Tetrachloromethane	0.0078	0.017	0.033	0.0078	0.017	0.033	1.7	3.8	7.3	Sirius/LQM/CIEH
1,1,1-trichloroethane (TCA)	2.6	5.5	10	2.7	5.5	10	390	820	1500	Sirius/LQM/CIEH
1,1,2-trichloroethane (TCA)	0.30	0.64	1.2	0.36	0.76	1.4	51	110	200	Sirius/CLEA/EIC
Trichloroethene (TCE)	0.045	0.1	0.18	0.046	0.098	0.19	6.6	14	27	Sirius/LQM/CIEH
Trichloromethane	0.34	0.63	1.1	0.37	0.68	1.2	57	110	190	Sirius/LQM/CIEH
Vinyl Chloride	0.00024	0.00032	0.00045	0.00026	0.00034	0.00047	0.04	0.052	0.072	Sirius/LQM/CIEH
Miscellaneous Organics										
Carbon disulphide	0.047	0.094	0.17	0.047	0.094	0.17	7.1	14	27	Sirius/LQM/CIEH
Di-(2-ethylhexyl)-phthalate	280	610	1000	2700	2800	2800	85000	86000	86000	Sirius/CLEA/EIC

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Source
	With Plant Uptake			Without Plant Uptake			1% SOM	2.5% SOM	5% SOM	
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM				
MTBE	23	40	70	28	48	81	4000	6900	12000	Sirius/CLEA/EIC
Phenol	180	290	392	310	420	510	3200 ^(a)			Phenol SGV
Methylphenols (cresols), total [o]	77	170	330	3900	5600	6800	160000	160000	160000	Sirius/CLEA/EIC
2,4-dimethylphenol (m-xylene)	18	41	78	140	300	500	14000	22000	27000	Sirius/CLEA/EIC

All values are rounded to 1 or 2 significant figures.

Notes:

[a] SGV reports comprise the SGV, TOX and supporting contaminant-specific reports published by the Environment Agency as part of the Science Report SC050021 series. SGV values are applied directly as the criteria are not sensitive to soil type nor SOM content. For the "Residential Without Plant Uptake" land use, GAC values have been derived by Sirius using CLEA version 1.06 and the published model parameter and chemical property data.

[b] Calculated by Sirius for sandy soil in CLEA version 1.06 using the toxicological, model parameter and chemical property data presented in Nathanail et al. (2009) "The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment", 2nd edition, Land Quality Press, Nottingham.

[c] The SGV and GAC values for cadmium are based on data for soils having a pH value in the range 6-8. Caution should be applied in applying them at pH values outside this range, especially at pH values <5.

[d] GAC for Cr (III) also applied for total chromium, as hexavalent chromium does not persist to a significant extent in soils under normal conditions (further information can be provided upon request). A SSAC will be required for sites where historical information indicate that Cr (VI) was handled or generated on site, when analytical data demonstrate Cr (VI) is present or when soil conditions indicate that Cr (VI) will persist in situ.

[e] For the 'Residential with Plant Uptake' end-use, the GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989). The equivalent GAC values for human health protection in this land-use are: Cu, 2300 mg/kg; Zn, 3700 mg/kg (LQM/CIEH values - Nathanail et al., 2009). The GAC values for the other land uses presented are human health-based criteria presented in Nathanail et al. (2009). In cases where soils in those land uses may be used for vegetation purposes, then the 'Residential with Plant Uptake' GAC values may be applied. However, for all cases where the GAC is set on the basis of potential phytotoxicity, alternative criteria will be derived where elevated natural background soil concentrations of these metals have been demonstrated.

[f] SGV10 has been retained as the most appropriate source of a GAC for lead, given the specific blood lead calculation methods and input data applied.

[g] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: "...the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low" (SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[h] BRE (2005) Special Digest 1, 3rd Edition "Concrete in aggressive ground". Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[i] GAC calculated for acute risk. Further information can be provided upon request.

[j] Calculated by Sirius for all land uses using CLEA version 1.06 and the toxicological, model parameter and chemical property data published by the Environment Agency (Science Report SC050021 Series).

[k] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[l] Calculated by Sirius for all land uses using CLEA version 1.06 and the toxicological, model parameter and chemical property data published by CL:AIRE in association with the AGS and EIC (December 2009).

[m] "No GAC" indicates that no value has been specified for this land use as the HCV cannot be exceeded at achievable soil concentrations.

[n] The GAC for Commercial/Industrial land use is based on the threshold protective of direct skin contact with phenol (See SR050021/Phenol SGV).

[o] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[p] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the 'Inert' waste threshold and should be considered as for information purposes only.

[q] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of chronic human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

CONTROLLED WATERS GAC (SCREENING) VALUES FOR FRESH WATER

Parameter	Generic Assessment Criterion (µg/l unless otherwise stated)
Metals/Metalloids	
Arsenic	50 ^(a) 10 ^(b)
Cadmium	5 ^(a, b)
Chromium ⁺	5-250 ^(a) 50 ^(b)
Lead ⁺	4-250 ^(a) 25 ^(b)
Mercury	1 ^(a, b)
Boron	2,000 ^(a) 1,000 ^(b)
Selenium	10 ^(b)
Copper ⁺	1-28 ^(a) 2,000 ^(b)
Nickel ⁺	50-200 ^(a) 20 ^(b)
Zinc ⁺	8-500 ^(a) 5,000 ^(b)
Inorganics	
Sulphate	400 mg/l ^(a) 250 mg/l ^(b)
Ammonia (NH ₃ as N)	15 ^(a)
Ammonium (as NH ₄ ⁺)	500 ^(b)
Organics	
Total TPH	10 ^(b)
Naphthalene	10 ^(a)
Benzo(a)pyrene	0.01 ^(b)
Benzo(b)fluoranthene*	0.1 ^(b)
Benzo(k)fluoranthene*	0.1 ^(b)
Benzo(ghi)perylene*	0.1 ^(b)
Indeno(1,2,3-cd)pyrene*	0.1 ^(b)
Sum PAH-4*	0.1 ^(b)
Benzene	30 ^(a) 1 ^(b)
Toluene	50 ^(a)
Ethylbenzene	20 ^(c) 300 ^(d)
Xylenes (sum)	30 ^(a)
MTBE	2,600 ^(f) 200 ^(e)
Phenol	30 ^(a) 0.5 ^(b)
Others	
Electrical Conductivity	2,500 µS/cm @ 20°C ^(b)
pH	6-9 pH units ^(g)

(a) Environment Agency (2002) Environment Agency technical advice to third parties on pollution of controlled waters for Part IIA of the EPA 1990. Freshwater Environmental Quality Standards (EQS).

(b) The Water Supply (Water Quality) (Amendment) Regulations 2001 and 2007.

(c) SEPA (2004) Environmental Quality Standards, Issue No 1, October 2004

(d) World Health Organisation (WHO) Guidelines for Drinking Water Quality, 1984. Health value.

(e) Based on a 5-fold dilution of the USEPA (1997) Drinking Water Advisory on MTBE value for taint, EPA-822-F-97-009. Full justification can be provided on request.

(f) EU Risk Assessment Report (2002) MTBE, 3rd Priority List, Volume 19. PNEC value for fresh and sea water life.

(g) The Surface Waters (Fishlife) (Classification) Regulations 1997.

+ Hardness related (Lowest values are applied in the absence of site-specific hardness data).

* The sum of all 4 individual PAHs marked with an asterisk (*)

CONTROLLED WATERS GAC (SCREENING) VALUES FOR SALT WATER

Parameter	Generic Assessment Criterion (µg/l unless otherwise stated)
Metals/Metalloids	
Arsenic	25 ^(a)
Cadmium	2.5 ^(a)
Chromium	15 ^(a)
Lead	25 ^(a)
Mercury	0.3 ^(a)
Boron	7,000 ^(a)
Selenium	10 ^(b)
Copper	5 ^(a)
Nickel	30 ^(a)
Zinc	40 ^(a)
Inorganics	
Sulphate	250 mg/l ^(a, b)
Ammonia (NH ₃ as N)	21 ^(a)
Organics	
Total TPH	10 ^(b)
Naphthalene	10 ^(a)
Benzo(a)pyrene	0.01 ^(b)
Benzo(b)fluoranthene*	0.1 ^(b)
Benzo(k)fluoranthene*	0.1 ^(b)
Benzo(ghi)perylene*	0.1 ^(b)
Indeno(1,2,3-cd)pyrene*	0.1 ^(b)
Sum PAH-4*	0.1 ^(b)
Benzene	30 ^(a)
Toluene	40 ^(a)
Ethylbenzene	20 ^(c)
Xylenes (sum)	30 ^(a)
MTBE	2,600 ^(d)
Phenol	30 ^(a)
Others	
Electrical Conductivity	2,500 µS/cm @ 20°C ^(b)
pH	6-9 pH units ^(e)

(a) Environment Agency (2002) Environment Agency technical advice to third parties on pollution of controlled waters for Part IIA of the EPA 1990. Saltwater EQS.

(b) The Water Supply (Water Quality) Regulations 1989 and (Amendment) 2001 and 2007.

(c) SEPA (2004) Environmental Quality Standards, Issue No 1, October 2004.

(d) EU Risk Assessment Report (2002) MTBE, 3rd Priority List, Volume 19. PNEC value for fresh and sea water life.

(e) The Surface Waters (Fishlife) (Classification) Regulations 1997.

* The sum of all 4 individual PAHs marked with an asterisk (*)