



Geo-Environmental Report

Public House, Drive-through and Petrol filling Station Development,
Holt Road Wrexham

LL13 9SA

for:

Liberty Properties Developments LTD



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Project:	Public House, Drive-through and Petrol Filling station, Holt Road, Wrexham LL13 9SA
For:	Liberty Properties Developments LTD
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Executive Summary

Proposed Development

A Public House and Petrol filling station and drive through are proposed.

Investigation

Site works were undertaken by Enzygo Ltd. in September 2014, together with a desk study, monitoring and preliminary soil infiltration testing.

Ground Conditions

Ground conditions were noted to comprise Made Ground over Glaciofluvial materials over weathered Salop Formation (sandstone). Groundwater was not encountered during the site investigation.

Contamination

No evidence of contamination has been identified from the desk study or ground investigation.

Foundations

Ground Improvement techniques are recommended due to strength of the underlying Glaciofluvial materials. The use of vibro techniques will remove the potential for unacceptable settlements and will allow shallow foundations to be adopted. Given the variable strength of the materials reinforcement is recommended. Given the thickness of the Made Ground and strength of the Fluvial Glacial materials a suspended floor slab is recommended

Re-use of Materials

Made Ground is not considered suitable for re-use as an engineered fill.

Pavement Design

A design CBR of 5% is recommended for the underlying natural materials. Soils are not considered to be frost susceptible.

Buried Concrete

It is considered that Class AC-1s conditions of Special Digest 1 can be used.

Drainage

A preliminary infiltration will be carried out from the borehole WS2 installation which gave a soil infiltration rate of $1.8 \text{ E}^{-4} \text{m/s}$.

Gas and Radon

Basic radon protection measures are required and gas monitoring identifies that characteristic situation 1 applies.

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1.0 INTRODUCTION

Background

- 1.1 Enzygo Limited has been commissioned by Simpson Associates Limited to prepare a Geo-Environmental Report for a proposed Public House and Petrol Filling Station and drive through development off Holt Road, Wrexham. LL13 9SA.

Proposed Development

- 1.1 The proposed development is shown on the Proposed Site Plan prepared by Axiom (3621/P104). This supersedes the original development drawing provided The Harris Partnership (1207NES-002). The updated proposed layout drawing has been incorporated in to the site plan prepared by Enzygo, which is presented as Drawing CRM.413.106.GE.D.001.

Objectives

- 1.2 The objectives of the study are to:
- Review historical plans, geology, hydrogeology, site sensitivity, mining records and any local authority information available in order to complete a Desk Study;
 - Review any existing site investigation report;
 - Undertake a targeted ground investigation;
 - Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors; and
 - Provide a factual and interpretative report relating to the desk study and site investigations. Provide a revised conceptual model and recommendations on any potential development issues and mitigation measures, where appropriate.
 - Provide geotechnical recommendations in relation to foundations and infrastructure.

Risk Classification

- 1.3 Enzygo has utilised the available information, together with our experience to assess the likely risks to development from land quality issues. Definitions of the risk terms used are provided on the following table.

Risk	Description
Negligible	No contamination risk has been identified which is likely to affect development.
Low	No significant contaminated land risks have been encountered affecting development and a low risk that remediation will be required.
Low-Moderate	There are unlikely to be significant contaminated land issue associated with the site which will adversely affect its re-development. However, minor or localised contamination may be present requiring remediation. Remediation should be possible under a discovery strategy and with a call out service.
Moderate	Some potential contaminated land risks have been encountered or identified which may affect re- development. The risks identified are unlikely to affect the entire site or preclude development. Remediation is considered feasible as part of the development process and no further investigation is considered necessary.
Moderate-High	Some potentially significant contaminated land risks have been identified at the property that requires remediation. It is recommended that a separate remedial methodology is prepared supported by a site specific risk assessment
High	Significant potential contaminated land risks have been identified and remediation is required supported by further intrusive ground investigation, risk assessment and remedial design.

- 1.4 Where adverse risks from ground instability are identified these are discussed within the report.

2.0 SITE SETTING

Site Description

Item	Description
Site Address	Holt Road, Wrexham LL13 9JB
National Grid Reference	335930,351856.
Site Area	Approximately 2.2ha

Current Site Description

- 2.1 The following site description has been compiled from the site inspection undertaken by an experienced environmental consultant, together with current maps and aerial photographs.
- 2.2 The site is predominantly rectangular in shape with the existing access through a padlock gate and off the roundabout to the south west of the site.
- 2.3 The site is predominantly grass with a tree lined north western boundary.
- 2.4 The site is vegetated with trees along the eastern and southern boundary of the site.
- 2.5 The A5156 is shown to the west of the site and the A534 is shown to the south of the site. The roundabout between the two is located to the south west of the site.
- 2.6 Wrexham Golf Course is shown to the north and east of the site.
- 2.7 The Petrol filling station is proposed to the north of the site with the Public House to the south and the Drive-through development in the centre. The remaining site is to be covered with hardstanding and car parking.
- 2.8 No evidence of contamination was noted on site.

Surrounding Area

- 2.9 Land uses surrounding the site are summarised as follows:

Direction	Land Use
South	Road, fields
East	Tree lined boundary and Golf course
West	Road and Residential Properties
North	Golf course.

- 2.10 No significant contamination risk to the site is noted.

3.0 SITE HISTORY

- 3.1 A review of historical Ordnance Survey maps and information pertinent to the site and within a 250m radius is summarised below:

Potentially Contaminative Historical Land Use		
Map Edition	Site	Surrounding Area
1874	Open fields. A track dissects the site from the south west to the north east. A well is shown in the northern corner of the site.	Open fields. Pond shown 0m NE of the site. Two ponds are shown 90m NW. Un referenced road shown on the southern boundary of the site.
1899-1949	Well is no longer shown.	No changes.
1959-1961	Track is no longer shown.	Ponds 90m NW no longer shown. Pond 0m NE shown as rough vegetation. Un referenced road to the south is shown as the A534. A track is shown 5m E of the site accessing a club house 200m NE associated with a Golf course 0m N.
1964-1977	Open site.	A534 is shown as Holt Road.
1982-1984	Open site (current configuration)	Roundabout shown 0m SW and the A5156 shown 0m W and forms the western boundary of the site. Residential development 200m SW shown in 1984.
1990	No changes.	Residential development 100m W.
1992 - 1995	Foot path shown dissecting the site from the SW to NE.	0m N shown as Golf Course.
2002-2014	No changes.	No changes

- 3.2 There are no significant risks identified. The risk of the ponds has been dismissed given the age of the backfill pre 1900, however gas monitoring is to be undertaken as part of the investigation.

4.0 ENVIRONMENTAL SETTING

Ground Conditions

- 4.1 The British Geological Survey (BGS) indicates that the site is underlain by the following geological sequence:

Geological Unit	Type	Description	Aquifer Classification
Drift.	Glaciofluvial sheet Deposits.	Sand and gravel.	Secondary A.
Solid.	Salop Formation	Mudstone, sandstone and conglomerate.	Secondary A.

- 4.2 There are two records of Artificial/Made Ground within 500m of the site. These are located 341m north and 432m east and have been described as worked grounds. Given the distance to the site these are not considered a risk to the site.
- 4.3 There are no records of landslip within 500m of the site.
- 4.4 Records of background soil chemistry do not indicate any elevated concentrations.
- 4.5 BGS boreholes records within 250m of the site indicate the site to be underlain by Glaciofluvial sand and gravel deposits over Salop Formation mudstone sandstone and conglomerate.

Groundwater

- 4.6 Permeability of the Drift materials is high to very high indicating the granular nature of the materials. Permeability of the Solid Geology is low to moderate and is fracture based reflecting the variable nature of the Mudstone and Sandstone. Based on the aquifer designation as a Secondary A, it is considered that the soils will be moderate permeability sandstone and conglomerates with inter-bedded low permeability Mudstone however localised bands of Sandstone and conglomerate and fractures could contain waters.
- 4.7 The Ground Sure Report indicates the site is not located within any source protection zones.
- 4.8 There is one groundwater abstraction licenses within 1000m of the site. This is located 899m east and is from a single borehole used for mineral washing. Given the distance to the site and the variable permeability of the materials this is not considered to be of a risk from the site.

- 4.9 BGS records show the site has a limited potential risk to groundwater flooding based on geological conditions.

Coal Mining

- 4.10 The groundsure report has identified coal mining within 1000m of the site, however this is associated with the Pennine Lower Coal Measures which are recorded as outcropping over 2km to the west with the closest recorded shaft 2km west of the site. Given this the risk to coal mining underneath the site is limited. The coal workings are separated from the sandstones by a major fault line, indicating that should coal be underneath the site this will be very deep and therefore no significant risk to the site.

Non Coal Mining and Cavities

- 4.11 The groundsure report has not identified any areas of non coal mining activities or cavities within 1000m of the site.

Ground Workings

- 4.12 There is no active ground workings within 250m of the site. The closest is located 651m north east and is associated with an opencast sand and gravel quarry. Given the distance to the site this is not considered a risk to the site.
- 4.13 The following historic ground workings are identified within 250m of the site:

Details	Distance	Notes
Fish Ponds	Om and 227m S.	There is a potential risk of gas associated with the backfilled pond materials, however given the historical date of this pond (1872-1900) it is unlikely to have been infilled with waste materials.

- 4.14 The pond has been described in the historical section.

Hydrology

- 4.15 No watercourse on or adjacent to the site. The nearest surface water feature is recorded 99m south of the site. There are no recorded watercourses within 500m of the site. Given the distance there is no risk to the site.
- 4.16 Environment Agency records show that the site is not located within a flood risk area.

Radon Risk Potential

- 4.17 The Groundsure GeoInsight Report indicates that the site is situated within a Radon Affected Area therefore basic radon protection measures are necessary.

Natural Hazards Finding

- 4.18 BGS information presented within the Groundsure report identified the following ground conditions:

Hazard	Risk Designation (Groundsure)
Coal Mining	None.
Collapsible Ground	Very low.
Compressible Ground	Negligible.
Ground Dissolution	Negligible.
Landslide	Very Low.
Running Sand	Very Low.
Swelling / Shrinking Clay	Negligible.

- 4.19 No risks were identified on site.

Sensitive Land Uses

- 4.20 The site comprises a Public House, drive- through and Petrol filling station and is considered to be of low sensitivity.
- 4.21 English Heritage identifies no historical features on the site.

Environmental Sensitivity

- 4.22 Overall the site is currently considered to be of Low to Moderate sensitivity due to the following:
- The underlying stratum is classified as Secondary A aquifer with permeable layers which support water supplies at a local scale as well as river base flow however there are no rivers recorded within 500m of the site.
 - There are no watercourses on or adjacent to the site;
 - The site is not within any source protection zones;
 - No ecological designations on the site.

- 4.23 The proposed end use of the site is a commercial end use, as such future sensitivity will be low for end users.

Industrial Land Uses

- 4.24 Given the predominantly residential surrounding land use industrial land uses within 250m of the site are limited to an Electrical substation 110m north west. Given the distance of the Electrical substation it is considered there is no significant risk to the site.
- 4.25 The Groundsure Report indicates that there are no active fuel stations within 500m of the site.
- 4.26 Records indicate the presence of no high pressure underground oil/gas pipelines associated with the site.
- 4.27 No new risks are identified from the register of industrial land uses.

5.0 CONSULTATIONS

Regulatory Database

- 5.1 The following information has been obtained from a commercially available environmental database.

Environmental Permits, Incidents and Registers	0 -250m	250-500m	Details
Site determined as contaminated land	0	0	Not applicable.
Authorised industrial processes	0	0	Not applicable.
Registered radioactive substances	0	0	Not applicable.
Enforcements, prohibitions or prosecutions	0	0	Not applicable.
Pollution Incidents	0	0	Not applicable.
Consents issued under the Planning (Hazardous Substances) Act 1990	0	0	Not applicable.
Control of Major Accident Hazard (COMAH)/ Notification of Installations Handling Hazardous Substances (NIHHS) sites	0	0	Not applicable.
Records of Licensed Discharge Consents	0	0	Not applicable.

- 5.2 No risks are identified from the regulatory data base.

Landfill Sites and Waste Treatment Sites

- 5.3 There are no operational landfill sites within 1000m of the site.
- 5.4 There are two historical landfills recorded within 1000m of the site. These are located 472m east and 689m north east, with the closest being used for all types of waste. This landfill was surrendered in 1988. Given the distance of the landfills there is no risk to the site.
- 5.4 There are no operational and non-operational waste treatment, transfer or disposal sites within 500m site.
- 5.5 No significant risks are identified from waste activities.

6.0 PRELIMINARY CONCEPTUAL MODEL

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Human Health					
Asbestos, metals and hydrocarbons.	Unforeseen Contamination.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed	Normal construction PPE will address risk under CDM.
			Site users.	Negligible	Low sensitive end use.
Hydrocarbon and metals.	Migration from off-site sources.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No encountered spillages.
			Site users.		
Ground Gas.	Historical Pond Om NE	Inhalation & Explosive	Construction Workers.	Dismissed	Normal construction PPE will address risk under CDM.
			Site users.	Low	Potential for gas risk from the backfilled pond on the NE boundary
	Historic Landfills.	Inhalation & Explosive.	Construction Workers.	Dismissed.	Source is identified as greater than 250m from the site
			Site users.		
Groundwater					
Hydrocarbon and metals.	Potential spillage on site.	Vertical Migration.	Groundwater.	Negligible	Significant source unlikely. No evidence of spillages.
Surface Water					
Hydrocarbon and metals.	Potential spillage on site.	Horizontal Migration.	River Network.	Dismissed.	No surface water on or adjacent to the site
Environmental Receptors					
On site contaminants		Ingestion dermal and inhalation.	Ecology.	Dismissed.	No sensitive ecology designation.
		Direct.	Archaeology.	Dismissed.	None present.
		Direct.	Geology.	Dismissed.	Secondary A.
		Phytotoxic.	Woodland.	Dismissed.	None present.
		Phytotoxic.	Crops.	Dismissed.	None present.
		Ingestion dermal and inhalation.	Livestock.	Dismissed.	None present.
Building Services					
On site contaminants		Direct.	Historic Buildings.	Dismissed.	No receptors.
		Direct.	Proposed Buildings.	Dismissed.	No sources identified.
		Permeate into pipework.	Water Pipes.	Dismissed.	No sources identified.

6.1 There is a negligible risk associated with potential contaminants within the Made Ground and the potential for these to affect groundwater.

6.2 There is low risk of gas affecting the site from the backfilled pond to the NE of the site. However, given the age of backfill pre 1900 the risk is considered as low. Gas monitoring should be undertaken.

7.0 SITE INVESTIGATION

General

- 7.1 A ground investigation was undertaken by Enzygo Limited in September 2014 which specifically targets the proposed positions of the original proposed development and the surrounding proposed car parking. This layout has been since modified with the additional of a drive-through building located in the previous car parking.
- 7.2 Locations of exploratory holes advanced by Enzygo Limited are presented on Drawing CRM.413.106.GE.D.001. This was based on the previous layout.
- 7.3 Site works were undertaken using window sampling boreholes. The scope of the investigation works are outlined below:

Rational	Exploratory Holes	Notes
Groundwater and gas	WS2, WS3, WS6 & WS7	Installation.
Foundations to Proposed Petrol filling Station	WS1 to WS4	Below building.
Foundations to the proposed Public House	WS5 to WS8	Below building.
Site coverage	WS1 to WS8	
Preliminary Soil Infiltration	WS2	Preliminary Soakaway.
Car parking	HP1	

- 7.4 The density of granular soils and shear strength of the cohesive soils was measured using a Standard Penetration Tests (SPT). Results are included on the logs presented in Appendix B.
- 7.5 Representative soil samples were collected for chemical and geotechnical testing. Soil samples destined for chemical analysis were collected in appropriate containers provided by the analytical laboratory. Samples were stored in cool boxes prior to dispatch to the laboratory for analysis. All samples were collected using appropriate sampling equipment that was cleaned at each sampling location.
- 7.6 Generally samples were collected from Made Ground, which may contain potential inclusions of contaminating materials and also materials displaying evidence of potential contamination.
- 7.7 In the absence of any evidence of contamination samples were collected near surface as this material is more likely to be contaminated by surface spillages and also will potentially be in contact with future residents.

Preliminary Soakaway Test

- 7.8 A preliminary soakaway test was undertaken in WS2 installations.

Laboratory Testing

- 7.9 Samples for geotechnical testing were sent to the laboratories of GSSL, which is UKAS accredited, for the following analysis:
- Particle Size Distribution (PSD);
 - California Bearing Ration (CBR) undertaken on re-compacted samples to mimic properties following proof rolling; and
 - Soluble sulphate and pH.
- 7.10 Samples for chemical analysis were sent to the Environmental Laboratories Ltd who are NAMAS and MCERTS accredited. Samples were tested for the CLEA metal suite, pH, sulphate, cyanide, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAH), organic carbon, banded Total Petroleum Hydrocarbon (TPH) and asbestos screen. Two stage WAC tests were also undertaken to assist with waste classification.

8.0 GROUND AND GROUNDWATER CONDITIONS

Summary of Ground and Groundwater Conditions

- 8.1 Ground and groundwater conditions have been assessed by Enzygo Limited investigation for the previous layout. A subsequent layout has been provided and the ground conditions interpreted for the additional drive-through building located in the centre of the site. Given there is little variation across the site, the ground conditions identified from this investigation can be interpreted for the drive-through buildings as being similar to the ground conditions to the north and south of this area. The investigation undertaken confirm the published geology and identify the following strata:

Strata	Summary Description	Thickness (m)
Made Ground - General	Up to two layers of dark brown sand with occasional gravel sized fragments of coal.	0.3 to 0.5
Made Ground – WS7	Tarmac over sub base	0.5
Glaciofluvial sand and gravel	Medium dense locally loose red and brown gravelly sand and sandy gravel.	2.1 to in excess of 4.00m
Salop formation	Dense red and brown slightly silty clayey sand (weathered sandstone)	Not proved
Groundwater	Not encountered	

- 8.2 Details of the ground and groundwater conditions encountered are given on the exploratory hole records included in Appendix B and are summarised in the sections below:

Made Ground

- 8.3 Made Ground was encountered across the site the thickness of the materials is dependant on the thickness of the topsoil like materials which ranges in thickness from 0.30m to 0.50m. The Made Ground generally comprised two layers of dark brown sand with occasional gravel sized fragments of coal. We have termed it Made Ground because it has shown signs of reworking associated with its agricultural usage and has not been classified as Topsoil in accordance with BS3882.
- 8.4 In Boreholes WS7 a layer of tarmac over sub-base was encountered to a depth of 0.50m this replaced the topsoil like materials.

Glaciofluvial materials

- 8.5 The Glaciofluvial materials comprised medium dense red and brown gravelly silty sand to medium dense sandy fine to medium subrounded gravel of sandstone and quartz. These materials were proved as being loose to north of the site at 2.00m bgl.

Salop Formation

- 8.6 The Salop formation comprised dense red and brown silty and clayey sand and was generally encountered below depths ranging from 2.10m bgl to 2.50m bgl with the exception of the northern part of the site where these materials were not encountered in three boreholes (WS2, WS3 and WS4).

Visual and Olfactory Evidence of Contamination

- 8.7 No visual or olfactory evidence of contamination was encountered during the site works.

Soil Strength

- 8.8 Consistency of soils has been assessed using the Standard Penetration Test (SPT) results and the Glaciofluvial materials is generally medium dense becoming loose below 2.00m bgl and the Salop formation (weathered sandstone) is generally dense.

Groundwater

- 8.9 Groundwater was not encountered in the site works. Subsequent monitoring visits are summarised below:

Exploratory Hole	Depth m(bgl)			
	Site Works	18-9-14	25.9.14	02.10.14
WS2	Dry	Dry	Dry	Dry
WS3	Dry	Dry	Dry	Dry
WS6	Dry	Dry	Dry	Dry
WS7	Dry	Dry	Dry	Dry

Ground Gas

- 8.10 Ground gas was monitored during the return visits and the results are summarised on the table below:

Exploratory Hole	Atmos pressure (Mb)	Flow (l/hr)	CH4		CO2		O2
			Concentration (%)	GSV (l/hr)	Concentration (%)	GSV (l/hr)	Concentration (%)
26-8-14							
WS2	1009	<0.1	0.3	<0.0003	1.7	<0.0017	18.8
WS3	1009	<0.1	<0.1	<0.0001	3.3	<0.0033	17.7
WS6	1010	0.5	<0.1	<0.0005	2.2	<0.011	18.9
WS7	1010	0.9	<0.1	<0.0009	3.4	<0.03	17.8
02.09.14							
WS2	1009	<0.1	0.2	<0.0002	1.4	<0.0014	19.6
WS3	1009	<0.1	0.2	<0.0002	2.7	<0.0027	18.7
WS6	1009	<0.1	0.2	<0.0002	1.8	<0.0018	19.5
WS7	1009	<0.1	0.1	<0.0002	1.6	<0.0016	19.1
09.09.14							
WS2	1019	<0.1	0.2	<0.0002	1.4	<0.0014	19.7
WS3	1019	<0.1	0.1	<0.0001	2.9	<0.0029	18.2
WS6	1019	<0.1	0.1	<0.0001	1.6	<0.0016	19.6
WS7	1019	<0.1	0.1	<0.0001	2.6	<0.0026	18.2

- 8.11 Where gas concentrations exceed 1% by volume methane or 5% by volume carbon dioxide the concentrations are coloured yellow. If concentrations are lower the values are coloured green. Where gas flux meets characteristic situation 1 the GSV is coloured green. The GSV is coloured yellow for Characteristic Situation 2 and red for Characteristic Situation 3 and above.

Preliminary Soil Infiltration

- 8.12 A preliminary soakaway test was undertaken within window sampler installation (WS2). An assessment of the likely soil infiltration has been undertaken above the groundwater level.

9.0 CONTAMINATION ASSESSMENT

General

- 9.1 A Tier I risk assessment has been undertaken using available and current screening values for human health and where appropriate controlled waters. The risk assessment is undertaken based on the findings of the preliminary conceptual model presented in Section 6. Based on the contamination testing and Tier I assessment a revised Conceptual Model has been prepared, which is presented later in this section.
- 9.2 Where significant risks are identified remedial measures are recommended.

Human Health

- 9.3 Assessment of the risks to human health has been undertaken by comparing the soil quality data with reference values obtained from the Contaminated Land Exposure Assessment (CLEA), Soil Guideline Values (SGV) and General Acceptance Criteria (GAC) published by LQM/CIEH. A summary table of the reference values is included in Appendix C.
- 9.4 Where an exceedance is identified the risk is assessed by considering the sensitivity of the proposed development and the potential pathway. Given the limited contact time by site users it is considered that the GAC values for commercial end use is applicable for the proposed development.
- 9.5 Results of the chemical testing are included in Appendix C. In addition to the laboratory sheets there is a sheet with the results coloured. Where results are coloured green these are below the GAC. Values coloured red exceed the GAC.
- 9.6 The soil quality analysis does not show any exceedances of the reference values for commercial end use. Asbestos fibres were not detected.

Controlled Waters

- 9.7 Where groundwater samples have been analysed the results are compared against reference values. These reference values are summarised in Appendix C and are taken from Fresh Water Environmental Quality Standards (EQS), UK Drinking Water Standards and World Health Organisation (WHO) values for Drinking Water.
- 9.8 Where the controlled waters receptor is a surface water course then the EQS are used as the primary reference value. Drinking Water Standards and WHO values are used where EQS

values are not available. An assessment of likely risk is then made based on a source-pathway-receptor model. Where the receptor is potable groundwater resources the Drinking Water Standards and WHO values are used.

- 9.9 No significant mobile source has been identified on site. As such risk to groundwater is dismissed.
- 9.10 The risk to surface waters was dismissed within the Preliminary Conceptual Model and no new risk has been identified.

Ground Gas

- 9.11 Following the guidance provided in CIRIA C665 an initial assessment is undertaken to determine if there are any significant sources of potential ground gas. Such sources include landfills, organic clays and Made Ground incorporating putrescible materials such as rags, paper and wood. Where no significant source is identified no further assessment is necessary.
- 9.12 This approach is further supported by RB17, published by CL:AIR which confirms that gas monitoring is not generally required on sites where Made Ground is less than 5m thick and with low organic matter content or on natural soils such as Alluvial Clays and Chalk as the ground gas sources are not considered significant. The supplementary guidance given in RB17 also takes account of the current requirements for sealing of floor slabs and substructures to meet air tightness requirements under Part L of the Building Regulations which were not considered in CIRIA C665. The advice given in RB17 is consistent with the Local Authority Guide to Ground Gas published by CIEH.
- 9.13 Where significant potential risk from ground gas has been identified from the Initial Conceptual Model and the intrusive ground investigation works ground gas monitoring is undertaken and the results of the monitoring are compared against the Gas Screening Values given in CIRIA Report C665. From this the Characteristic Situation is identified and remedial measures proposed.
- 9.14 When assessing the risk and type of remedial measures appropriate consideration is given to the likely construction of the development, the nature of the gas posing a risk and the nature of the likely source. The use of engineering judgement when determining risk from ground gas is consistent with the recommendations given in CIRIA C665. The assessment also takes account of the physical properties of ground gas and also ventilation requirements under Part F of Building Regulations.

- 9.15 Made Ground was encountered on site but this did not include putrescible materials and as such there is not considered to be a significant risk from ground gas, however a backfilled pond has been located just off the NE boundary and therefore gas monitoring has been undertaken.
- 9.16 Gas monitoring was undertaken during return visits to monitor groundwater levels. Ground gas has not recorded elevated concentrations of Methane or Carbon Dioxide and there are no significant detectable gas flow rates with the gas flux falling into Characteristics Situation 1. Basic Radon protection measures will be required.
- 9.17 This supports the assessment and findings of the desk study and ground investigation.

Revised Conceptual Model

- 9.18 The Initial Conceptual Model presented in Section 6 has been revised based on the findings of the ground investigation and the revised Conceptual Model is presented overleaf:

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Human Health					
Metals and hydrocarbons	Unforeseen contamination	Ingestion dermal and inhalation.	Construction Workers.	Dismissed	Normal construction PPE will address risk under CDM.
			Site users.	Negligible	Discovery Strategy.
Metals and hydrocarbons.	Made Ground.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed	Below GAC.
			Site users.		
Asbestos	Made Ground on site	Ingestion dermal and inhalation	Construction Workers.	Dismissed	None encountered
			Site users.		
Hydrocarbon and metals.	Potential localised spillage on site.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Below GAC.
			Site users.		
Hydrocarbon and metals.	Potential migration from off-site source.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No significant off site risks identified.
Ground Gas.	Historic Landfills/backfilled ponds.	Inhalation & Explosive.	Construction Workers.	Dismissed	No source identified
			Site users.		
Radon	Made Ground	Inhalation	Construction Workers.	Negligible	Remediation
			Site users.	Low	
Groundwater					
Hydrocarbon and metals.	Potential spillage on site.	Vertical Migration.	Groundwater	Dismissed	Secondary A Aquifer but no source noted.
Surface Water					
Hydrocarbon and metals.	Potential spillage on site	Horizontal Migration.	River Network	Dismissed	No receptor.
Environmental Receptors					
On site contaminants		Ingestion dermal and inhalation.	Ecology.	Dismissed.	No sensitive ecology designation.
		Direct.	Archaeology.	Dismissed.	None present.
		Direct.	Geology.	Dismissed.	None present.
		Phytotoxic.	Woodland.	Dismissed.	None present.
		Phytotoxic.	Crops.	Dismissed.	None present.
		Ingestion dermal and inhalation.	Livestock.	Dismissed.	None present.
Building Services					
On site contaminants		Direct.	Historic Buildings.	Dismissed.	None present.
		Direct.	Proposed Buildings.	Dismissed.	No source identified.
		Permeate into pipework.	Water Pipes.	Dismissed.	No source identified.

Remediation and verification Strategy

- 9.19 No remediation proposed with the exception of the inclusion of basic radon protective measures.
- 9.20 If contamination is encountered during construction works an Environmental Consultant will be available on a 'call out' basis to undertake an assessment of risk. If 'unforeseen contamination' is encountered this will be discussed with the Local Planning Authority and remedial measures agreed prior to implementation. A validation report will be prepared should any remediation of unforeseen contamination.

Waste Classification

- 9.21 Two part WAC tests have been undertaken across the site, the results of which are included in Appendix C. These show one exceedances above the inert threshold values for leachable extracts.
- 9.22 The Waste Management paper 2 has recently been updated to version 3 which states that that sites which previously could be considered 'uncontaminated land' surplus soils if they did not exceed the GAC values now requires the landfill to make an appropriate assessment of the waste classification. As such final assessment will be undertaken by the receiving landfill based on the requirements of their permit, although based on the results received it is likely that soils should be deemed Stable Non-Reactive materials and inert. Based on this it is recommended that further testing is carried from the stockpile heaps to classify the materials to be disposed of off site.
- 9.23 The report is being submitted to a waste operator for classification of soils and this will be reported separately.

10.0 GEOTECHNICAL ASSESSMENT

Proposed Development

- 10.1 The proposed development will comprise a Petrol Filling Station to the north of the site, a drive-through building in the centre of the site and a Public House to the south with associated car parking in-between. The structural loadings are not known and is assumed to be 50kN per/metre run for assessment purposes.
- 10.2 It is considered that the scheme meets the criteria of Geotechnical Category 1 of Eurocode 7.

Ground Conditions

- 10.3 Ground Conditions comprise Made Ground over Glaciofluvial materials over Salop Formation (weathered sandstone). Groundwater was not recorded in the investigation or the subsequent monitoring.

Site Preparation

- 10.4 The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the Specification for Highway Works. This should include:
- Any redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill; and,
 - Any buried structures and old foundations encountered on site should be excavated from below the proposed structures with the resulting void backfilled.

Foundations

- 10.5 The Made Ground is not considered competent foundation materials due to their inherent variability it is therefore recommended that strip or pad foundations or vibro foundations are adopted below these materials and within the Glaciofluvial materials or the weathered Salop formation.

Foundations for the Petrol filling Station Development

- 10.6 The Made Ground and shallow superficial material are not considered competent foundation materials due to their inherent variability and low strength it is therefore

recommended that shallow foundations are not recommended. Raft foundations are not considered suitable as the settlements would be too high based on the low SPT N values of 4 and 5 and the variability across the site of the Glaciofluvial materials.

- 10.7 Based on the ground conditions it is recommended that a vibro granular or vibro concrete columns are installed to allow shallow foundations to be utilised within the Glaciofluvial glacial materials. The use of ground improvement techniques would remove the potential for unacceptable settlements associated with the loose Glaciofluvial materials above 3.00m bgl. Should ground improvement techniques be required it is recommended that a specialist contractor is contacted to confirm suitability and give appropriate allowable bearing pressures. It is likely the vibro piles will be installed in to the underlying dense Salop formation materials proved below 3.00mbgl.
- 10.8 Given the variable strength of the founding materials (loose to medium dense) in formation it is recommended that all foundations are reinforced.
- 10.9 No groundwater was encountered during the site works.

Foundations for the Public House and Drive-through building

- 10.10 The Made Ground is not considered competent foundation materials due to their inherent variability it is therefore recommended that shallow foundations are not recommended. Raft foundations are not considered suitable as the settlements would be too high based on the low SPT N values of 7 and the variability across the site of the Glaciofluvial materials.
- 10.11 Shallow pad foundations have also been considered and although an allowable bearing pressure of 100kN/m² is achievable the settlements will be in the order of 40-50mm. Based on the ground conditions it is recommended that a vibro granular or vibro concrete columns are installed to allow shallow foundations to be utilised within the Glaciofluvial materials. The use of ground improvement techniques would remove the potential for unacceptable settlements associated with the loose Glaciofluvial materials above 3.00m bgl. Should ground improvement techniques be required it is recommended that a specialist contractor is contacted to confirm suitability and give appropriate allowable bearing pressures. It is likely the vibro piles will be installed in to the underlying dense Salop formation materials proved below 3.00mbgl. It is likely that vibro granular columns will be achieve an allowable bearing pressure of 100kN/m² with settlements less than 25mm, however this will need to be confirmed by a specialist contractor. Plate bearing tests are also likely to be required to confirm settlements.

10.12 Given the variable strength of the founding materials (loose to medium dense) in formation it is recommended that all foundations are reinforced.

10.13 No groundwater was encountered during the site works.

Ground Floor Slab

10.14 Given the variability in the thickness and strength of the underlying Glaciofluvial materials it is recommended a suspended floor slab is adopted, however should a Ground bearing floor slabs be required the frequency of the ground improvement techniques can be increased to allow ground bearing floor slabs, however the achievable allowable bearing pressures and resulting settlements will need to be confirmed by a specialist contractor. Settlements should be confirmed once loadings are known and may require plate testing to provide suitable modulus of subgrade reaction to allow design of the slabs.

Materials Re-use

10.15 An assessment of the shallow soils suitability for re-use has been undertaken using the following parameters:

- Laboratory CBR tests undertaken on re-compacted samples to mimic proof rolling.
- Grading analysis; and
- Description of the soils.

10.16 It is considered that Made Ground is not suitable for re-use as engineered fill.

Pavement Construction

10.17 An assessment of the likely California Bearing Ratio (CBR) has been assessed from the following sources:

- Laboratory CBR tests undertaken on re-compacted soil samples;
- Description of the materials encountered in the exploratory holes; and
- Guidance given in HD25/94 and 73/06.

10.18 Based on this it is recommended that a design CBR of 5% is used for underlying materials within the area of the car parking. Soils are not to be considered as frost susceptible. The formation should be proof rolled and any areas of loose material excavated and removed.

Drainage

- 10.19 Preliminary soakaway tests gave a soil infiltration value of $1.8 \text{ E}^{-4} \text{ m/s}$. Based on this it is likely that soakaway drainage will be suitable, however given the granular nature of the materials any soakaways should be sited away from the proposed foundations and further BRE 365 soakaway tests should be undertaken at the required positions.
- 10.20 Chemical results should be provided to the water authority to confirm the design of potable water supply pipes.

Buried Concrete

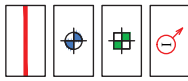
- 10.21 Results of the sulphate testing indicate that soils have soluble sulphate concentrations of less than 0.5 g/l consistent with DS1 Conditions of BRE Special Digest 1 and as such buried concrete may be designed in accordance with ACEC Class AC-1s.

Excavation

- 10.22 Based on the various site observations it is considered that excavations should be feasible with normal plant. Groundwater has not been encountered.
- 10.18 Excavations where access is required should be supported in accordance with CIRIA RR97.



Key



Site Boundary
Window Sampler Boreholes (WS)
(WS1 - WS8)
Hand Pit (HP)
(HP1) CBR Sample 0.5m
Borehole Installation (I)

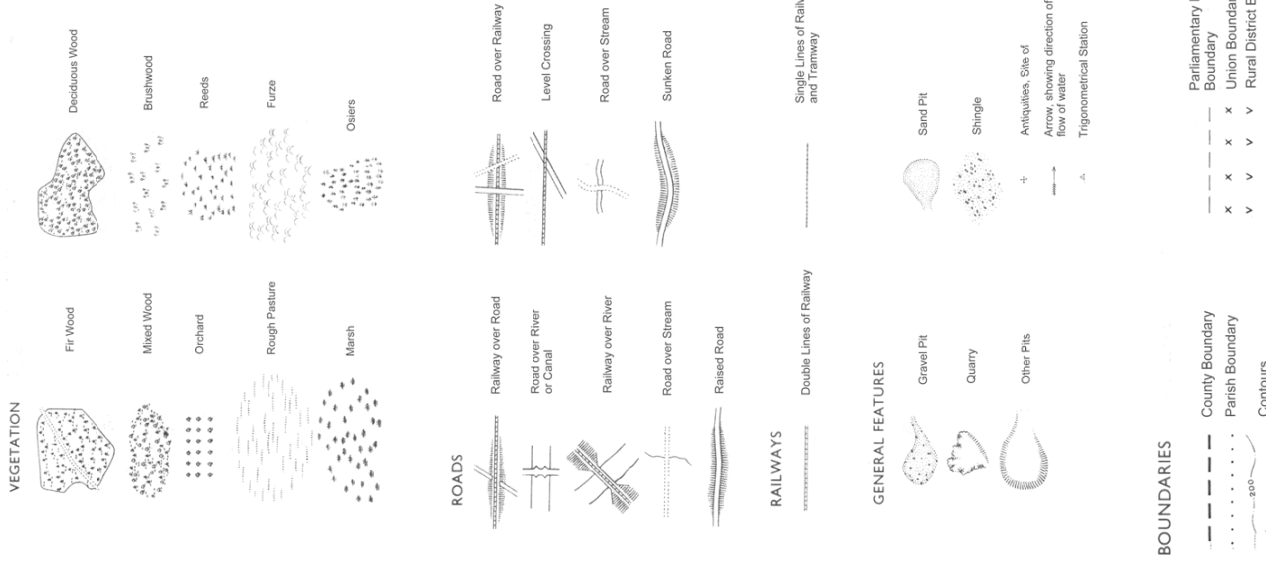


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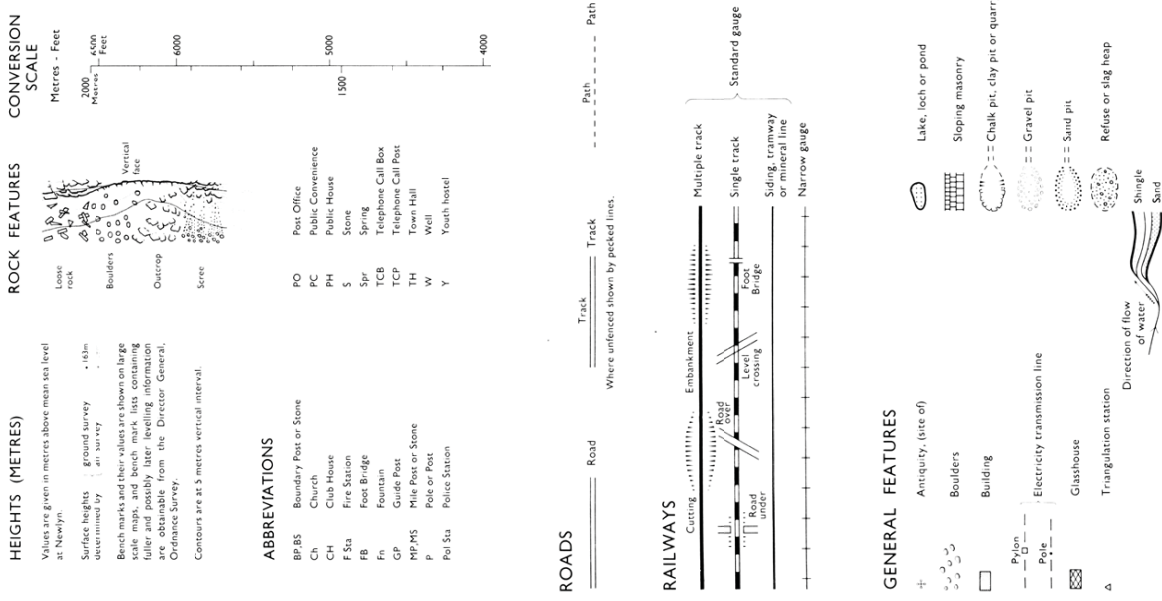
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DRAWN:	MG	CHECKED:	RH
DATE:	June 2016	PROJECT:	Wrexham
TITLE			
Exploratory Hole Positions			
FIGURE NO:			
CRM.413.106.GE.D.001.B			



County Series 1:10,560 scale



National Grid 1:10,000 scale



County Series & National Grid

1:10,560 scale
&
1:10,000 scale

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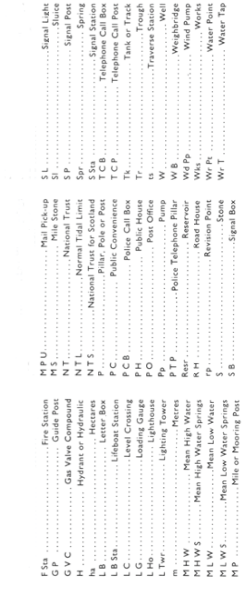
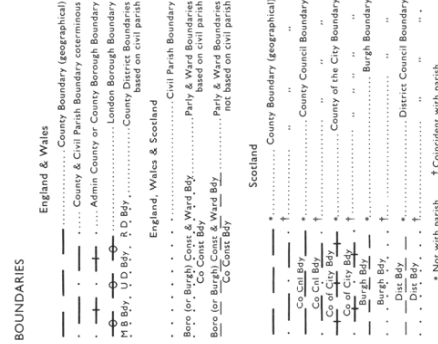
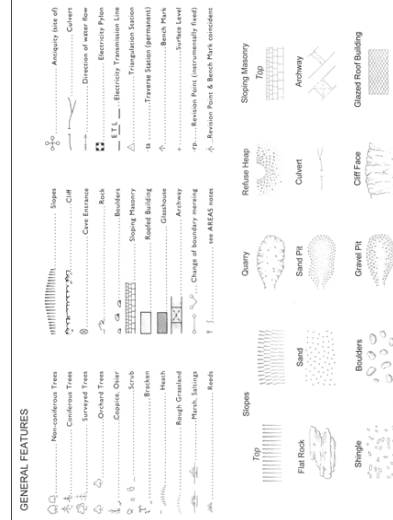
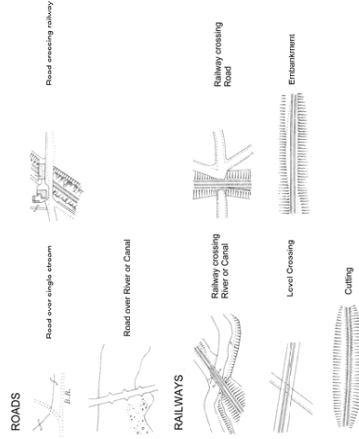
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**National Grid 1:2,500 / 1:1,250
scale**

**National Grid 1:2,500 / 1:1,250
scale**



Historical Map Pack Legend

County Series

1:1,250 scale



County Series & National Grid

1:2,500 scale

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EmapSite
Masdar House, ,
Eversley, RG27 ORP

GroundSure
Reference: EMS-267849_361428

Your Reference: EMS_267849_361428

Report Date 16 Sep 2014

Report Delivery Method: Email - pdf

GroundSure EnviroInsight

Address: Wrexhm Golf Course,Holt Road,Wrexham,LL13 9SB,

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Yours faithfully,

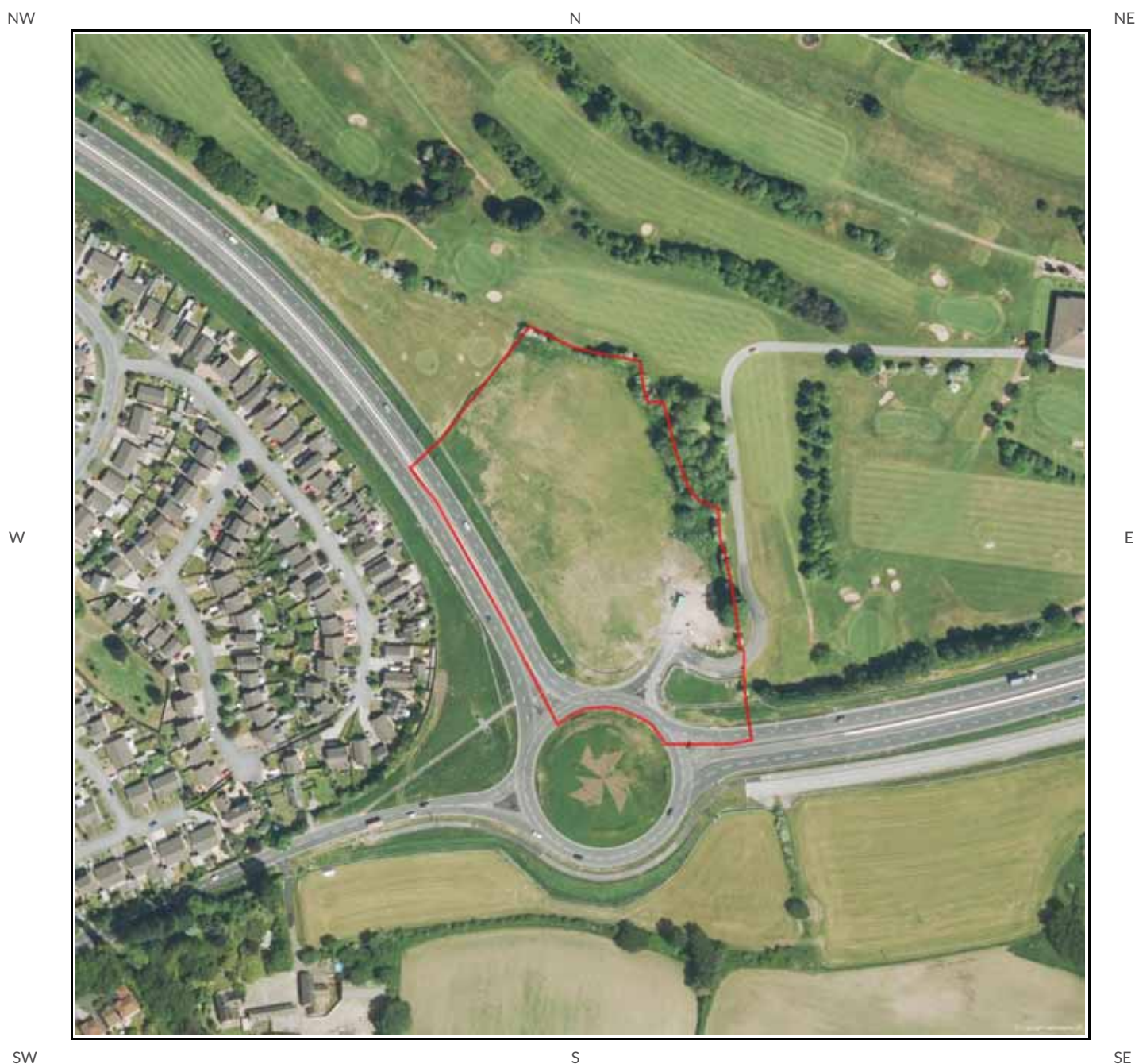
emapsite customer services team

Enc.
GroundSure EnviroInsight



GroundSure EnvirolInsight

Address: Wrexham Golf Course, Holt Road, Wrexham, LL13 9SB,
Date: 16 Sep 2014
Reference: EMS-267849_361428
Client: EmapSite



Aerial Photograph Capture date: 11-May-2009
Grid Reference: 335930,351856
Site Size: 2.25ha

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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.

Section 1: Environmental Permits, Incidents and Registers		On-site	0-50m	51-250	251-500		
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations							
1.1.1	Records of historic IPC Authorisations	0	0	0	0		
1.1.2	Records of Part A(1) and IPPC Authorised Activities	0	0	0	0		
1.1.3	Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0		
1.1.4	Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0		
1.1.5	Records of List 1 Dangerous Substances Inventory sites	0	0	0	0		
1.1.6	Records of List 2 Dangerous Substances Inventory sites	0	0	0	0		
1.1.7	Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0		
1.1.8	Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0		
1.1.9	Records of Licensed Discharge Consents	0	0	0	0		
1.1.10	Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0		
1.2	Records of COMAH and NIHHS sites	0	0	0	0		
1.3 Environment Agency Recorded Pollution Incidents							
1.3.1	National Incidents Recording System, List 2	0	0	0	0		
1.3.2	National Incidents Recording System, List 1	0	0	0	0		
1.4	Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0		
Section 2: Landfill and Other Waste Sites		On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1 Landfill Sites							
2.1.1	Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
2.1.2	Environment Agency Historic Landfill Sites	0	0	0	1	1	0
2.1.3	BGS/DoE Landfill Site Survey	0	0	0	0	0	0
2.1.4	GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings							
2.2.1	Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
2.2.2	Environment Agency Licensed Waste Sites	0	0	0	0	1	0

Section 3: Current Land Use	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	0	0	1	Not searched
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

Section 4: Geology

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.	

Section 5: Hydrogeology and Hydrology

5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
5.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	1	2
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
5.7 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	1	0	0	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
5.8 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.9 Detailed River Network entries within 500m of the site	0	0	0	0	Not searched	Not searched
5.10 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 6: Flooding

6.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No
6.2 Are there any Environment Agency 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?	Limited potential
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	1
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
7.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.5 Records of Ramsar sites	0	0	0	0	0	2
7.6 Records of Ancient Woodlands	0	0	0	0	0	5
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0

Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Very Low
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Negligible
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low

Section 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?

Negligible

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. Environmental Permits, 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 productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) 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 and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

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 (08444 159000) 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. Environmental Permits, Incidents and Registers Map



Environmental Permits,
Incidents and Registers Legend



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- | | | |
|-----------------------------|---|--|
| Site Outline | ★ Recorded Pollution Incident | ▼ RAS 3 & 4 Authorisations |
| 250 | ◆ Dangerous Substances (List 1) | ▲ Part A(1) Authorised Processes and Historic IPC Authorisations |
| 500 | ◇ Dangerous Substances (List 2) | ▲ Part A(2) and Part B Authorised Processes |
| Water Industry Referrals | ◻ COMAH / NIHHS Sites | |
| Licenced Discharge Consents | ◻ Sites Determined as Contaminated Land | |
| Red List Discharge Consents | ◻ Hazardous Substance Consents and Enforcements | |



1. Environmental Permits, 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:

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

0

Database searched and no data found.

1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

1.1.3 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.

1.1.4 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.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

0

Database searched and no data found.

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

0

Database searched and no data found.

1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

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

0

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

0

Database searched and no data found.

1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

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.

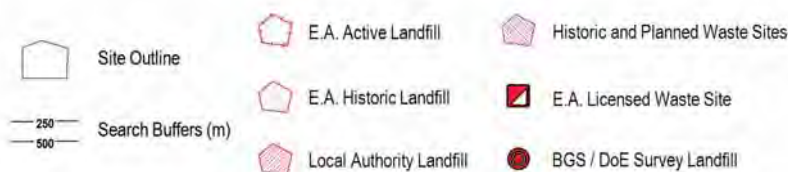
2. Landfill and Other Waste Sites Map



Landfill and Other Waste Sites Legend



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2. Landfill and Other Waste Sites

2.1 Landfill Sites

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

0

Database searched and no data found.

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

2

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

ID	Distance (m)	Direction	NGR	Details
1	472.0	E	336500 351500	Site Address: Land of West Lane, Llan-Y-Pwll, Wrexham Waste Licence: Yes Site Reference: WMBC Waste Type: Inert, Industrial, Commercial, Household, Special, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 31-Dec-1984 Licence Surrendered: 31-Dec-1988 Licence Hold Address: - Operator: -
Not shown	689.0	NE	336300 352600	Site Address: Borrass Airfield, Holt Road, Wrexham, Clwyd Waste Licence: Yes Site Reference: - Waste Type: Inert, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.2 Other Waste Sites

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

0

Database searched and no data found.

2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

1

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	904.0	E	336906 351887	Site Address: Holt Road, Borrás, Wrexham, LL13 9SE Type: Management of inert or extractive waste at mine Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: TAR106 EPR reference: EA/EPR/XP3695VK/A001 Operator: Tarmac Ltd Waste Management licence No: 102745 Annual Tonnage: 0.0 Issue Date: 24/05/2011 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Borrás Quarry Correspondence Address: -, -

3. Current Land Use Map



Current Land Use Legend



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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: 1

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	110.0	NW	Electricity Sub Station	335746 351958	LL13	Electrical Features	Infrastructure and Facilities

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
GFSDDD-SAGR	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL

4.3 Bedrock and Solid Geology

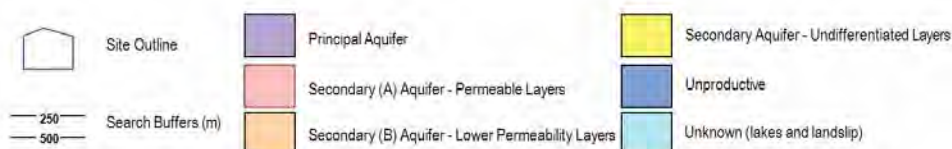
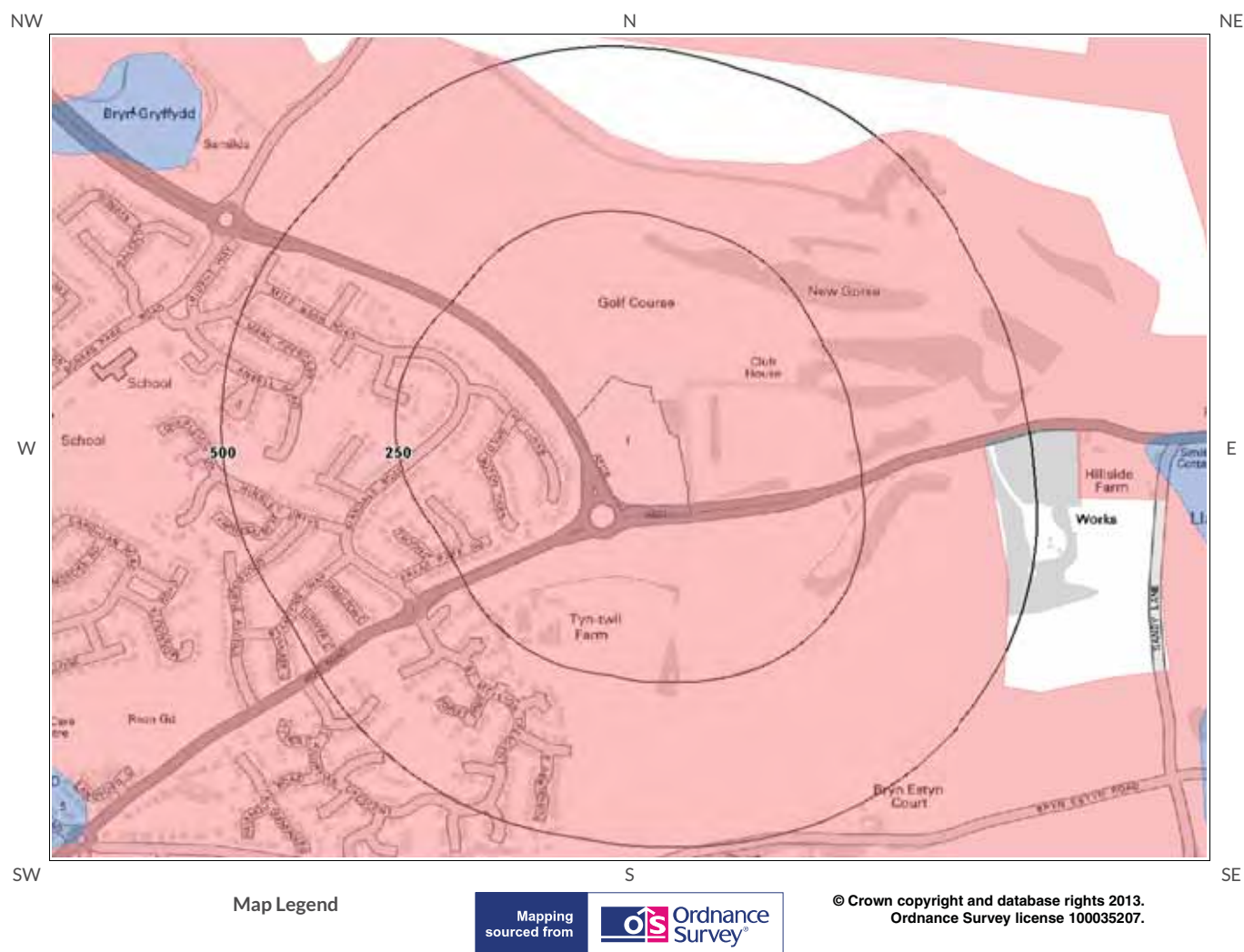
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
SAL-MDSC	SALOP FORMATION	MUDSTONE, SANDSTONE AND CONGLOMERATE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

5. Hydrogeology and Hydrology

5a. Aquifer Within Superficial Geology



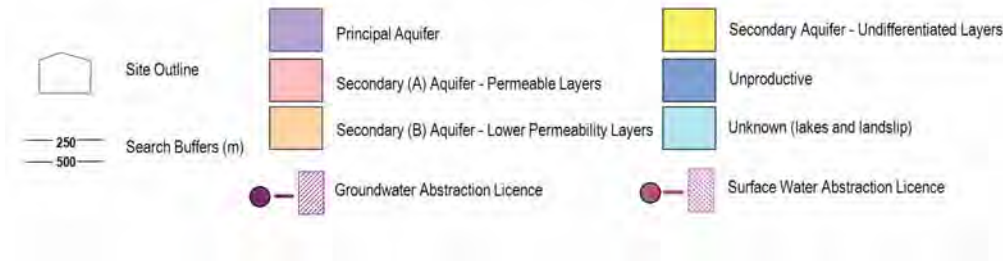
5b. Aquifer Within Bedrock Geology and Abstraction Licenses



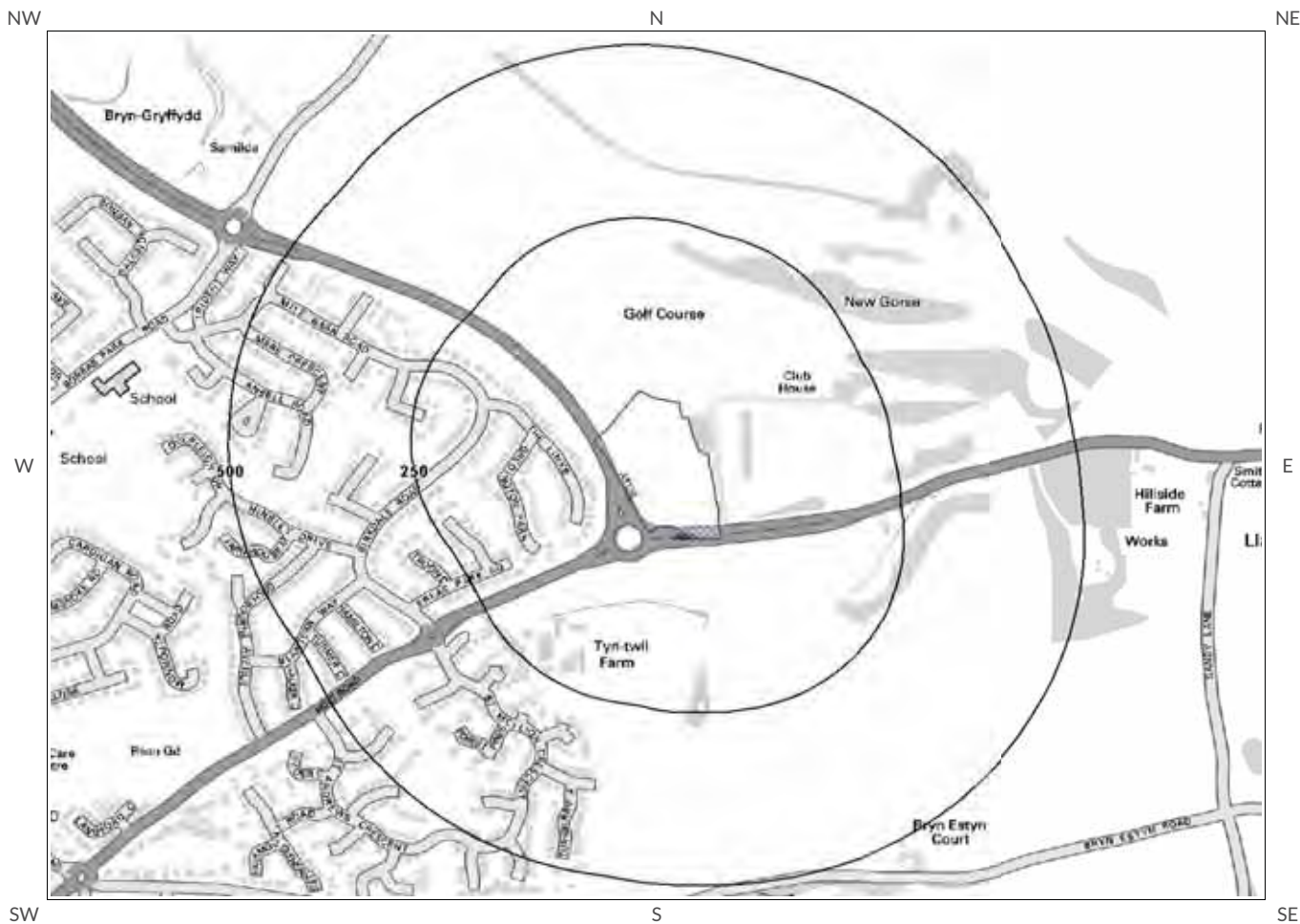
Map Legend

Mapping
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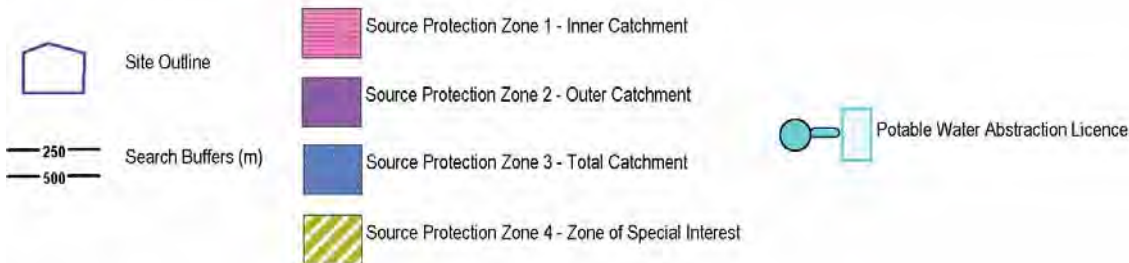
5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



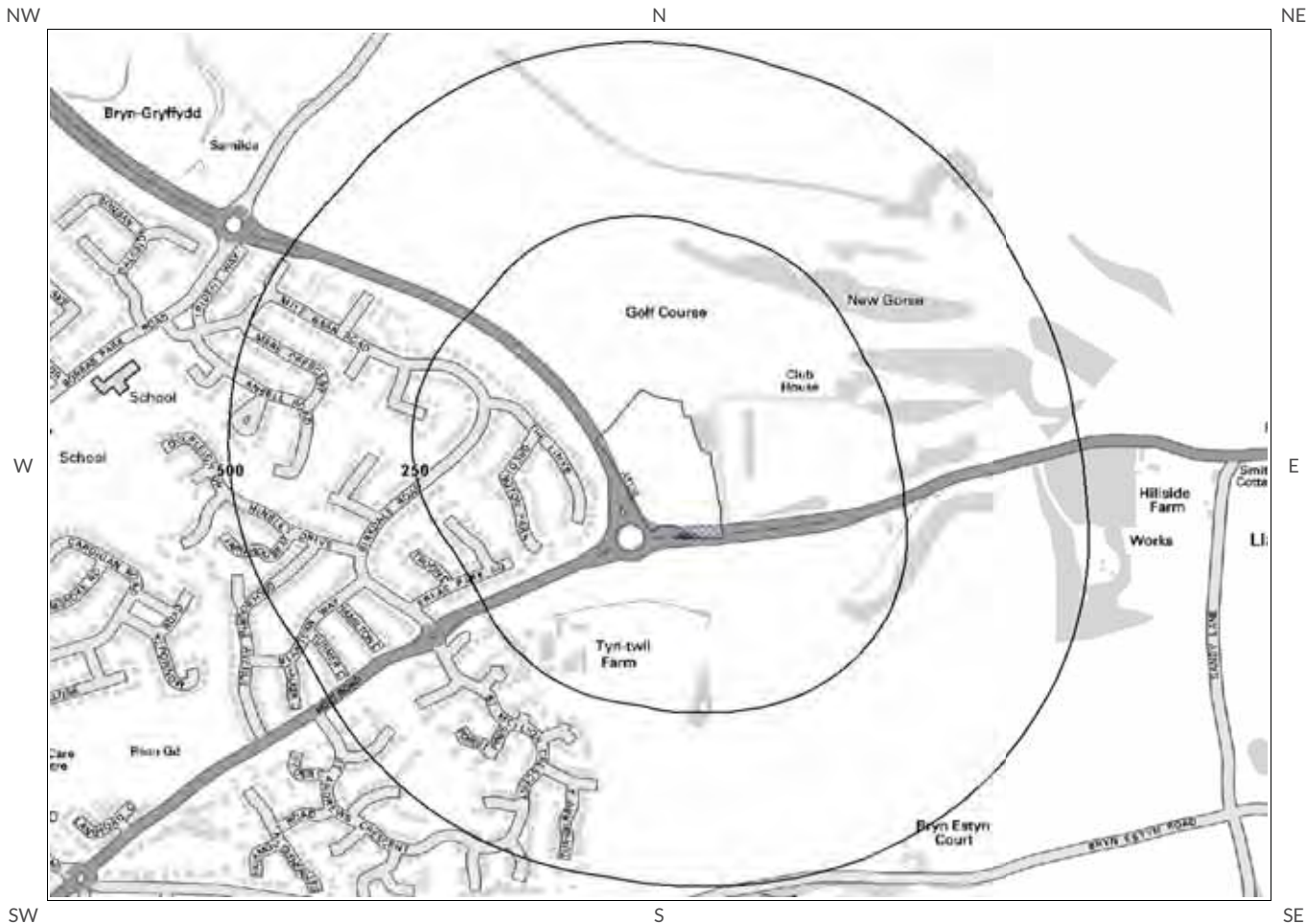
Map Legend

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5d. Hydrology – Detailed River Network and River Quality



Map Legend



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- | | | | | | |
|--|--------------------|--|---------------------------------------|--|-------------------------------------|
| | Site Outline | | Primary River | | Canal |
| | 250 | | Secondary River | | Canal Tunnel |
| | 500 | | Tertiary River | | Culvert |
| | Search Buffers (m) | | Lake/Reservoir | | Multiple Channel Culvert |
| | | | Underground River (inferred) | | Underground River (Potential Sewer) |
| | | | General Quality Assessment: Biology | | Underground River (local knowledge) |
| | | | General Quality Assessment: Chemistry | | |



5. Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

5.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
2	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
1	470.0	E	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

5.3 Groundwater Abstraction Licences

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

Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	NGR	Details
Not shown	899.0	E	336870 352070	Licence No: 24/67/7/0197 Details: Mineral Washing Direct Source: Eaw Groundwater Point: Borehole Data Type: Point Annual Volume (m³): 195180 Max Daily Volume (m³): 533.28 Original Application No: WPCC1716 Original Start Date: 25/8/1982 Expiry Date: - Issue No: 103 Version Start Date: 27/3/2014 Version End Date:
Not shown	1839.0	NW	334640 353310	Licence No: 24/67/8/0017 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well 2 Data Type: Point Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 503 Original Start Date: 9/8/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/4/1995 Version End Date:
Not shown	1935.0	NW	334620 353421	Licence No: 24/67/8/0017 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well 1 Data Type: Point Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 503 Original Start Date: 9/8/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/4/1995 Version End Date:

5.4 Surface Water Abstraction Licences

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

No

Database searched and no data found.

5.5 Potable Water Abstraction Licences

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

No

Database searched and no data found.

5.6 Source Protection Zones

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

No

Database searched and no data found.

5.7 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site?

Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.
24	E	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

5.8 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site?

No

5.8.1 Biological Quality:

Database searched and no data found.

5.8.2 Chemical Quality:

Database searched and no data found.

5.9 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

No

Database searched and no data found.

5.10 Surface Water Features

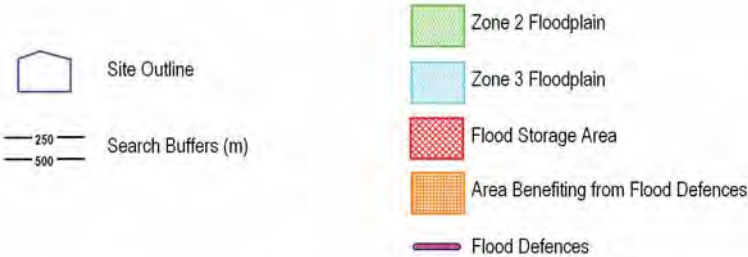
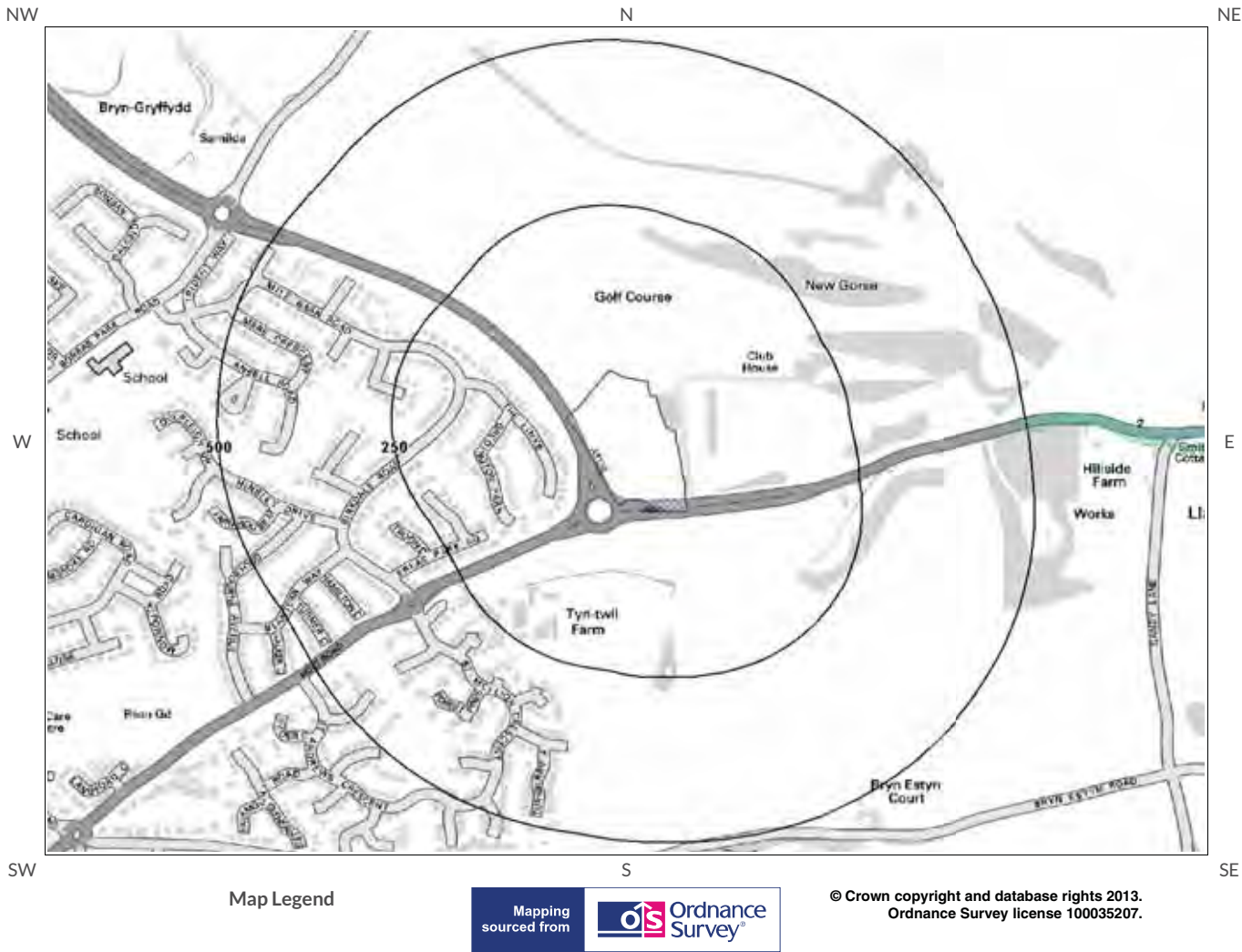
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
99.0	S
190.0	SE
227.0	E

6. Environment Agency Flood Map for planning (from rivers and the sea)





6. Flooding

6.1 Zone 2 Flooding

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning:

Is the site within 250m of an Environment Agency Zone 2 floodplain? No

Database searched and no data found.

6.2 Zone 3 Flooding

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning.

Is the site within 250m of an Environment Agency Zone 3 floodplain? No

Database searched and no data found.

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

6.5 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

6.6 Groundwater Flooding Susceptibility Areas

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

Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding?

Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

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

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

6.7 Groundwater Flooding Confidence Areas

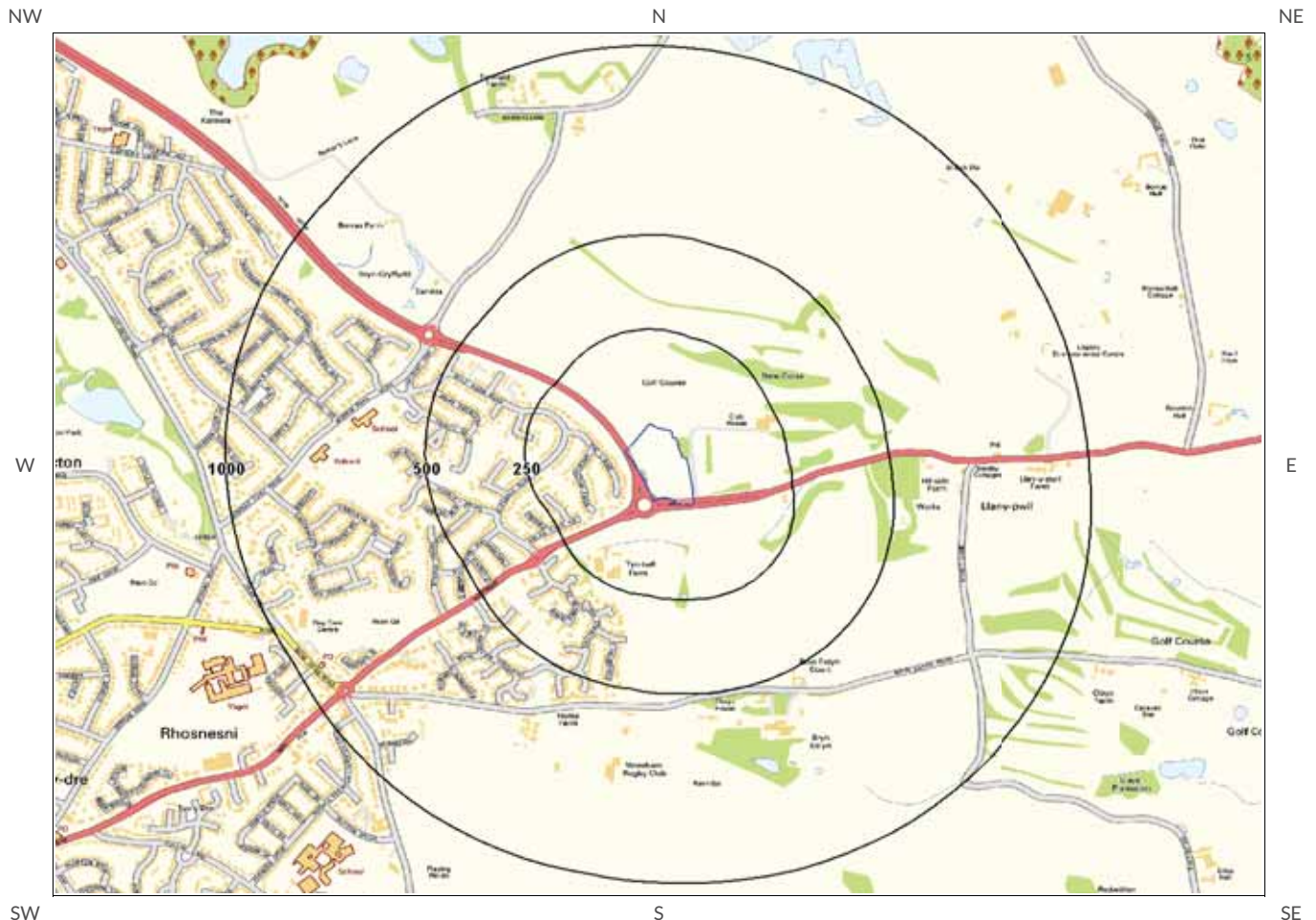
What is the British Geological Survey confidence rating in this result?

High

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 threefold scale - Low, Moderate 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



Map Legend

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Site Outline	SAC	SSSI	NNR	World Heritage Sites
Areas of Outstanding Natural Beauty	SPA	Ramsar	LNR	Environmentally Sensitive Areas
	Nitrate Vulnerable Zones	Nitrate Sensitive Areas	National Parks	Ancient Woodlands



7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site?

Yes

7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

1

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Countryside Council for Wales and Scottish Natural Heritage are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
Not shown	1787.0	N	Vicarage Moss	Countryside Council for Wales

7.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

7.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

7.5 Records of Ramsar sites within 2000m of the study site:

2

The following Ramsar site records provided by Natural England/Countryside Council for Wales and Scottish Natural Heritage are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ramsar Site Name	Data Source
Not shown	1787.0	N	Midland Meres and Mosses Phase 2 (Wales)	Countryside Council for Wales
Not shown	1788.0	N	Midland Meres and Mosses Phase 2	Natural England

7.6 Records of Ancient Woodland within 2000m of the study site:

5

The following Ancient Woodland records are supplied by English Nature/Scottish Natural Heritage/Countryside Council for Wales and are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
4	1296.0	NW	PANT-YR-OCHAIN WOOD	Ancient and Semi-Natural Woodland
5	1690.0	NE	BORRAS WOODS	Ancient Replanted Woodland
Not shown	1723.0	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1769.0	NE	Unknown	Ancient Replanted Woodland
Not shown	1938.0	S	BIG WOOD	Ancient Replanted Woodland

7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

7.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

7.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.13 Records of Nitrate Vulnerable Zones within 2000m 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 on geology and ground stability, please obtain a **GroundSure GeoInsight**, 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.

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

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* 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

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.

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?

Very Low

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

Hazard

Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk 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
0.0	On Site	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 subsidence hazard relating to shallow mining on-site*?

Negligible

*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

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

No

Guidance: No Guidance Required.

Contact Details

EmapSite
Telephone: 0118 9736883
sales@emapsite.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



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



Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
<https://www.gov.uk/government/organisations/public-health-england>
Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000



The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk



Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505



Local Authority

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

Gemapping PLC

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



Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, English Nature who retain the Copyright and Intellectual Property Rights for the data. PointX © Database Right/Copyright, Thomson Directories Limited © Copyright Link Interchange Network Limited © Database Right/Copyright and Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028].
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 terms and conditions unless the context otherwise requires:

“Beneficiary” means the person or entity for whose benefit the Client has obtained the Services.

“Client” means the party or parties entering into a Contract with GroundSure.

“Commercial” means any building or property which is not Residential.

“Confidential Information” means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

“Support Services” means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

“Contract” means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

“Third Party Data Provider” means any third party providing Third Party Content to GroundSure.

“Data Reports” means reports comprising factual data with no accompanying interpretation.

“Fees” has the meaning set out in clause 5.1.

“GroundSure” means GroundSure Limited, a company registered in England and Wales under number 03421028.

“GroundSure Materials” means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

“Intellectual Property” means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

“Mapping” means a map, map data or a combination of historical maps of various ages, time periods and scales.

“Order” means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

“Ordnance Survey” means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

“Order Website” means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

“Report” means a Risk Screening Report or Data Report for Commercial or Residential property.

“Residential” means any building or property used as or intended to be used as a single dwelling.

“Risk Screening Report” means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

“Services” means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

“Site” means the area of land in respect of which the Client has requested GroundSure to provide the Services.

“Third Party Content” means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

“User Guide” means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 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 writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions

implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

- (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, and
- (v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. 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 (together “Fees”).

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death

or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; 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 or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) 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 and/or Beneficiary any property of the Client and/or Beneficiary in

GroundSure's possession or control; and

(ii) 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 or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, 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.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 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 Third Party Data Providers;
- (viii) changes in law; or
- (ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 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.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 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.

12.12 This Contract shall be governed by and construed in accordance with English

law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law. © GroundSure Limited June 2013



EmapSite

Masdar House,
Eversley, RG27 0RP

Report Reference: EMS-267849_361427

Your Reference: EMS_267849_361427

Report Date 16 Sep 2014

Report Delivery Method: Email - pdf

GroundSure Geoinsight

Address: Wrexham Golf Course, Holt Road, Wrexham, LL13 9SB,

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure GeoInsight** as requested.

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
GroundSure GeoInsight



GroundSure GeoInsight

Address: Wrexham Golf Course, Holt Road, Wrexham, LL13 9SB,
Date: 16 Sep 2014
Reference: EMS-267849_361427
Client: EmapSite



Aerial Photograph Capture date: 11-May-2009
Grid Reference: 335930,351856
Site Size: 2.25ha

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Overview of Findings

The GroundSure GeoInsight 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, Johnson Poole and Bloomer mining data 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.

Section 1:Geology

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 and 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
1.4 Radon data	1.4.1 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 5 and 10% of properties are above the Action Level
	1.4.2 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?	Basic radon protective measures are necessary

Section 2:Ground Workings

	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	2	1	3	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	0	0	3

Section 3:Mining, Extraction & Natural Cavities

	On-site	0-50m	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0

Section 3: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.2 Coal Mining	1	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining	0	0	0	0	0
3.5 Non-Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0

Section 4: Natural Ground Subsidence	On-site
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	Very Low
4.6 Running Sand	Very Low

Section 5: Borehole Records	On-site	0-50m	51-250
5 BGS Recorded Boreholes	4	4	10

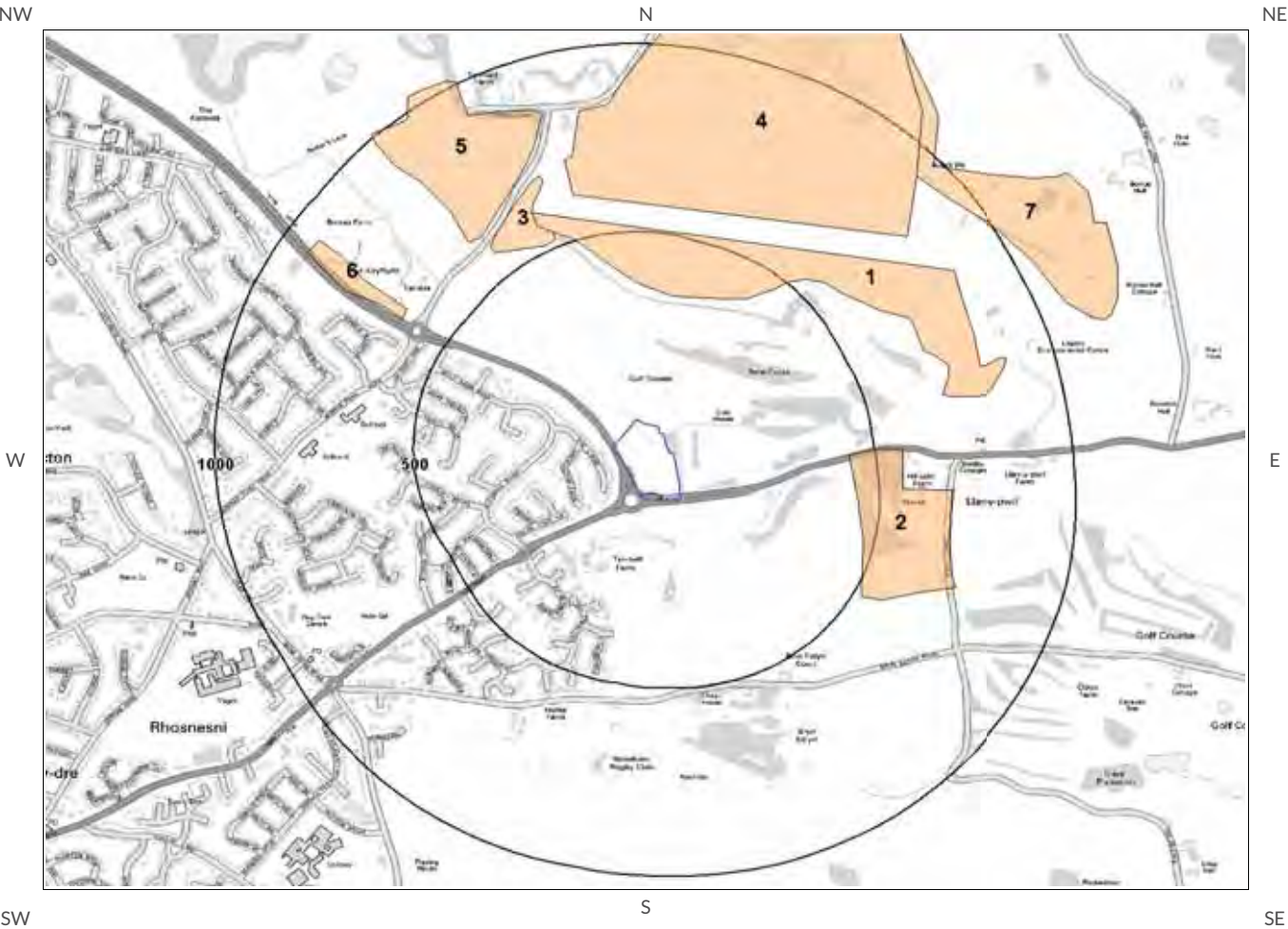
Section 6: Estimated Background Soil Chemistry	On-site	0-50m	51-250
6 Records of Background Soil Chemistry	2	1	1

Section 7: Railways and Tunnels	On-site	0-50m	51-250	251-500
7.1 Tunnels	0	0	0	Not Searched
7.2 Historical Railway and Tunnel Features	0	0	0	Not Searched
7.3 Historical Railways	0	0	0	Not Searched
7.4 Active Railways	0	0	0	Not Searched

Section 7:Railways and Tunnels	On-site	0-50m	51-250	251-500
7.5 Railway Projects	0	0	0	0

1 Geology

1.1 Artificial Ground Map



Artificial Ground Legend



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1 Geology

1.1 Artificial Ground

1.1.1 Artificial/ Made Ground

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

Are there any records of Artificial/Made Ground within 500m of the study site boundary? Yes

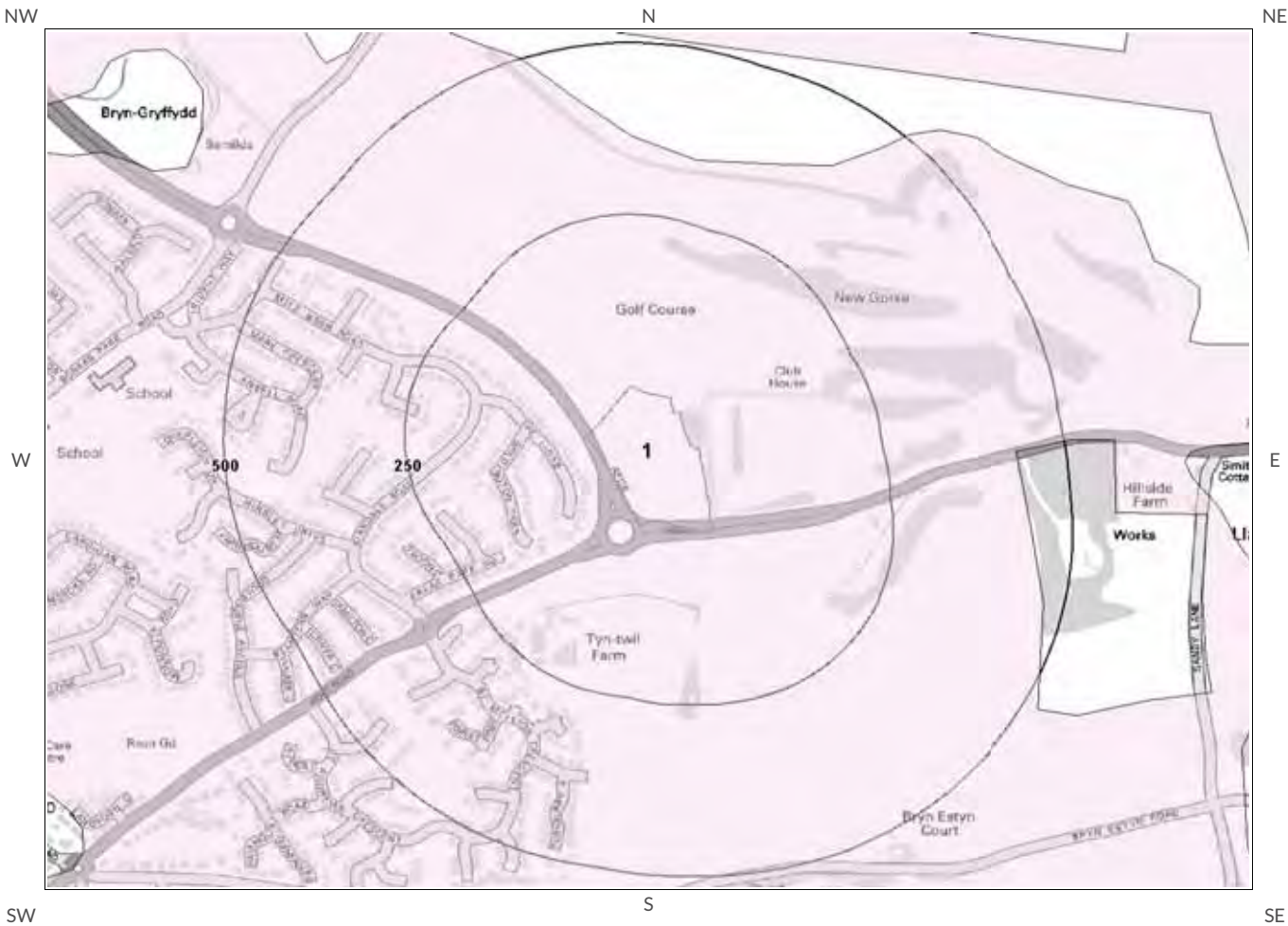
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	341.0	N	WGR-OPEN	WORKED GROUND (UNDIVIDED)	VOID
2	432.0	E	WGR-OPEN	WORKED GROUND (UNDIVIDED)	VOID

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.

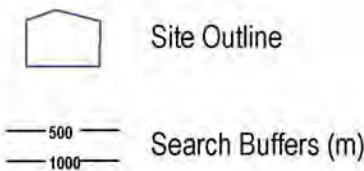
1.2 Superficial Deposits and Landslips Map



Superficial Deposits and Landslips Legend



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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	GFSDD-SAGR	GLACIOFLUVIAL SHEET 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

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

Database searched and no data found.

This Geology shows the main components as discrete 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.

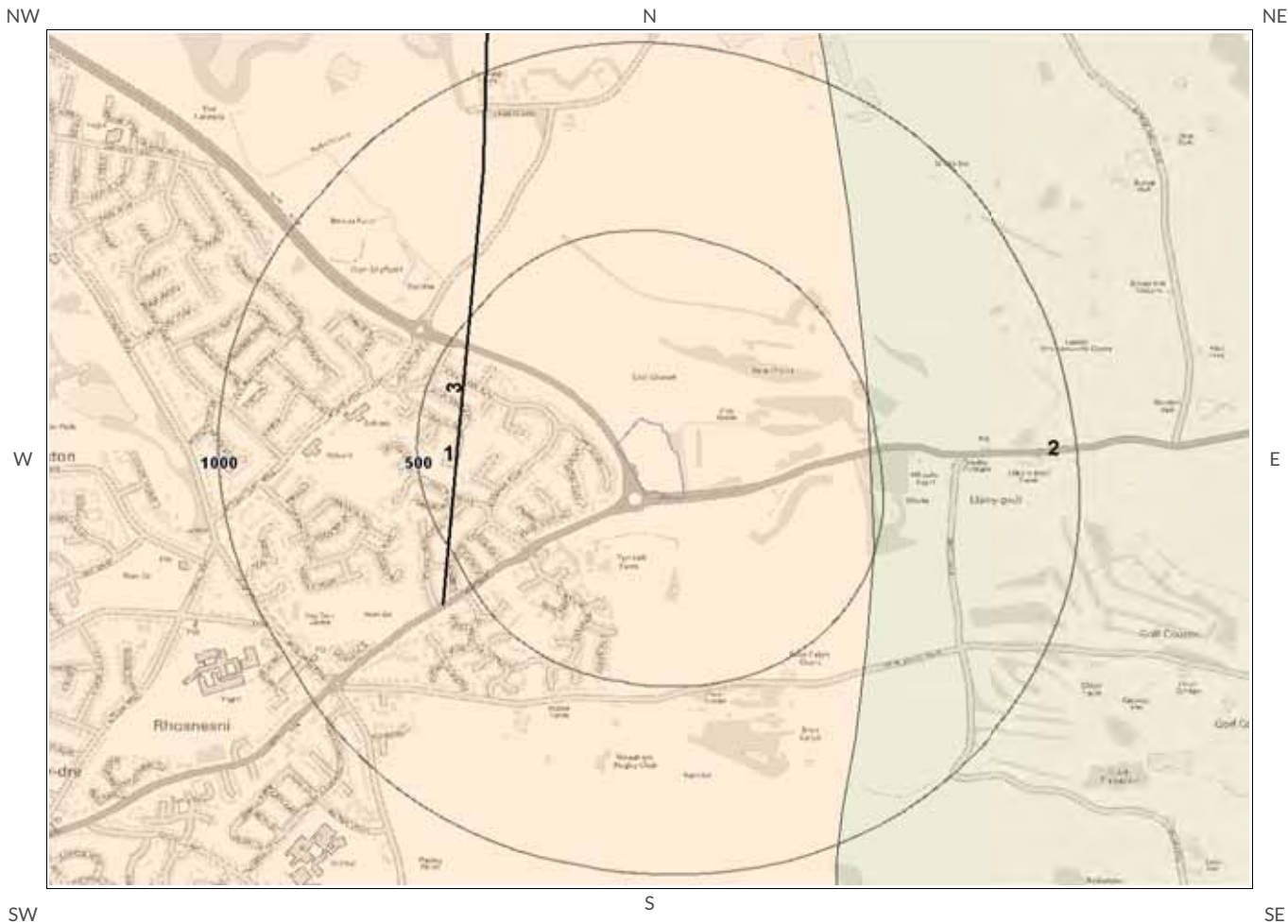
1.2.4 Landslip Permeability

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

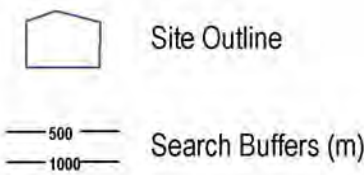
1.3 Bedrock and Faults Map



Bedrock and Faults Legend



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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	Description	Rock Age
1	0.0	On Site	SAL-MDSC	Salop Formation - Mudstone, Sandstone And Conglomerate	/ Westphalian D
2	470.0	E	KNSF-SDST	Kinnerton Sandstone Formation - Sandstone	Scythian

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
3	396.0	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 discrete 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.

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

1.4 Radon Data

1.4.1 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 5 and 10% of properties are above the Action Level

1.4.2 Radon Protection

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? Basic radon protective measures are necessary

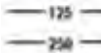
2 Ground Workings Map



Ground Workings Legend



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-  Site Outline
-  Search Buffers (m)
125
250
-  Historic Surface Ground Workings
-  Historic Underground Workings
-  Current Ground Workings



2 Ground Workings

2.1 Historical Surface Ground Working Features derived from 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
1A	0.0	On Site	335985 351896	Pond	1872
2A	0.0	On Site	335981 351900	Pond	1900
3A	2.0	NE	335988 351899	Pond	1949
4B	227.0	S	335979 351497	Ponds	1900
5B	227.0	S	335984 351496	Pond	1949
6B	232.0	S	335986 351493	Ponds	1872

2.2 Historical Underground Working Features derived from 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? No

Database searched and no data found.

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? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	651.0	NE	336300 352500	Sand & Gravel	Borras Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Active
Not shown	920.0	W	334921 351797	Sand & Gravel	Apton Nursery Gravel Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	982.0	N	335962 352947	Sand & Gravel	Canister Cottages	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3 Mining, Extraction & Natural Cavities Map





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
0.0	On Site	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 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

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

No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

3.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

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

No

Database searched and no data found.

3.5 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.

3.6 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.

3.7 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.

3.8 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.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level.

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.10 Clay Mining

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

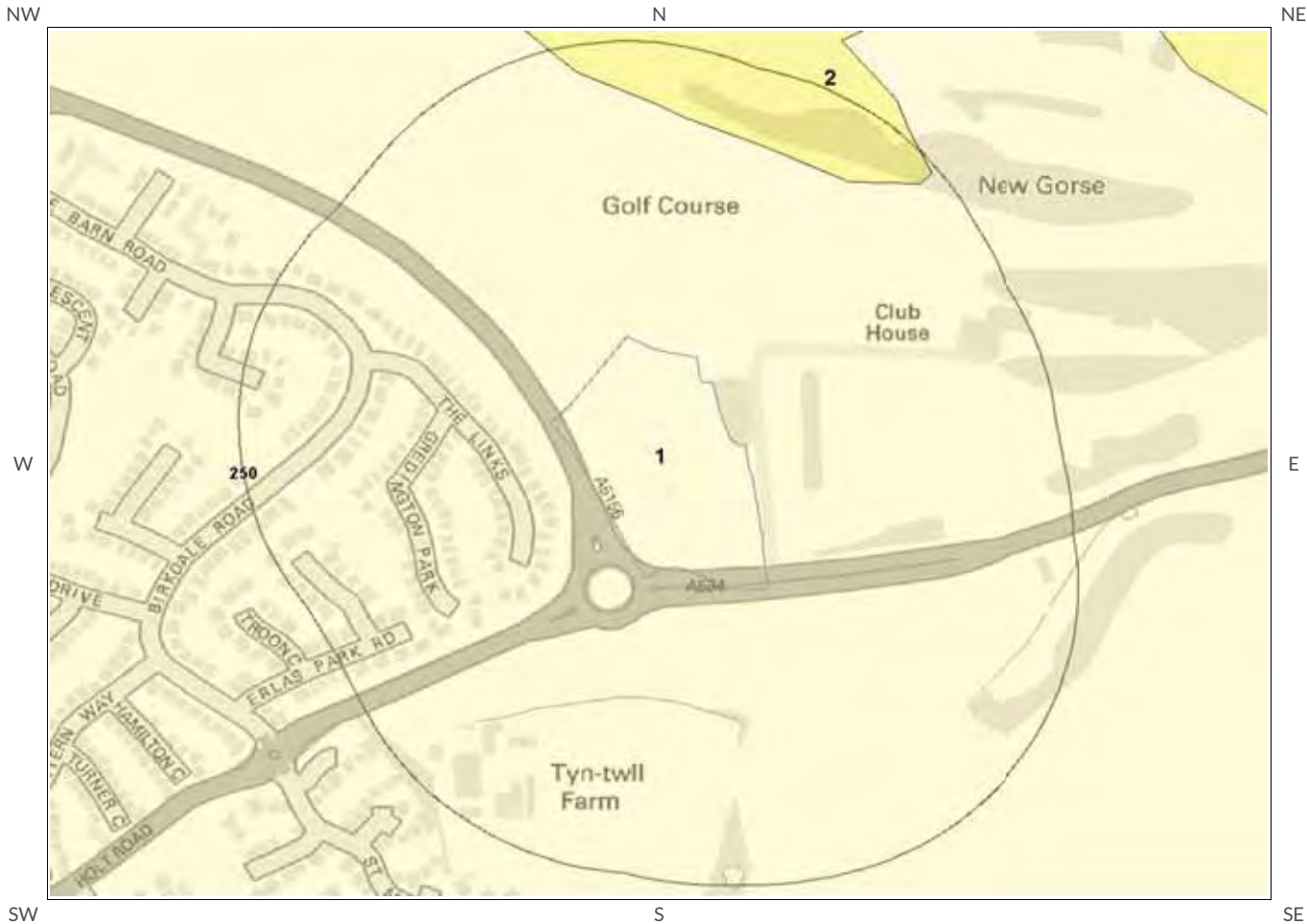
Are there any Clay Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

4 Natural Ground Subsidence

4.1 Shrink-Swell Clay Map



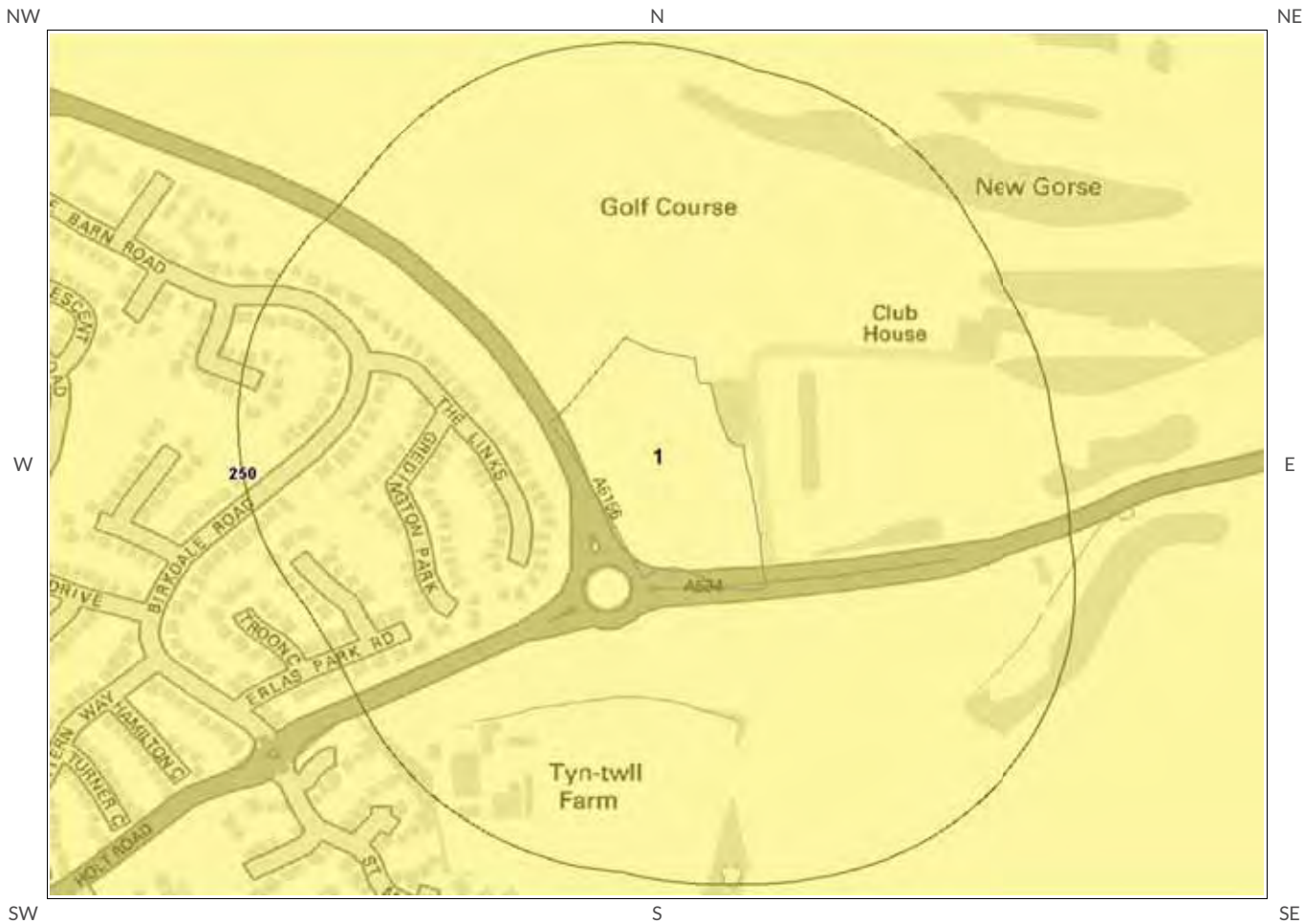
Shrink Swell Clay Legend

Mapping sourced from
 Ordnance Survey®

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4.2 Landslides Map



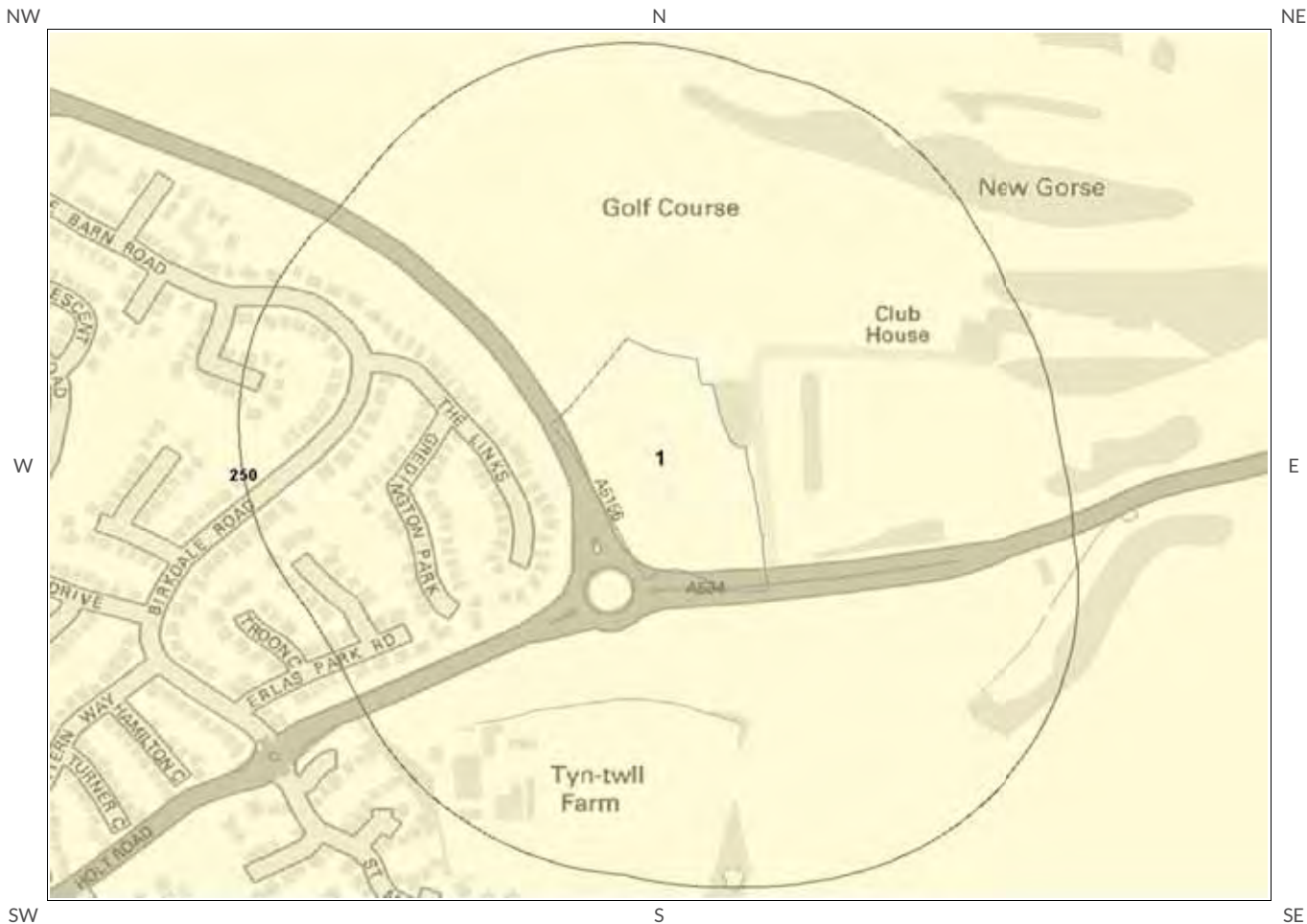
Landslides Legend



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4.3 Ground Dissolution Soluble Rocks Map



Ground Dissolution
Soluble Rocks Legend

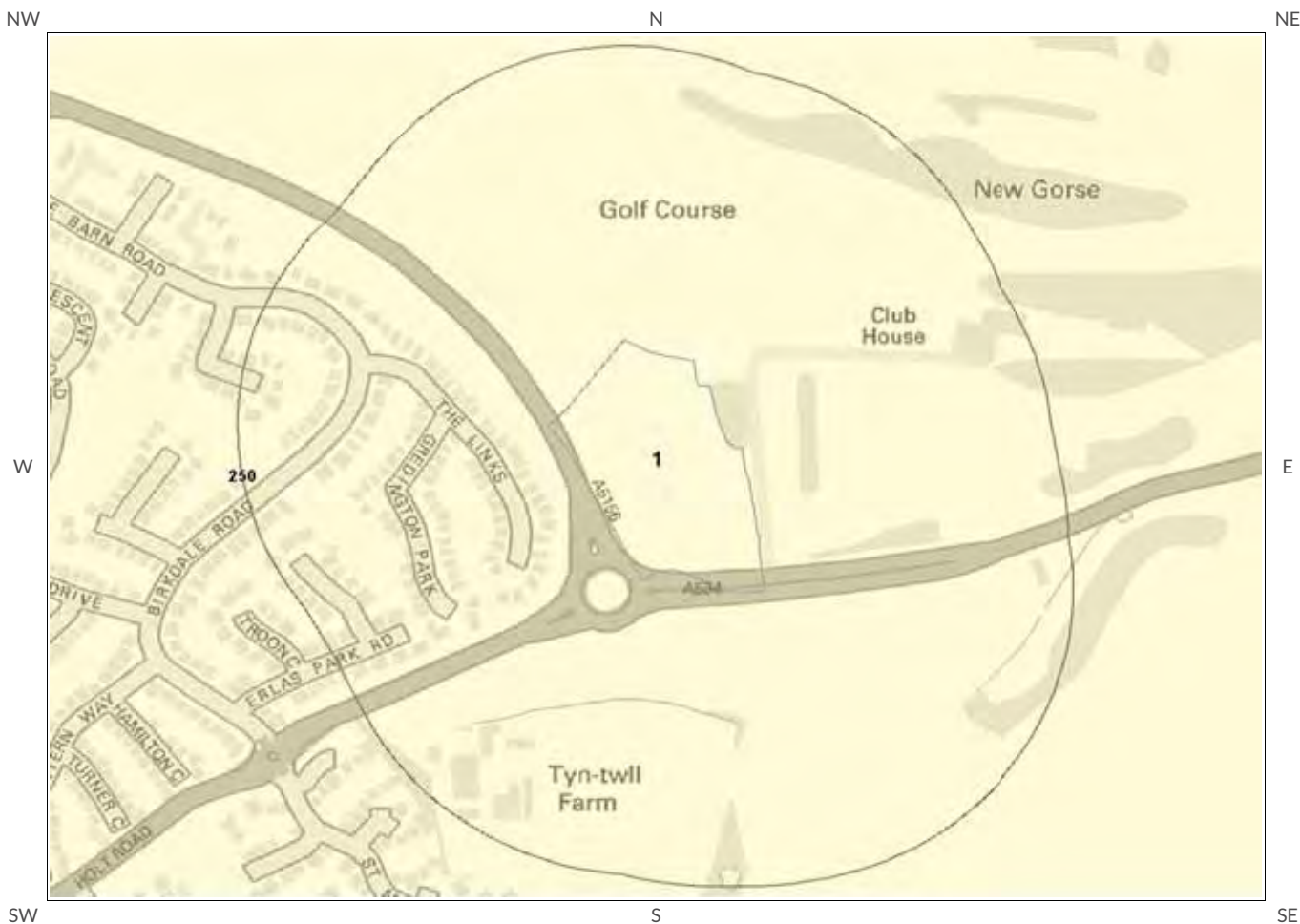
Mapping
sourced from



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4.4 Compressible Deposits Map



Compressible Deposits Legend



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4.5 Collapsible Deposits Map



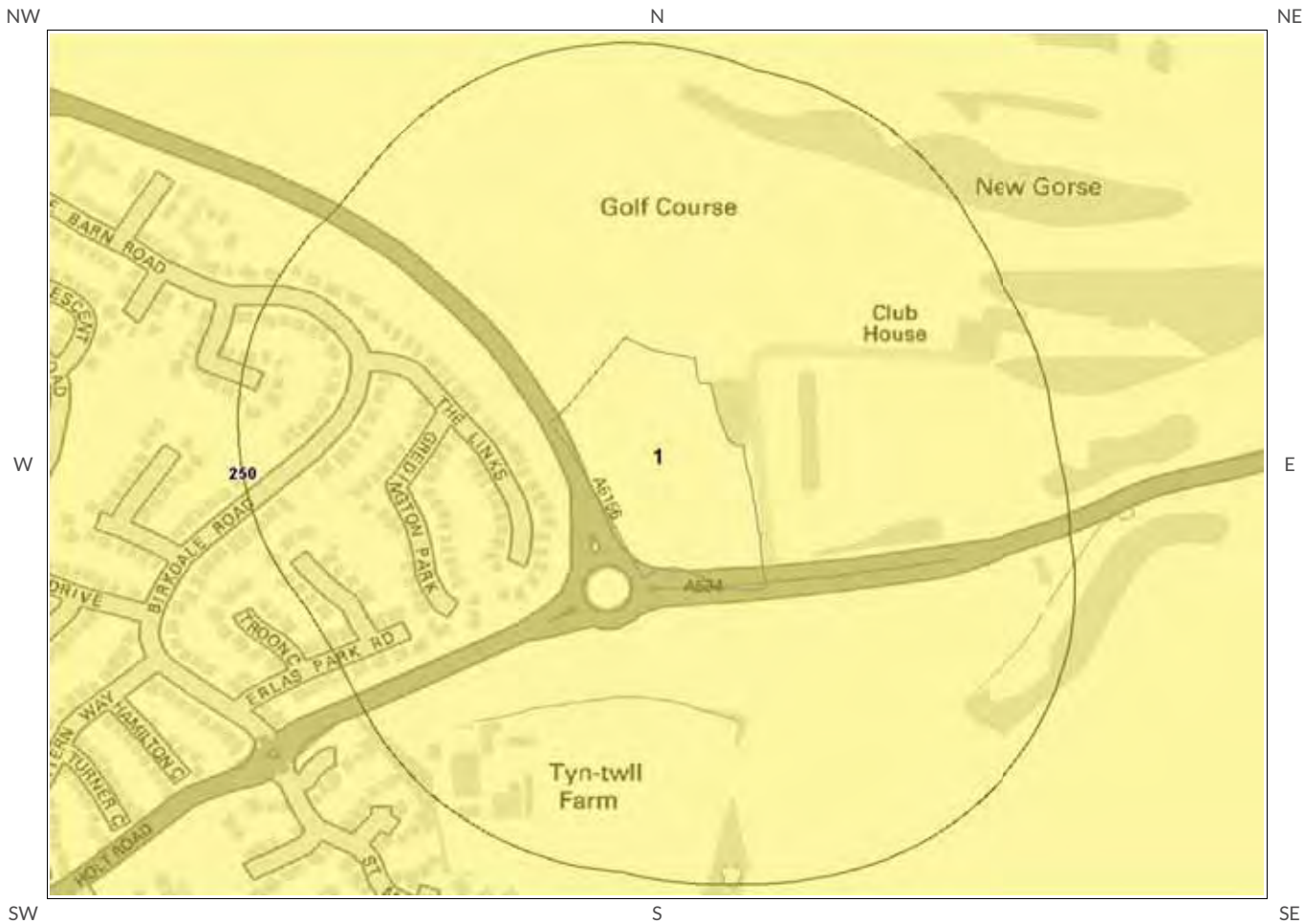
Collapsible Deposits Legend



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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**

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 Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	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.

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

4.4 Compressible Deposits

The following Compressible Deposits 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 provided by the British Geological Survey:

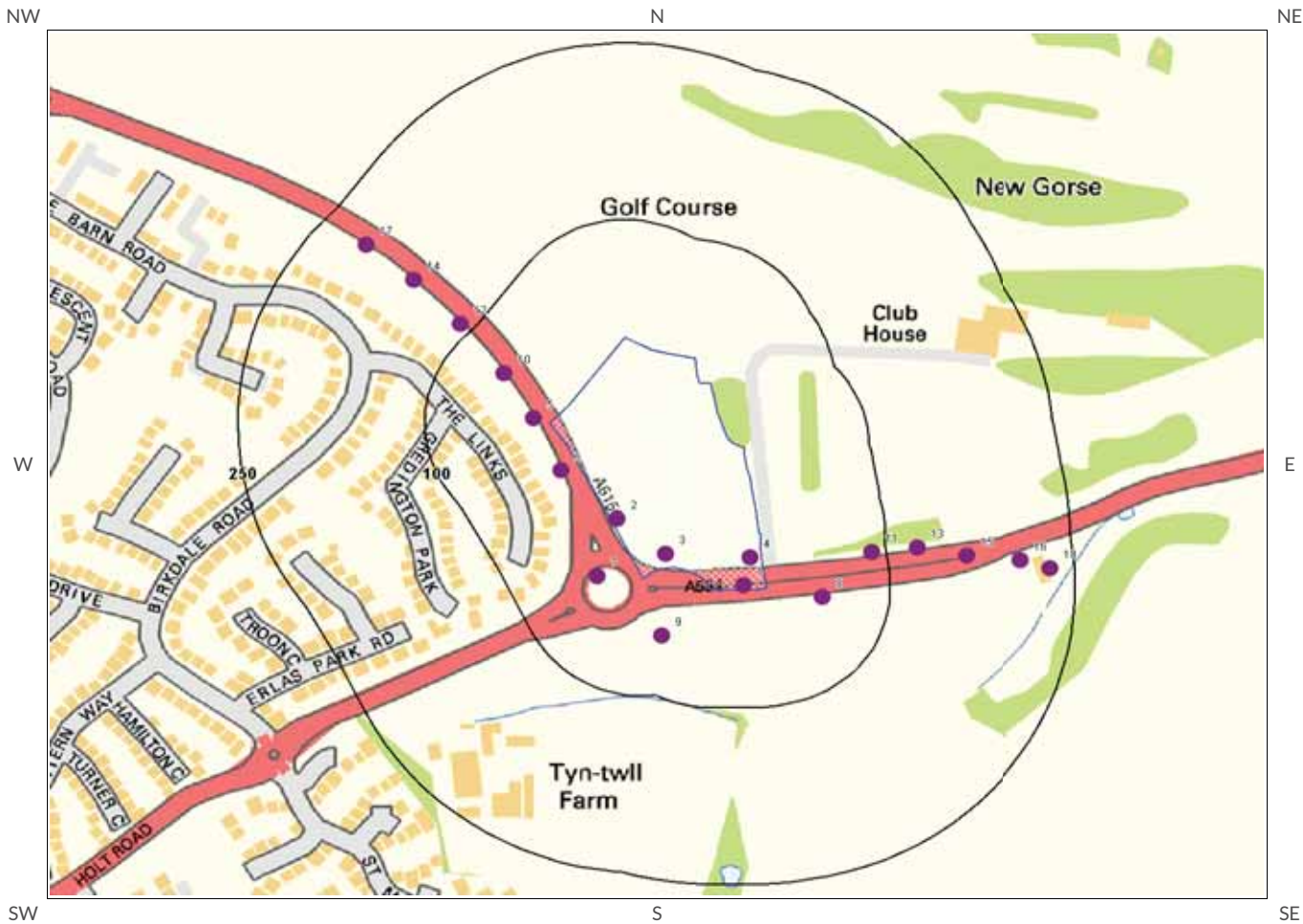
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

4.6 Running Sands

The following Running Sands information 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.

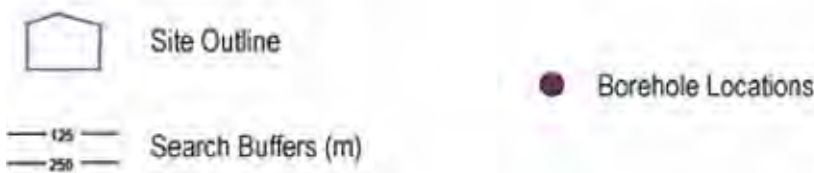
5 Borehole Records Map



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:

18

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	0.0	On Site	335992 351756	SJ35SE249	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD 09
2	0.0	On Site	335890 351812	SJ35SE286	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP07
3	0.0	On Site	335929 351782	SJ35SE287	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP08
4	0.0	On Site	335997 351779	SJ35SE289	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP10
5	14.0	W	335823 351898	SJ35SE285	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP06
6	15.0	SW	335845 351853	SJ35SE247	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD 07
7	33.0	SW	335874 351763	SJ35SE248	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD 08
8	46.0	E	336055 351746	SJ35SE290	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP11
9	51.0	S	335926 351713	SJ35SE288	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP09
10	56.0	NW	335799 351936	SJ35SE246	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD 06
11	89.0	E	336095 351784	SJ35SE250	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD 10
12	111.0	NW	335764 351978	SJ35SE284	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP05
13	125.0	E	336131 351788	SJ35SE291	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP12
14	163.0	NW	335727 352015	SJ35SE245	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD 05
15	163.0	E	336171 351781	SJ35SE251	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD 11
16	207.0	E	336216 351777	SJ35SE292	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP13
17	211.0	NW	335689 352045	SJ35SE283	-1.0	WREXHAM INDUSTRIAL ESTATE ACCESS ROAD TP04
18	231.0	E	336240 351770	SJ35SE81	9.55	KEEPERS COTTAGE LLANYPWLL

Additional online information is available for the following boreholes listed above:

#18: scans.bgs.ac.uk/sobi_scans/boreholes/154697



6 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

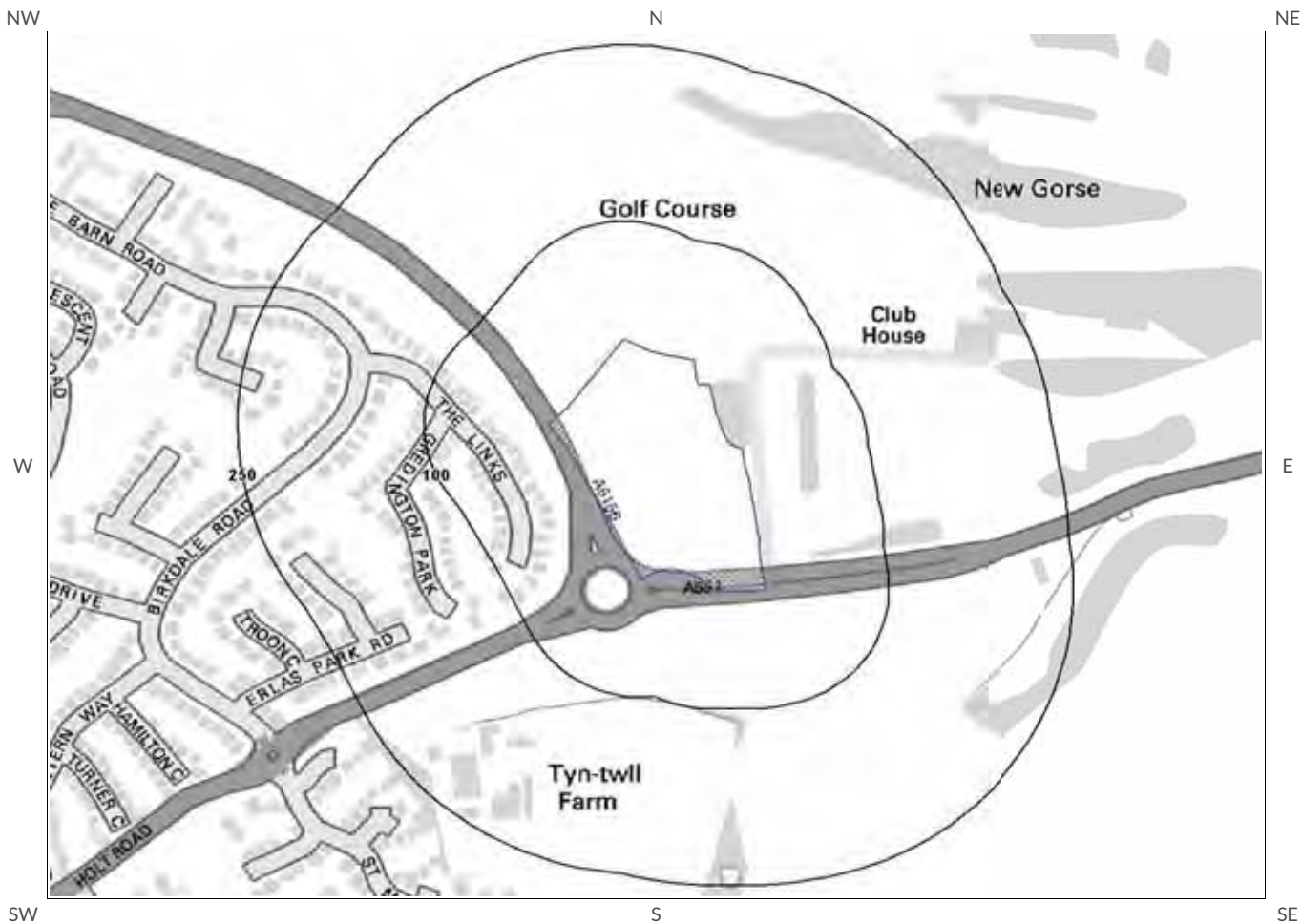
4

For further information on how this data is calculated and limitations upon its use, please see the GroundSure GeoInsight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
0.0	On Site	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
33.0	N	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
69.0	NE	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

7 Railways and Tunnels Map



Railways and Tunnels Legend

Mapping
sourced from

 **Ordnance
Survey**

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- | | | | | | |
|---|--------------------|---|---|---|--|
|  | Site Outline |  | Underground or Partially Underground
Railway / Subway System |  | Railway Track (OpenStreetMap) |
|  | Search Buffers (m) |  | Railway Tunnel (OS Mapping) |  | High Speed 2 |
| | |  | Abandoned or Dismantled Railway
(OpenStreetMap) |  | Crossrail |
| | |  | Railway Track (OS Mapping) |  | Railway and/or Tunnel Feature
from Historical Mapping |



7 Railways and Tunnels

7.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

7.2 Historical Railway and Tunnel Features

This data is derived from GroundSure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

7.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

7.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

7.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail.

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail rail project? No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a **GroundSure HS2 and Crossrail Report**.

Contact Details

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Email: enquiries@bgs.ac.uk
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BGS Geological Hazards Reports and general geological enquiries



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Website: <http://www.peterbrett.com/home>



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Report Reference: EMS-267849_361427
Client Reference: EMS_267849_361427

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

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

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 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 writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order

shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(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, and
(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. 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 (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and
(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

- (i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;
 - (ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;
 - (iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
 - (iv) not combine the Services with or incorporate such Services into any other information data or service;
 - (v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);
 - (vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and
 - (vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,
- 6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.
- 6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7. Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

- (i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;
 - (ii) any use made of the Reports, Services, Materials or any part of them; and
 - (iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.
- 7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.
- 7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.
- 7.4 GroundSure shall not be liable for

- (i) loss of profits;
- (ii) loss of business;
- (iii) depletion of goodwill and/or similar losses;
- (iv) loss of anticipated savings;
- (v) loss of goods;
- (vi) loss of contract;
- (vii) loss of use;
- (viii) loss or corruption of data or information;
- (ix) business interruption;
- (x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;
- (xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;
- (xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;
- (xiii) loss or damage to a computer, software, modem, telephone or other property; and
- (xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

- (i) the Client fails to pay any sum due to GroundSure within 30

days of the Payment Date; 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 or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

- (i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and
- (ii) the Reports and/or Mapping provided under this Contract are
 - (a) supplied to the Client's specification(s) and in any event
 - (b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

- (i) 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 and/or Beneficiary any property of the Client and/or Beneficiary in GroundSure's possession or control; and
- (ii) 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 or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

- (i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;
- (ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and
- (iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, 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.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 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 Third Party Data Providers;
- (viii) changes in law; or
- (ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 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.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 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.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law

Site Details:

Wrexham Golf Course Holt
Road, Wrexham, LL13 9SB

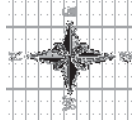
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Grid Ref: 335930, 351856

Map Name: County Series

Map date: 1872

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1872
Edition N/A
Copyright N/A
Levelled N/A

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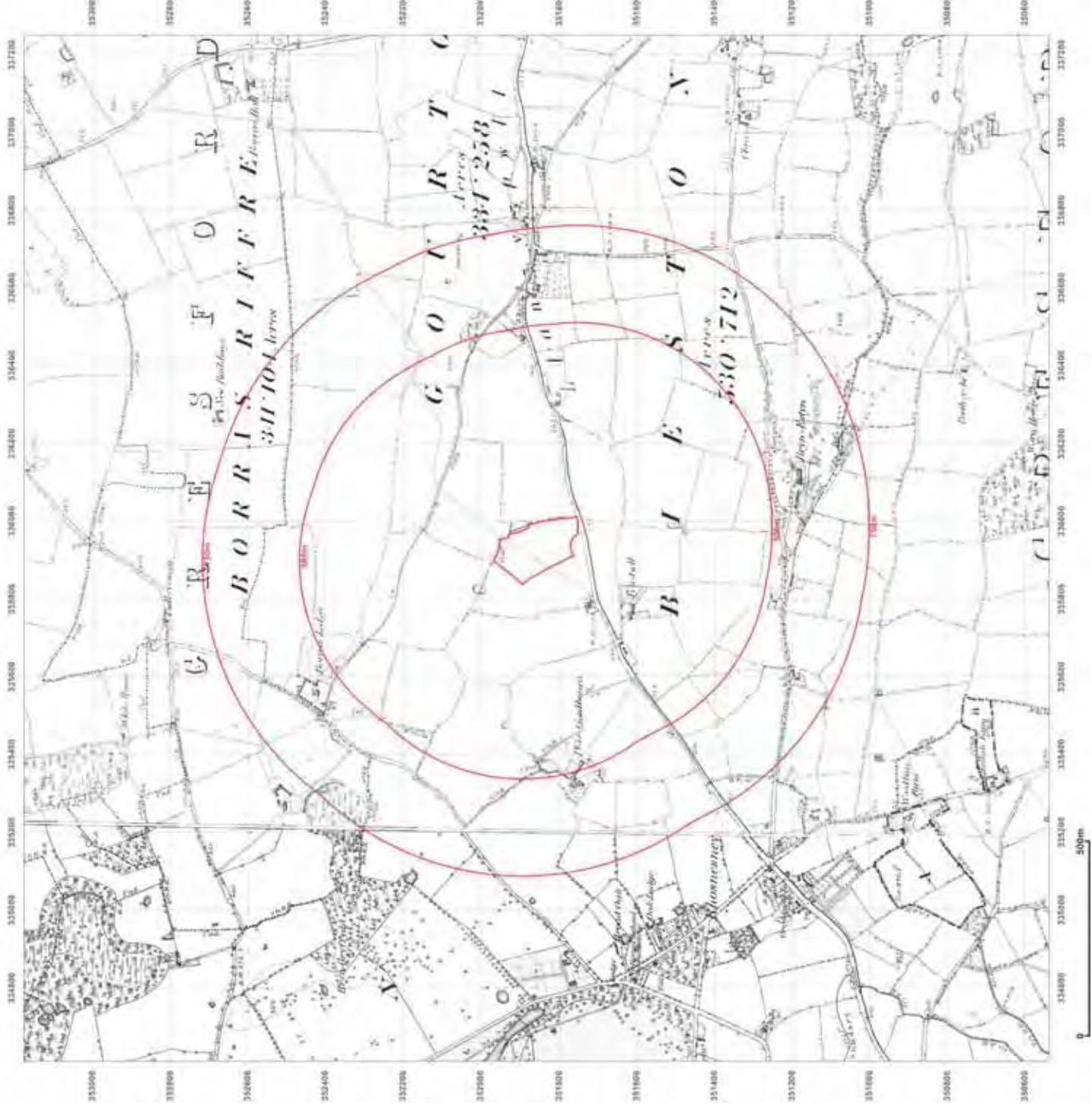


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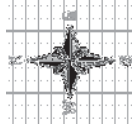
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Map Name: County Series

Map date: 1898-1900

Scale: 1:10,560

Printed at: 1:10,560



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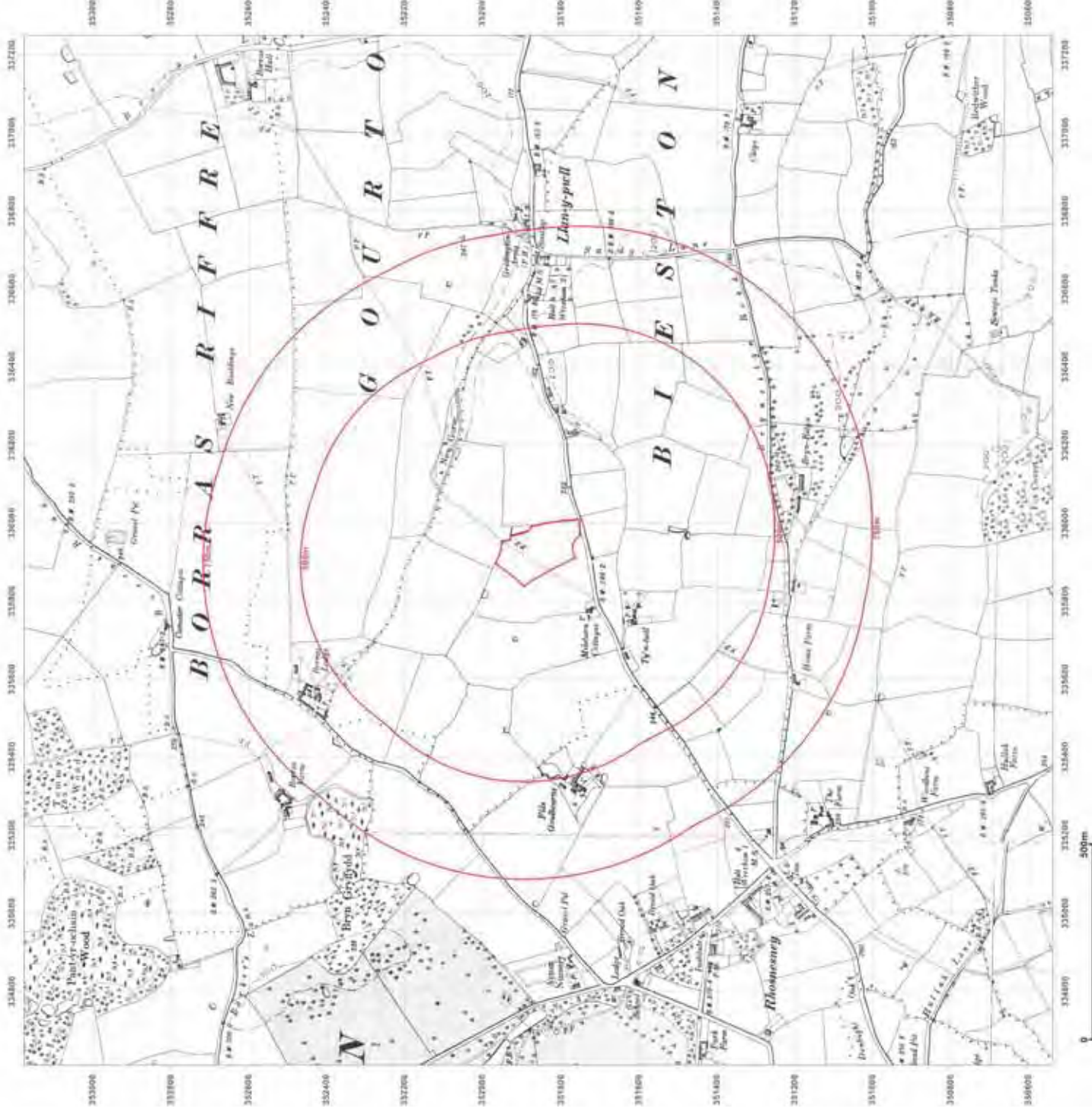


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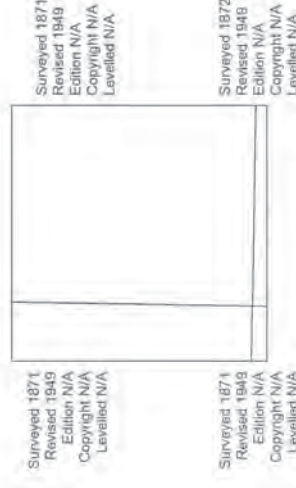
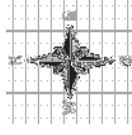
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Map Name: County Series

Map date: 1949

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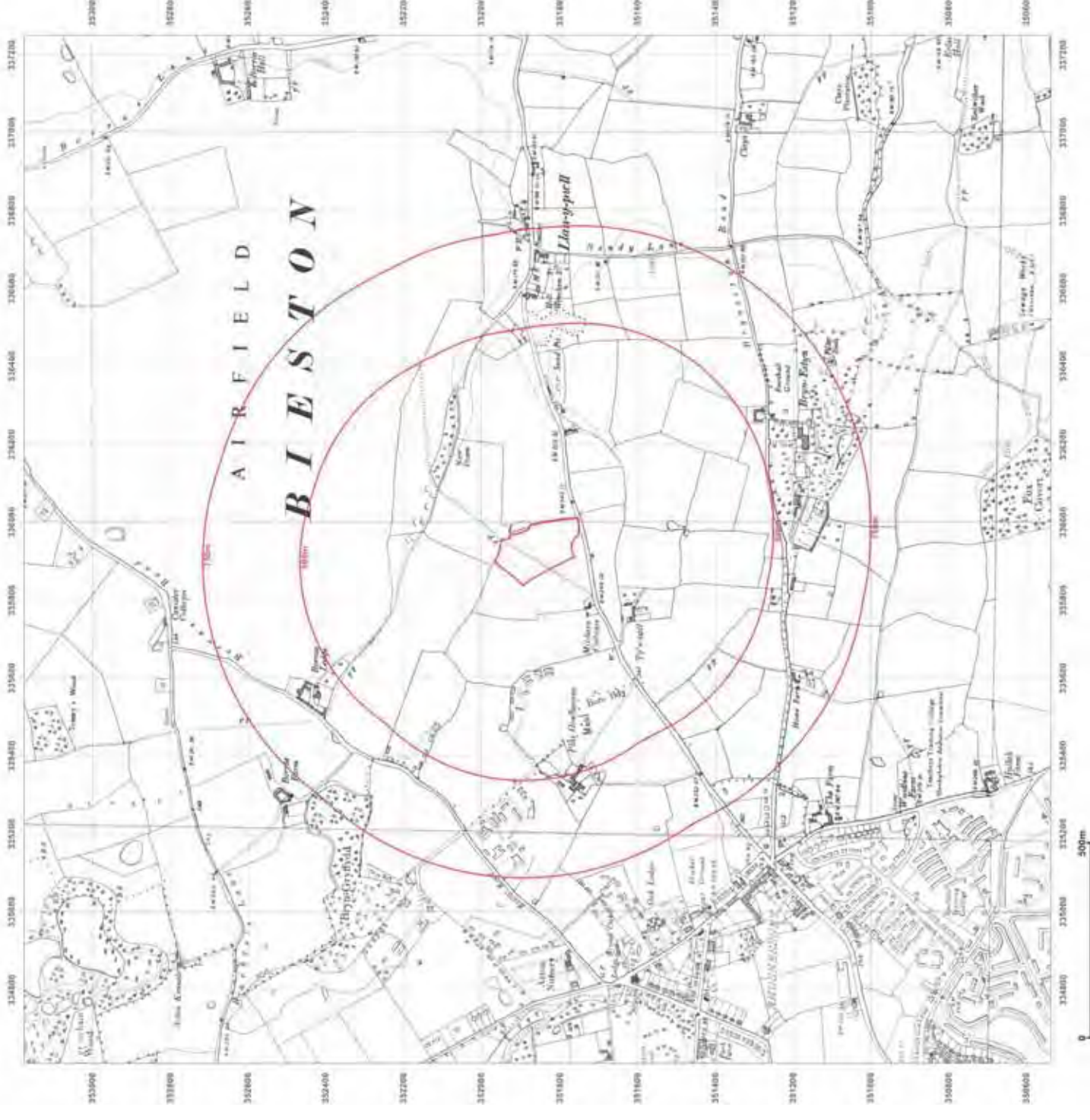


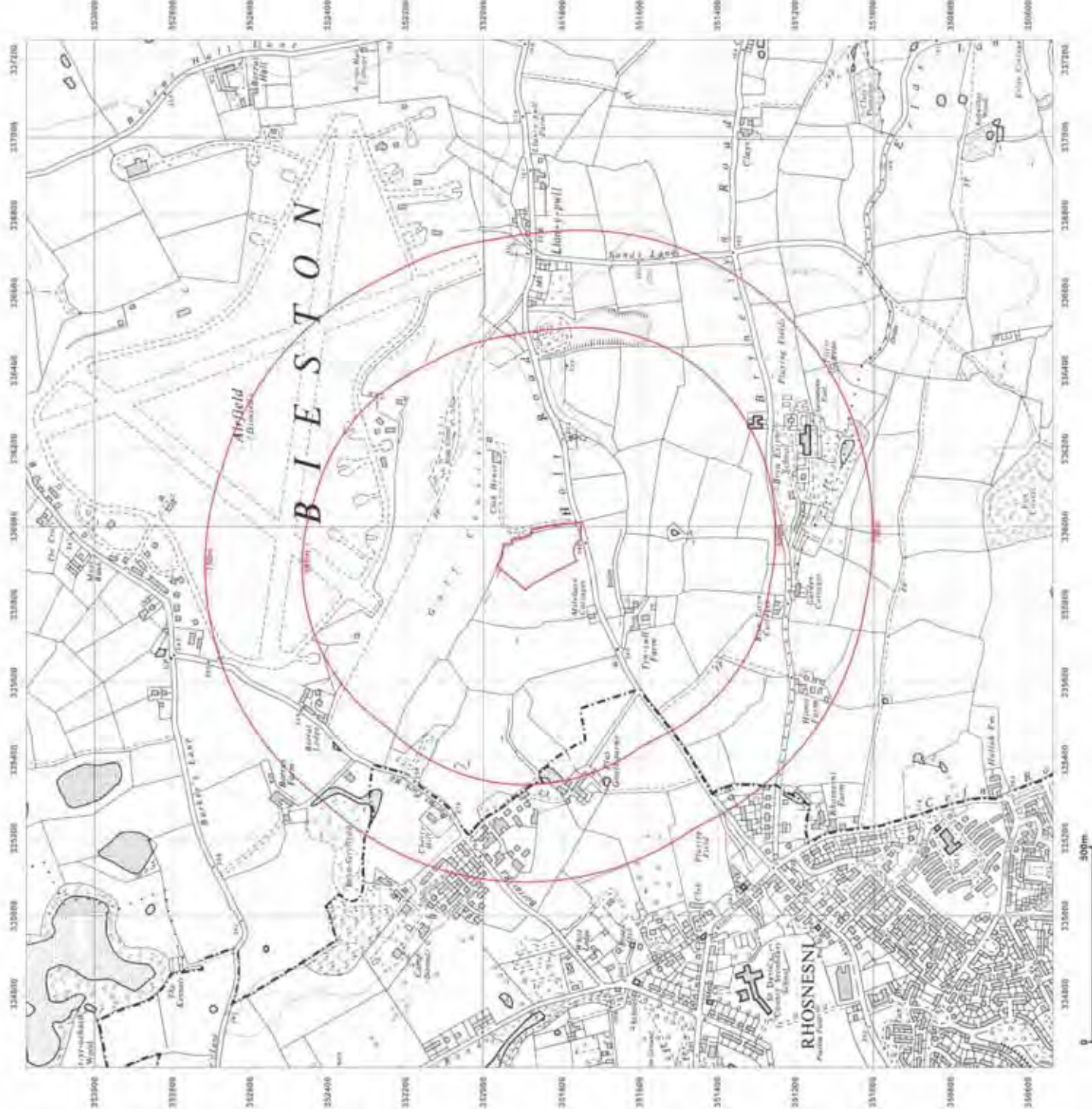
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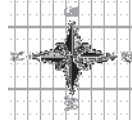
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Map Name: National Grid

Map date: 1980-1982

Scale: 1:10,000

Printed at: 1:10,000



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Surveyed 1970
Revised 1982
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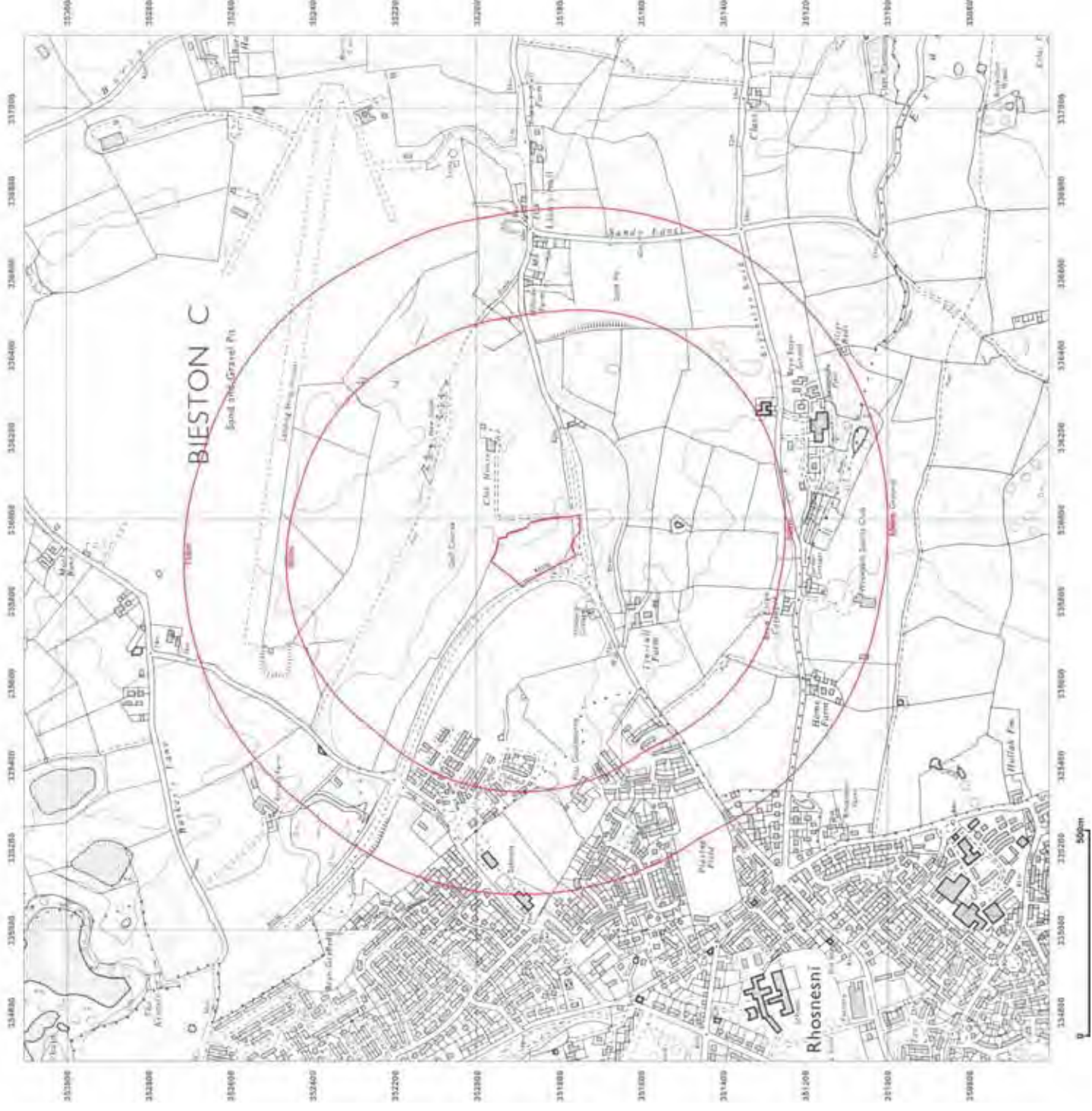


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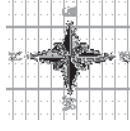
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Map Name: National Grid

Map date: 1989-1992

Scale: 1:10,000

Printed at: 1:10,000



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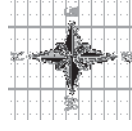
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Grid Ref: 335930, 351856

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



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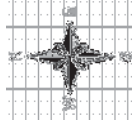
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Report Ref: EMS-267849_361426
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Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



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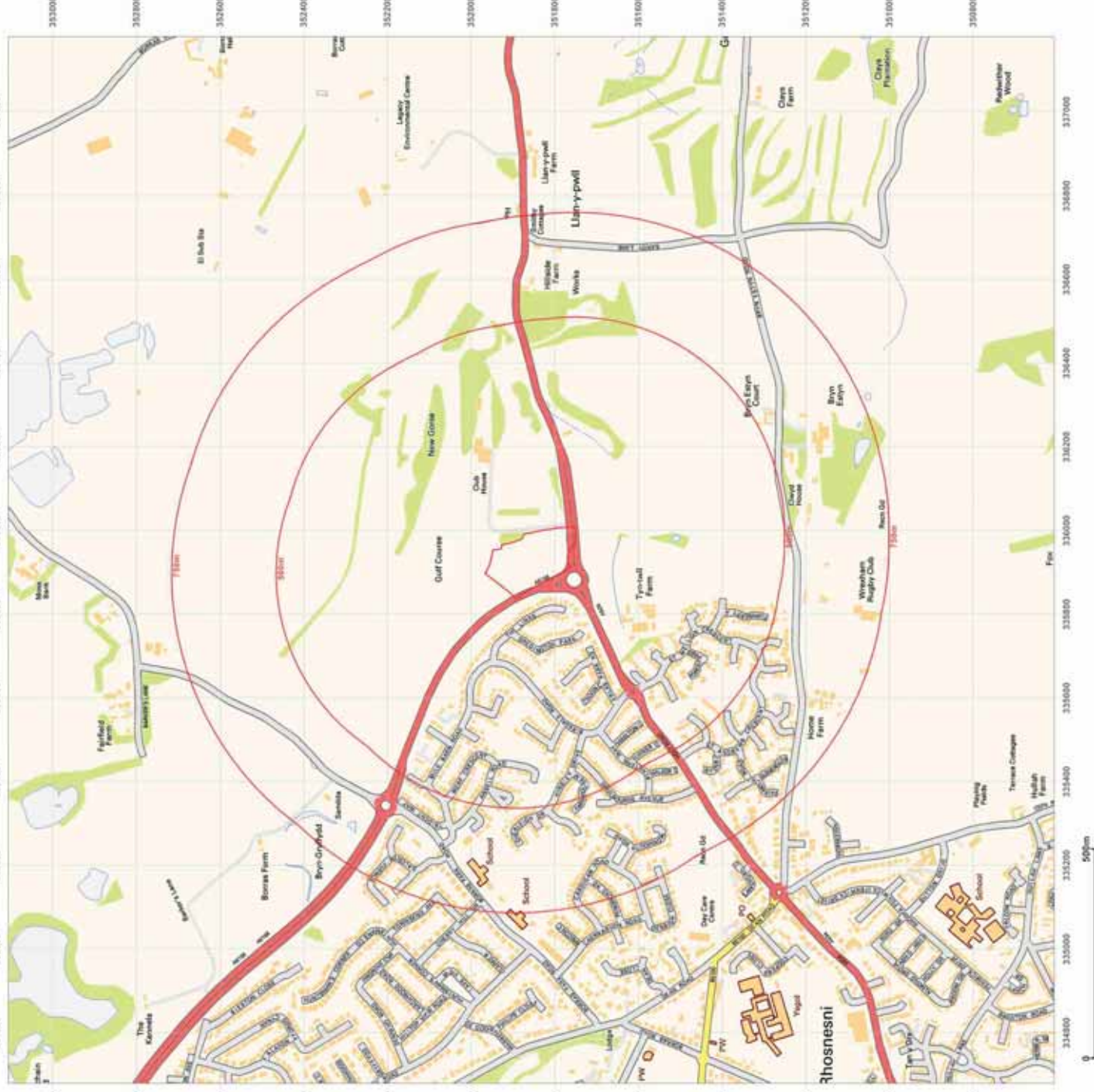


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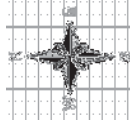
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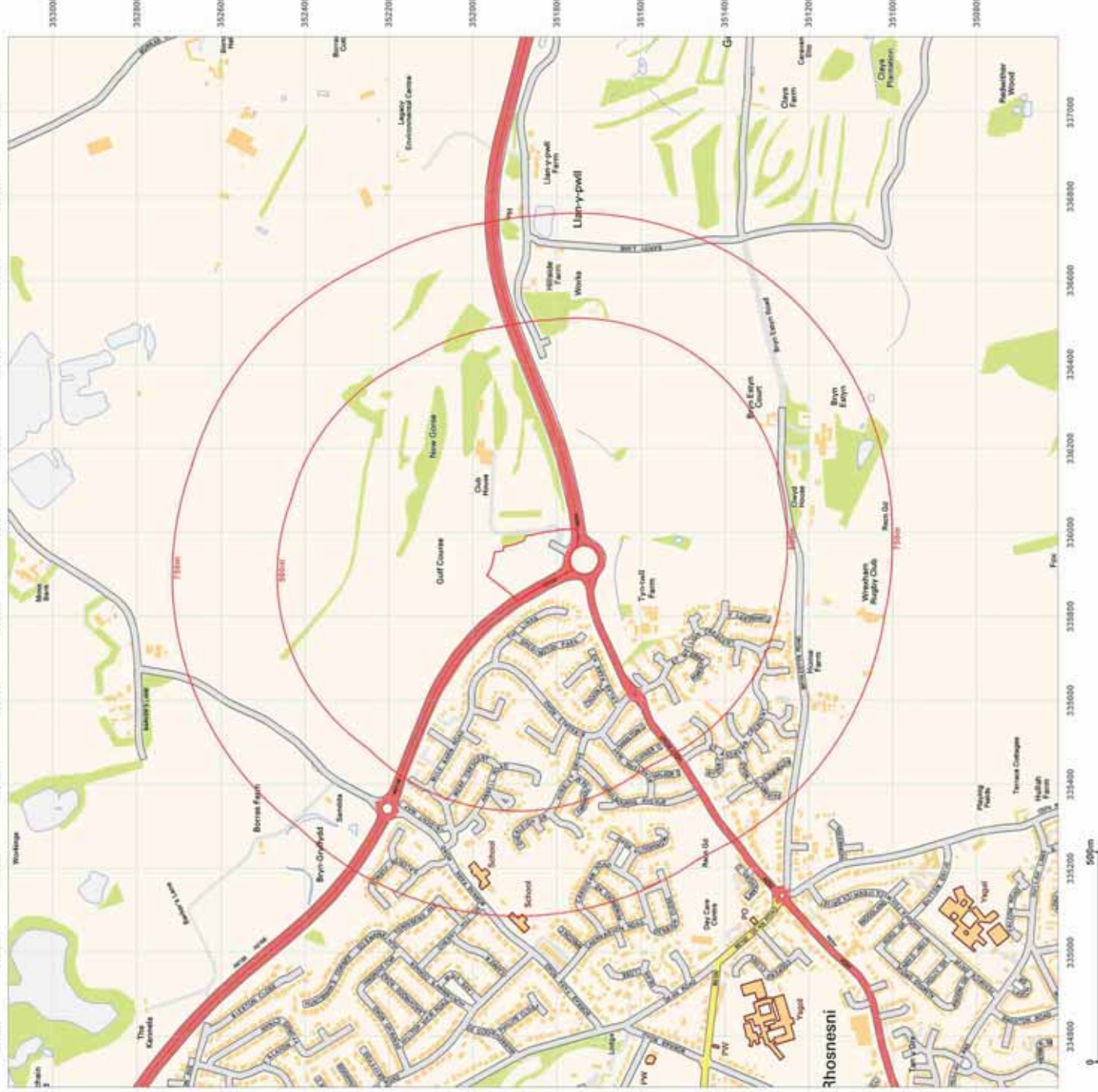


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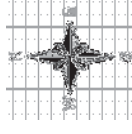
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Report Ref: EMS-267849_361426
Grid Ref: 335930, 351856

Map Name: County Series

Map date: 1874

Scale: 1:2,500

Printed at: 1:2,500



Survived 1874
Revised 1874
Edition N/A
Copyright N/A
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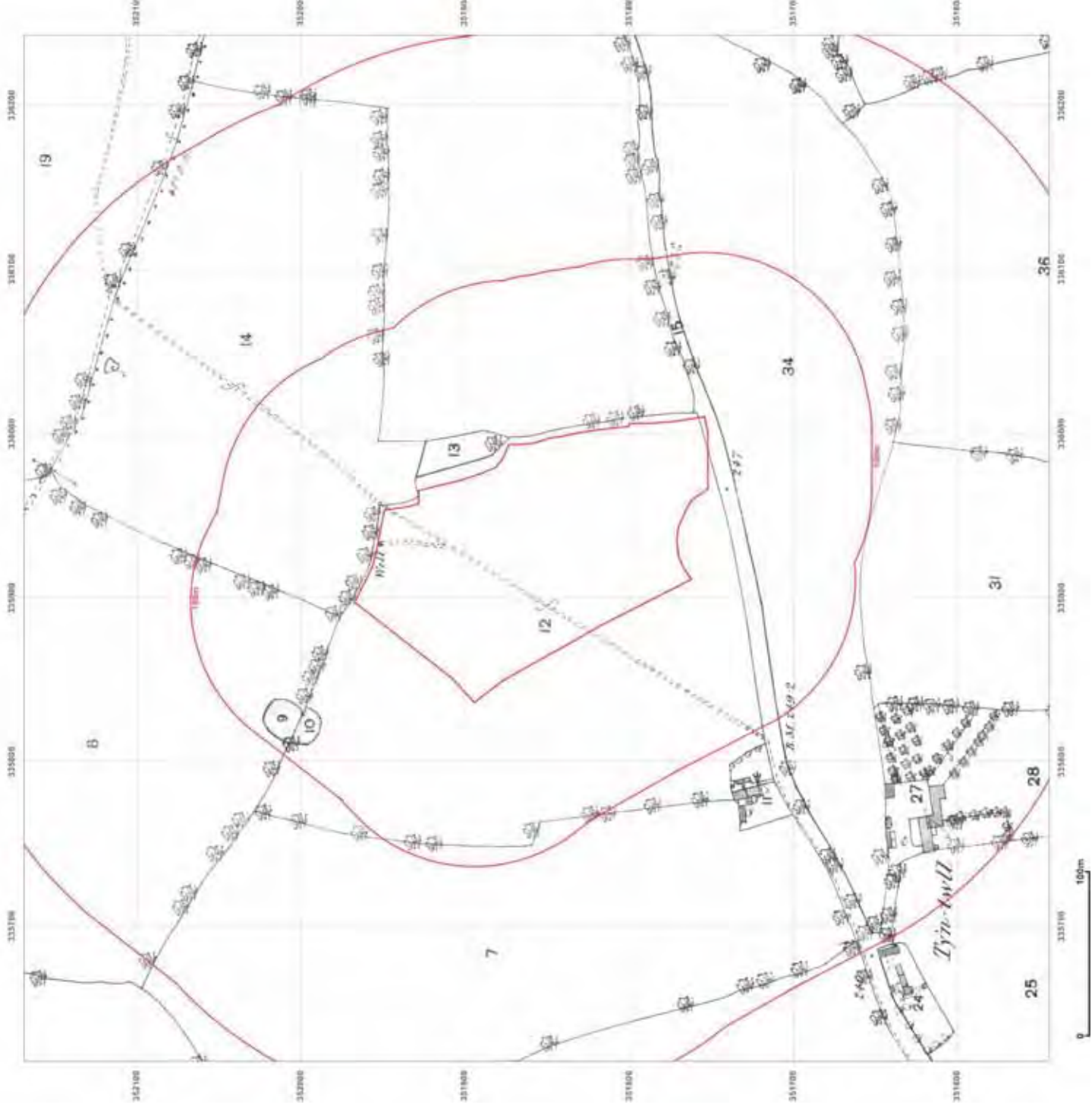


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Site Details:

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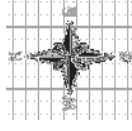
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Report Ref: EMS-267849_361426
Grid Ref: 335930, 351856

Map Name: County Series

Map date: 1899

Scale: 1:2,500

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Surveyed 1889
Revised 1888
Edition N/A
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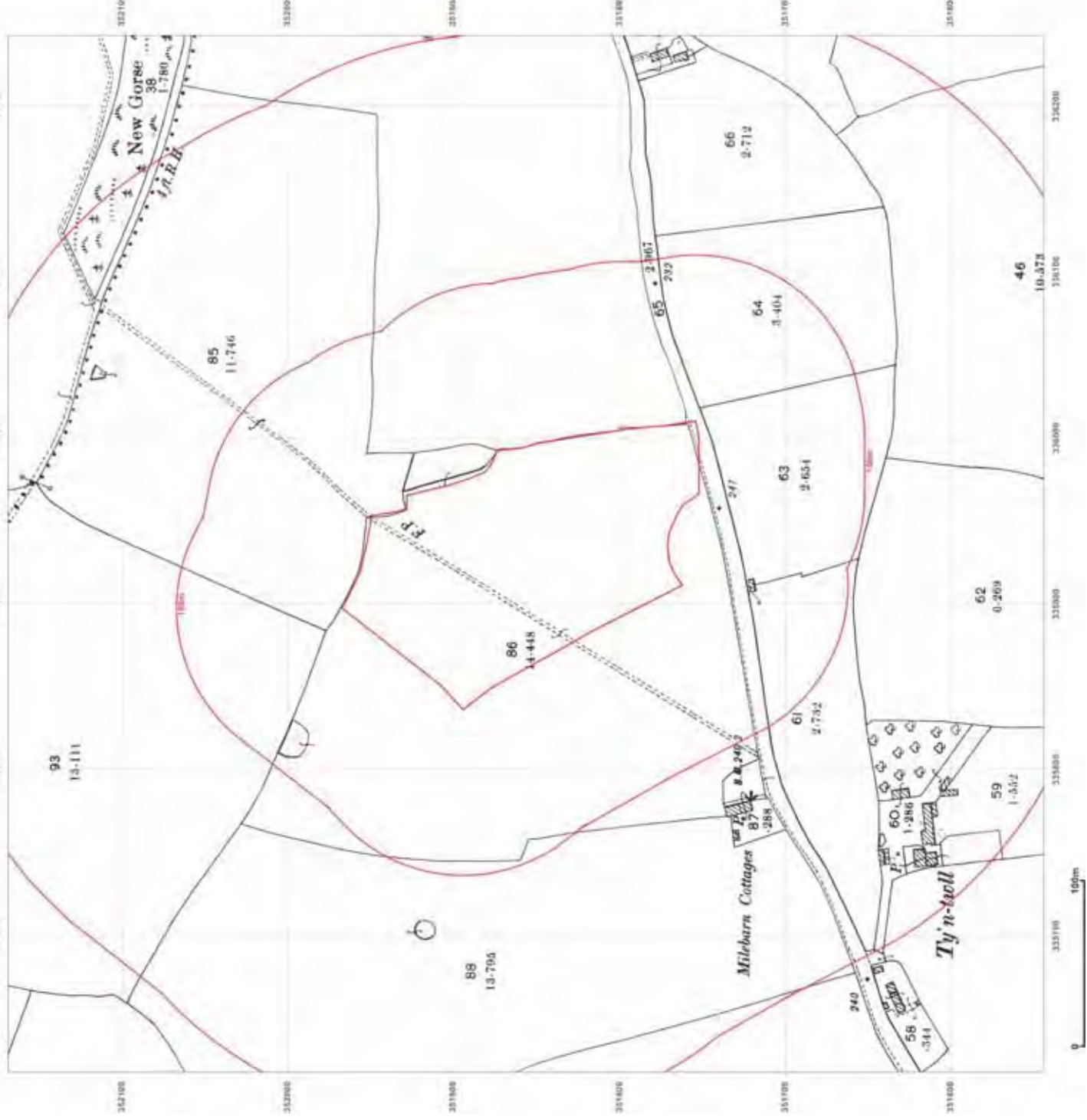


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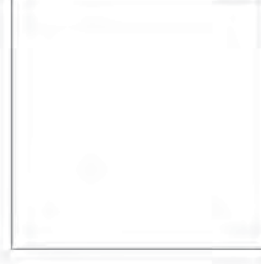
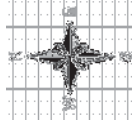
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Grid Ref: 335930, 351856

Map Name: County Series

Map date: 1912

Scale: 1:2,500

Printed at: 1:2,500



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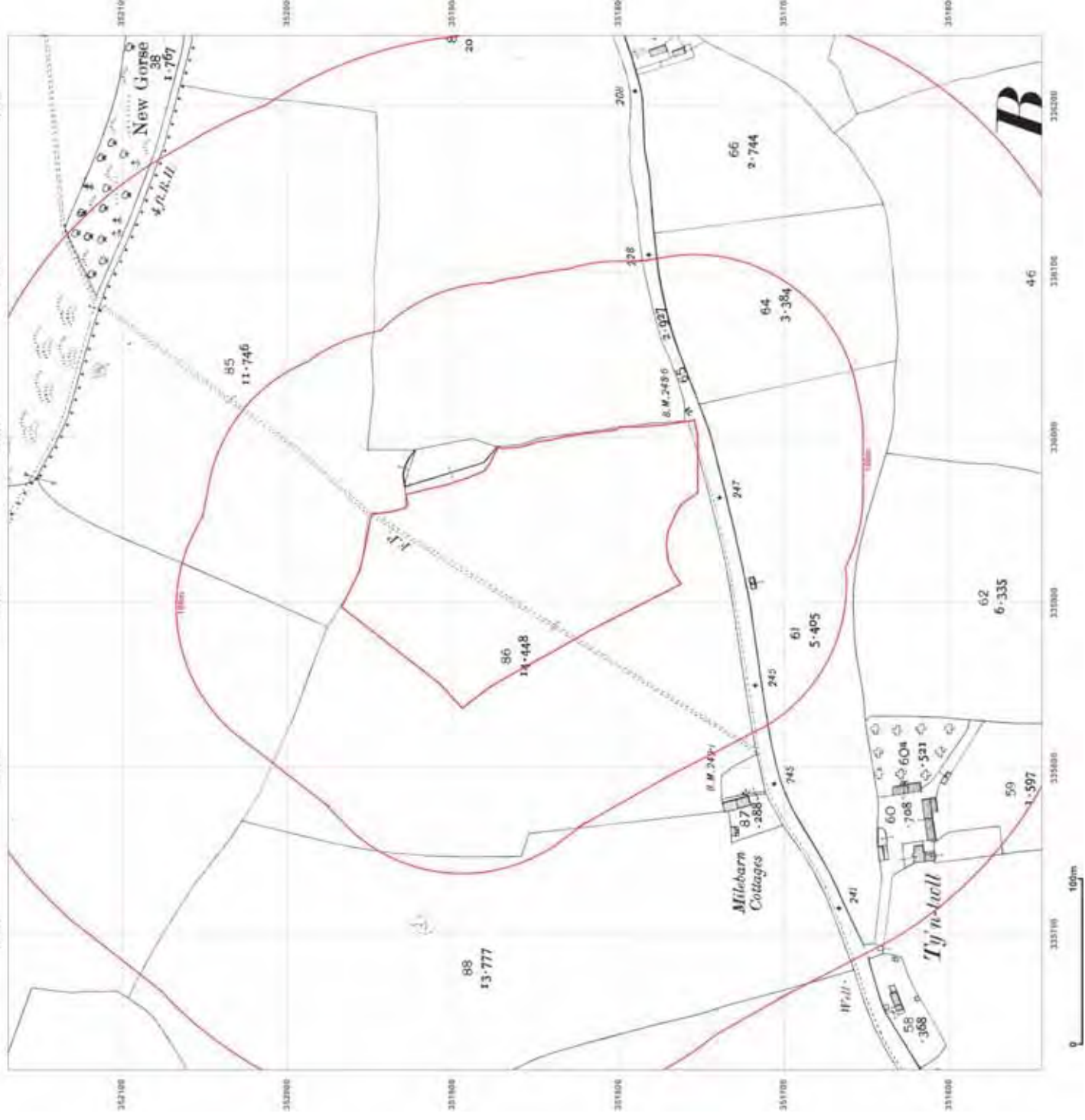


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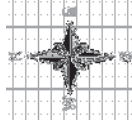
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Grid Ref: 335930, 351856

Map Name: National Grid

Map date: 1959

Scale: 1:1,250

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Site Details:

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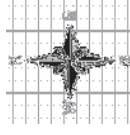
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Report Ref: EMS-267849_361426
Grid Ref: 335930, 351856

Map Name: National Grid

Map date: 1958-1961

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1961
Revised 1961
Edition N/A
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Surveyed 1961
Revised 1961
Edition N/A
Copyright 1962
Levelled 1959

Surveyed 1958
Revised 1958
Edition 1960
Copyright 1960
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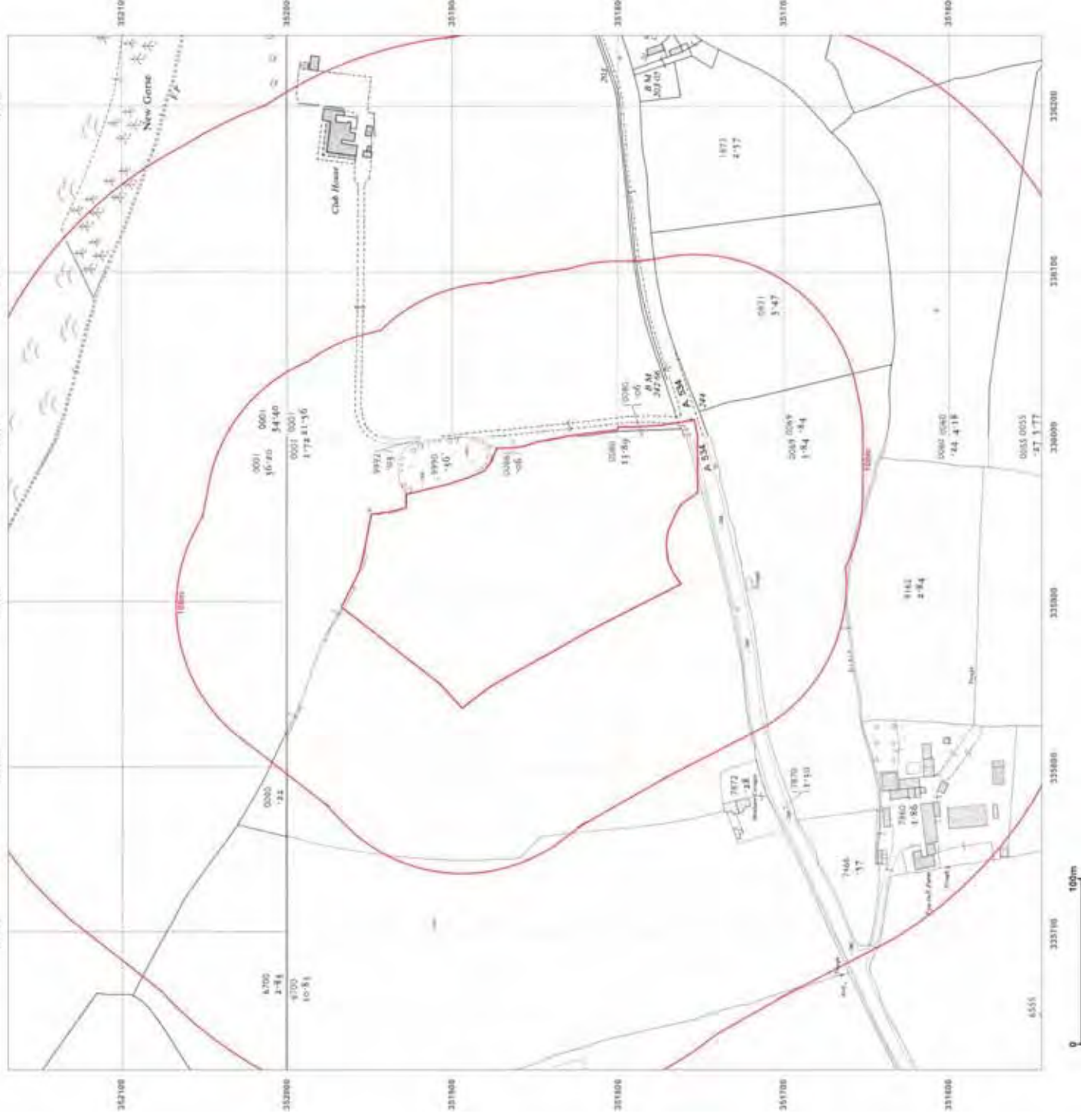


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Wrexham Golf Course, Holt
Road, Wrexham, LL13 9SB

Map Name: National Grid



Scale: 1:1,250

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Site Details:

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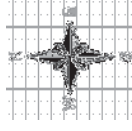
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Report Ref: EMS-267849_361426
Grid Ref: 335930, 351856

Map Name: National Grid

Map date: 1987-1989

Scale: 1:2,500

Printed at: 1:2,500



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Revised N/A
Edition N/A
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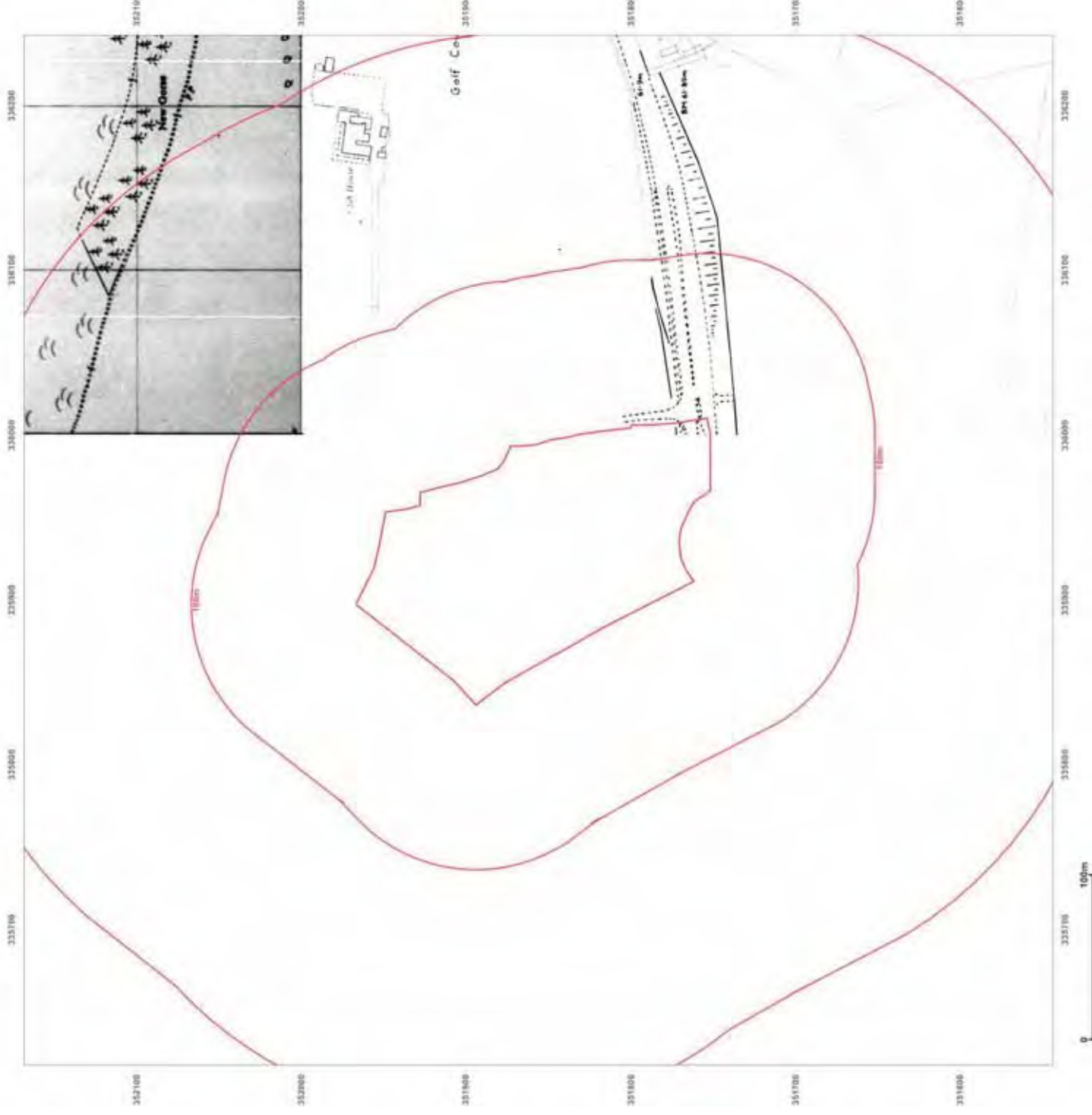


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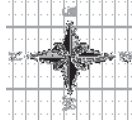
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Grid Ref: 335930, 351856

Map Name: National Grid

Map date: 1988-1992

Scale: 1:1,250

Printed at: 1:2,000



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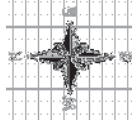
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Report Ref: EMS-267849_361426
Grid Ref: 335930, 351856

Map Name: National Grid

Map date: 1992

Scale: 1:1,250

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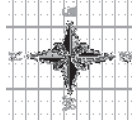
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Map Name: National Grid

Map date: 1987-1992

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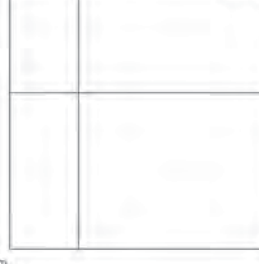
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Revised 1989
Edition N/A
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Report Ref: EMS-267849_361426

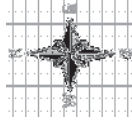
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Map Name: National Grid

Map date: 1992

Scale: 1:2,500

Printed at: 1:2,500



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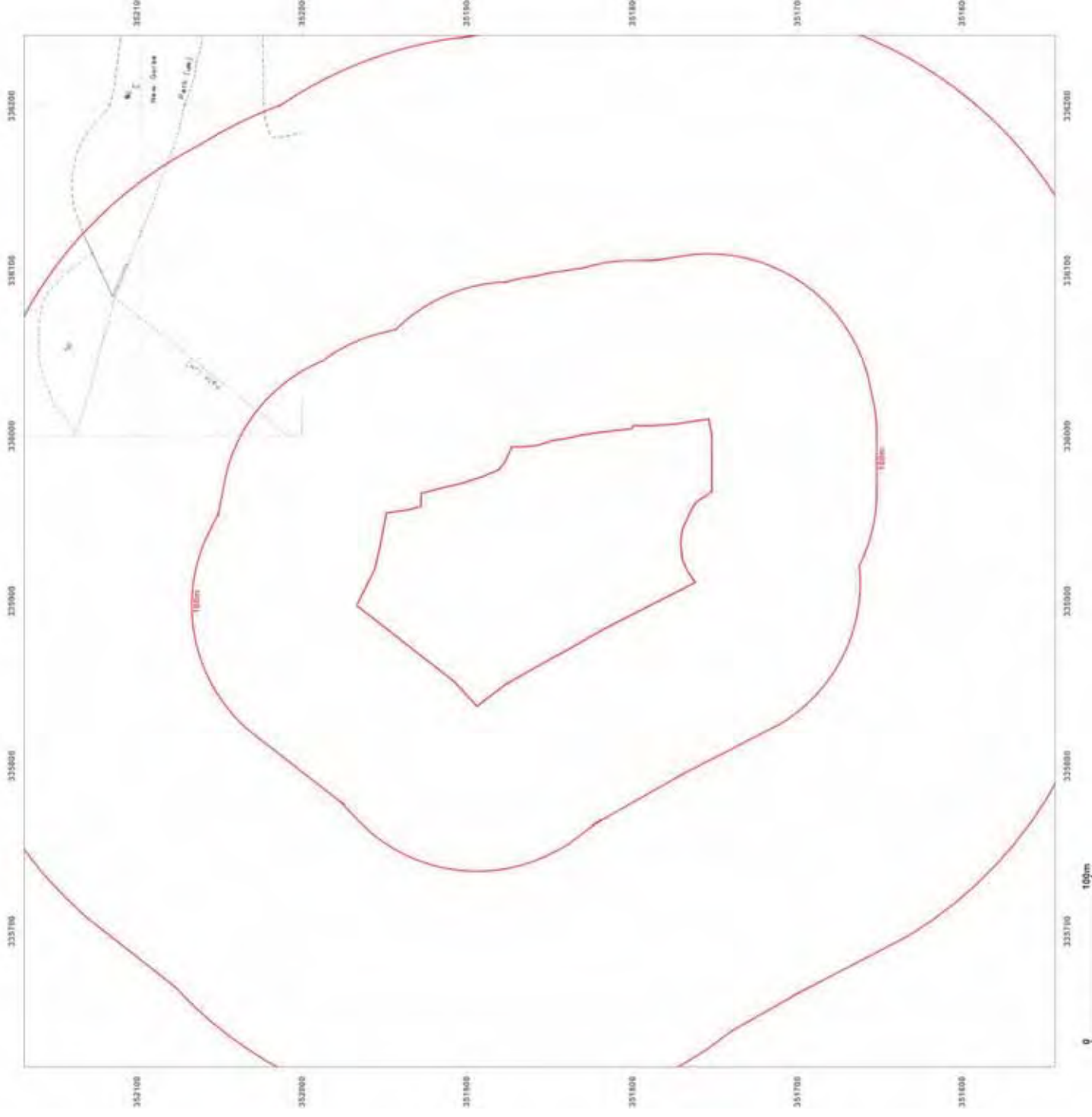


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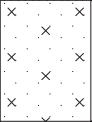
Production date: 16 September 2014

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Site Holt Road, Wrexham LL13 9SB						TP1		
Job No CRM.413.106		Dates Start 04-09-14 Finish 04-09-14		Ground Level (m)				Co-Ordinates
Client Simpson Associates						Sheet 1 of 1		
Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
	Depth (m)	No/Type	Results					
	0.20	ES		0.30			Dark brown sand.	0
	0.50	B		0.70			Red brown occasionally slightly gravelly slightly clayey silty SAND.	
							Trial Pit completed at 0.70m.	1
								2
								3
								4
				{4.00}				
General Remarks Dimensions: xx0.70 EQUIPMENT: Hand excavated.. METHOD: Hand dug. CASING: No casing used. REMARKS: Groundwater not encountered. BACKFILL: On completion, the trial pit was backfilled with arisings.								
All dimensions in metres Scale 1:25						Logged By SM		

1.1 ENZYGO TP LOG CRM.413.106 HOLT ROAD WREXHAM.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 6/10/14



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Site Holt Road, Wrexham LL13 9SB				WS1
Job No CRM.413.106	Dates Start 04-09-14 Finish 04-09-14	Ground Level (m)	Co-Ordinates	
Client Simpson Associates				Sheet 1 of 1

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
		0.20	ES		0.40			Grass over dark brown occasionally gravelly sand with occasional coal fragments.	0
		1.00 1.00 - 1.45	D SPT	C 12				Loose to medium dense reddish brown occasionally gravelly silty SAND becoming clayey with depth, with occasional coal fragments. Gravel is fine to coarse sandstone. Sand is fine to medium.	1
		2.00 2.00 - 2.45	D SPT	C 5	2.50				2
		2.80 - 3.00 3.00 - 3.45	D SPT	C 11				Medium dense red brown occasionally gravelly silty SAND. Gravel is fine to medium, rounded.	3
		3.80 - 4.00 4.00 - 4.45	D SPT	C 10	4.60				4
		4.80 - 5.00 5.00 - 5.45	D SPT	C 17				Medium dense to dense red brown SAND and GRAVEL with fine coal fragments. Gravel is fine to medium, rounded. Sand is medium to coarse.	5
					5.45			Borehole completed at 5.45m.	6
					{8.00}				7
									8

General Remarks

EQUIPMENT: Premier Window Sampling Tracked Rig.
METHOD: Dynamic sampled 0m-5.45mbgl. CPT at 1.00m spacing.
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
All dimensions in metres Scale 1:50				Logged By SM

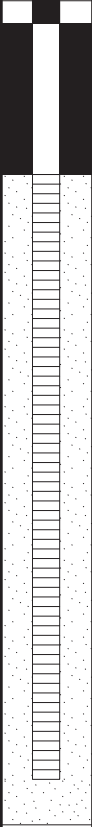
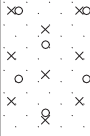
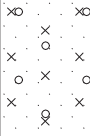
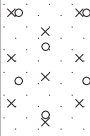
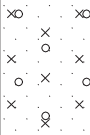
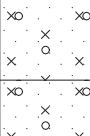
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Site Holt Road, Wrexham LL13 9SB				WS2
Job No CRM.413.106	Dates Start 03-09-14 Finish 03-09-14	Ground Level (m)	Co-Ordinates	

Client Simpson Associates	Sheet 1 of 1
------------------------------	-----------------

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
		0.20	ES		0.40			Grass over dark brown sand.	0
		1.00 1.00 - 1.45	D SPT	C 5				Loose to medium dense pale red brown occasionally gravelly silty SAND. Sand is medium to coarse.	1
		2.00 2.00 - 2.45	D SPT	C 4					2
		3.00 3.00 - 3.45	D SPT	C 11					3
		4.00 4.00 - 4.45	D SPT	C 11	4.50				4
		5.00 5.00 - 5.45	D SPT	C 18	5.45			Medium dense to dense pale red brown occasionally gravelly silty SAND. Sand is fine to coarse.	5
								Borehole completed at 5.45m.	6
									7
					{8.00}				8

General Remarks
EQUIPMENT: Premier Window Sampling Tracked Rig.
METHOD: Dynamic sampled from 0m-5.45m. CPT at 1.00m spacing.
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, a gravel pack was installed from 5.45-5.15mbgl. 50mm HDPE slotted pipes with gravel around annulus from 5.15-1.15mbgl. 50mm HDPE plain pipe with bentonite around annulus from 1.15-0.15mbgl. 0.15-0m concrete, gas valve and stop cock cover at the top of the installation.

Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
All dimensions in metres Scale 1:50				Logged By SM

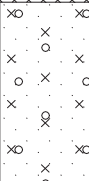
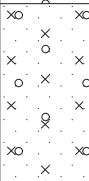
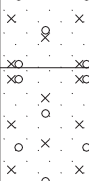
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Site Holt Road, Wrexham LL13 9SB				WS3
Job No CRM.413.106	Dates Start 03-09-14 Finish 03-09-14	Ground Level (m)	Co-Ordinates	

Client Simpson Associates	Sheet 1 of 1
------------------------------	-----------------

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
		0.15	ES		0.30			Grass over dark brown sand.	0
		1.00 1.00 - 1.45	D SPT	C 8	1.50			Loose to medium dense reddish brown occasionally gravelly silty SAND becoming clayey with depth, with occasional coal fragments. Gravel is fine to coarse sandstone. Sand is fine to medium.	1
		1.70 - 2.00 2.00 - 2.45	D SPT	C 10	4.30			Medium dense to dense red brown occasionally gravelly silty SAND with occasional coal fragments. Gravel is fine to medium sandstone. Sand is fine to medium.	2
		3.00 3.00 - 3.45	D SPT	C 10	5.45			Dense to very dense red brown gravelly silty SAND with occasional coal fragments. Gravel is fine to medium sandstone. Sand is fine to medium.	3
		4.00 4.00 - 4.45	D SPT	C 23					4
		5.00 5.00 - 5.45	D SPT	C 33					5
					{8.00}			Borehole completed at 5.45m.	6
									7
									8

General Remarks

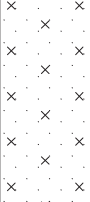
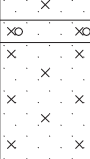
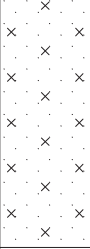
EQUIPMENT: Premier Window Sampling Tracked Rig.
METHOD: Dynamic sampled 0m-5.45mbgl. CPT at 1.00m spacing.
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
All dimensions in metres Scale 1:50				Logged By SM

1.0 ENZYGO BH LOG CRM.413.106 HOLT ROAD WREXHAM.GPJ GINT STD AGS 3 - 1 ENZYGO.GPJ 6/10/14



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Site Holt Road, Wrexham LL13 9SB							WS4		
Job No CRM.413.106		Dates Start 04-09-14 Finish 04-09-14		Ground Level (m)		Co-Ordinates			
Client Simpson Associates							Sheet 1 of 1		
Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
		0.20	ES		0.40			Grass over dark brown sand.	0
		1.00 1.00 - 1.45	D SPT	C 8				Loose to medium dense pale red brown silty SAND. Sand is fine to medium.	1
		1.90 - 2.00 2.00 - 2.45	D SPT	C 7		Medium dense pale red brown gravelly silty SAND. Sand is fine to medium.	2		
		3.00 3.00 - 3.45	D SPT	C 12		Medium dense to very dense red brown silty SAND. Sand is fine to medium.	3		
		4.00 4.00 - 4.45	D SPT	C 36		Borehole completed at 4.45m.	4		
							5		
								6	
								7	
								8	
General Remarks EQUIPMENT: Premier Window Sampling Tracked Rig. METHOD: Dynamic sampled 0m-4.45mbgl. CPT at 1.00m spacing. CASING: No casing used. REMARKS: Groundwater not encountered. BACKFILL: On completion, the borehole was backfilled with arisings.									
Groundwater									
Date		Strike Depth (m)		Casing Depth (m)		Depth After Observation (m)			
All dimensions in metres Scale 1:50								Logged By SM	

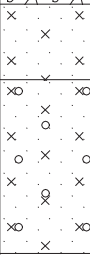
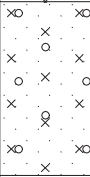
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Site Holt Road, Wrexham LL13 9SB				WS5
Job No CRM.413.106	Dates Start 04-09-14 Finish 04-09-14	Ground Level (m)	Co-Ordinates	

Client Simpson Associates	Sheet 1 of 1
------------------------------	-----------------

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
		0.20	ES		0.40			Grass over dark brown slightly gravelly sand with tarmac fragments.	0
		1.00 1.00 - 1.45	D SPT	C 11				Loose to medium dense red brown silty SAND and GRAVEL.	1
		2.00 2.00 - 2.45	D SPT	C 11					2
		2.90 - 3.00 3.00 - 3.45	D SPT	C 10	2.80			Medium dense red brown occasionally gravelly silty SAND. Sand is coarse.	3
		3.50 - 3.70	D		3.30			Medium dense to very dense red brown occasionally gravelly slightly silty and clayey SAND with occasional coal fragments. Sand is fine. Gravel is fine.	4
		4.00 - 4.45	SPT	C 34	4.45			Borehole completed at 4.45m.	5
					{8.00}				6
									7
									8

General Remarks EQUIPMENT: Premier Window Sampling Tracked Rig. METHOD: Dynamic sampled 0m-4.45mbgl. CPT at 1.00m spacing. CASING: No casing used. REMARKS: Groundwater not encountered. Collapsed to 2.90mbgl. BACKFILL: On completion, the borehole was backfilled with arisings.				
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Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
All dimensions in metres Scale 1:50				Logged By SM

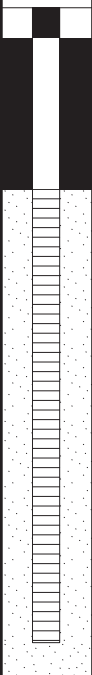
1.0 ENZYGO BH LOG CRM.413.106 HOLT ROAD WREXHAM.GPJ GINT STD AGS 3 - 1 ENZYGO.GPJ 6/10/14



Enzygo Ltd
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Site Holt Road, Wrexham LL13 9SB				WS6
Job No CRM.413.106	Dates Start 04-09-14 Finish 04-09-14	Ground Level (m)	Co-Ordinates	

Client Simpson Associates	Sheet 1 of 1
------------------------------	-----------------

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
		0.25	ES		0.50			Dark brown sand and gravel with tarmac fragments.	0
		1.00 - 1.20 1.00 - 1.45	D SPT	C 8				Loose to medium dense reddish brown SAND and GRAVEL with coal fragments. Gravel is fine to medium, angular and rounded ironstone and quartz.	1
		1.80 - 2.00 2.00 - 2.45	D SPT	C 7					2
		2.90 - 3.00 3.00 - 3.45	D SPT	C 8	2.85			Medium dense to very dense red brown clayey SAND with occasional coal fragments.	3
		4.00 4.00 - 4.45	D SPT	C26	4.45				4
								Borehole completed at 4.45m.	5
									6
									7
					{8.00}				8

General Remarks

EQUIPMENT: Premier Window Sampling Tracked Rig.
METHOD: Dynamic sampled from 0-4.45m. CPT at 1.00m spacing.
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, a gravel pack was installed from 4.45-4.20mbgl. 50mm HDPE slotted pipes with gravel around annulus from 4.20-1.20mbgl. 50mm HDPE plain pipe with bentonite around annulus from 1.20-0.0.20mbgl. 0.20-0m concrete, gas valve and stop cock cover at the top of the installation.

Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
All dimensions in metres Scale 1:50				
				Logged By SM

1.0 ENZYGO BH LOG CRM.413.106 HOLT ROAD WREXHAM.GPJ GINT STD AGS 3 - 1 ENZYGO.GPJ 6/10/14



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Site Holt Road, Wrexham LL13 9SB				WS7
Job No CRM.413.106	Dates Start 03-09-14 Finish 03-09-14	Ground Level (m)	Co-Ordinates	
Client Simpson Associates				Sheet 1 of 1

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
		0.30	ES		0.15			Dark brown sand and gravel with tarmac fragments.	0
					0.50			Tarmac and roadstone.	
		1.00 1.00 - 1.45	D SPT	C 16				Medium dense to dense reddish brown SAND and GRAVEL with occasional coal fragments. Gravel is rounded quartz and sandstone.	1
		1.80 - 2.00 2.00 - 2.45	D SPT	C 12				Medium dense to very dense red brown slightly clayey SAND.	2
		3.00 3.00 - 3.45	D SPT	C 21	2.60			Medium dense to very dense red brown slightly clayey SAND.	3
		4.00 4.00 - 4.45	D SPT	C 40	4.45			Medium dense to very dense red brown slightly clayey SAND.	4
								Borehole completed at 4.45m.	5
									6
									7
					{8.00}				8

General Remarks

EQUIPMENT: Premier Window Sampling Tracked Rig.
METHOD: Dynamic sampled 0m-4.45mbgl. CPT at 1.00m spacing.
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date

Strike Depth
(m)

Casing Depth
(m)

Depth After
Observation
(m)

All dimensions in metres
Scale 1:50

Logged By
SM

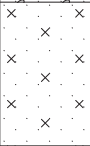
1.0 ENZYGO BH LOG CRM.413.106 HOLT ROAD WREXHAM.GPJ GINT STD AGS 3 - 1 ENZYGO.GPJ 6/10/14



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Site Holt Road, Wrexham LL13 9SB				WS8
Job No CRM.413.106	Dates Start 03-09-14 Finish 03-09-14	Ground Level (m)	Co-Ordinates	

Client Simpson Associates	Sheet 1 of 1
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Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
		0.30	ES		0.60			Grass over dark brown occasionally gravelly sand. Gravel is sandstone.	0
		1.00 - 2.00 1.00 - 1.45	B SPT	C 10				Loose to medium dense brown SAND and GRAVEL with occasional cagments oal f. Sand is rounded sandstone.	1
		2.00 - 2.45	SPT	C 7	2.80				2
		2.80 - 3.00 3.00 - 3.45	D SPT	C 24				Medium dense to very dense pale red brown silty SAND.	3
		3.30 - 3.75	SPT	C 27					
					3.75			Borehole completed at 3.75m.	4
									5
									6
									7
									8
					{8.00}				

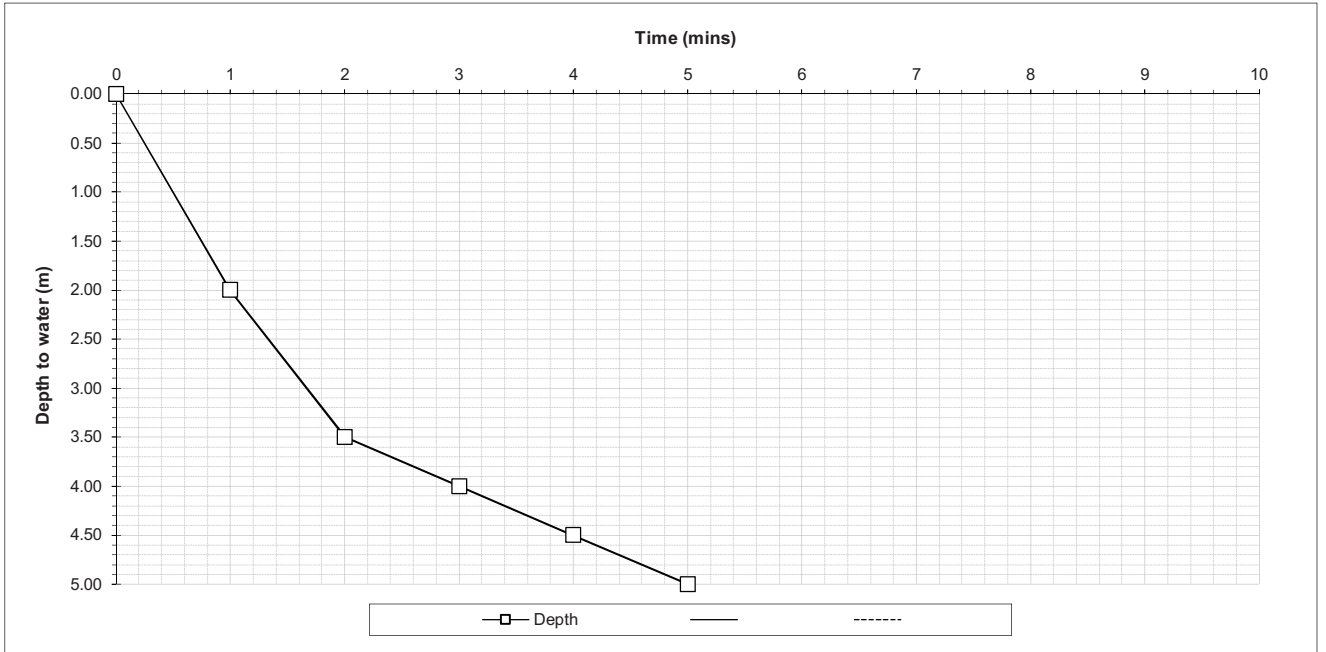
General Remarks
EQUIPMENT: Premier Window Sampling Tracked Rig.
METHOD: Dynamic sampled 0m-3.75mbgl. CPT at 1.00m spacing, and CPT at 3.30-3.75mbgl
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
All dimensions in metres Scale 1:50				Logged By SM

1.0 ENZYGO BH LOG CRM.413.106 HOLT ROAD WREXHAM.GPJ GINT STD AGS 3 - 1 ENZYGO.GPJ 6/10/14

 SOIL INFILTRATION RATE TEST See B.R.E. Digest 365, 1991, Soakaway Design.		Site..... Wrexham Job Number..... CRM.413.106 Date of Test..... 25.09.14		Borehole Number WS2 Borehole diameter 0.085 m Depth 5.00 m Groundwater Level 5 m Slotted section 1 m			
		TEST 1		Test 2		-	
		Time(min)	Depth to Water (m)				
		0.0	0.00				
		1.0	2.00				
		2.0	3.50				
		3.0	4.00				
		4.0	4.50				
		5.0	5.00				
		0.0	0.00				
		0.0	0.00				
		0.0	0.00				
		0.0	0.00				
		0.0	0.00				
		0.0	0.00				
Effective Storage Depth		m	5.00				
75% Effective Storage Depth		m	1.25				
25% Effective Storage Depth		m	3.75				
Effective Storage Depth 75%-25%		m	2.50				
Time to fall to 75% effective depth		mins	0.5				
Time to fall to 25% effective depth		mins	2.5				
V (75%-25%)		m3	0.01419				
Area		m2	0.673				
t (75%-25%)		mins	2				
SOIL INFILTRATION RATE		m/s	1.8E-04				

SOIL INFILTRATION RATE, f	1.8E-04 m/s
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APPENDIX C – CHEMICAL TESTING

Human Health Assessment Reference Values

Determinant	Units	GAC Value						Primary Pathway
		Residential			Commercial			
Arsenic	mg/kg	32			640			Ingestion
Cadmium	mg/kg	10			230			Ingestion
Chromium	mg/kg	3000			30400			Ingestion
Chromium IV	mg/kg	4.3			35			Ingestion
Lead	mg/kg	450			590			Ingestion
Mercury	mg/kg	170			3600			Inhalation
Nickel	mg/kg	130			1800			Ingestion
Selenium	mg/kg	350			13000			Ingestion
Copper	mg/kg	2330			71700			Ingestion
Zinc	mg/kg	3750			665000			Ingestion
Cyanide	mg/kg	791			16200			Ingestion
Phenol	mg/kg	210			1100000			Ingestion
SOM	%	1	2.5	6	1	2.5	6	
Napthalene	mg/kg	1.5	3.7	8.7	200	480	1100	Inhalation
Acenaphtylene	mg/kg	170	400	850	84000	97000	100000	Dermal and ingestion
Acenaphthene	mg/kg	210	480	1000	85000	98000	100000	Ingestion
Flourene	mg/kg	160	380	780	64000	69000	71000	Ingestion
Phenanthrene	mg/kg	92	200	380	22000	22000	22000	Dermal and ingestion
Anthracene	mg/kg	2300	4900	9200	530000	540000	540000	Dermal and ingestion
Fluoranthene	mg/kg	260	460	670	23000	23000	23000	Dermal and ingestion
Pyrene	mg/kg	560	1000	1600	54000	54000	54000	Dermal and ingestion
Benzo(a)Anthracene	mg/kg	3.1	4.7	5.9	90	95	97	Dermal and ingestion
Chrysene	mg/kg	6	8	9.3	140	140	140	Dermal and ingestion
Benzon(b/k)Flouranthene	mg/kg	5.6	6.5	7	100	100	100	Dermal and ingestion
Benzo(a)Pyrene	mg/kg	0.83	0.94	1	14	14	14	Dermal and ingestion
Indeno(123-cd)Pyrene	mg/kg	3.2	3.9	4.2	60	61	62	Dermal and ingestion
Dibenzo(a,h)Anthracene	mg/kg	0.76	0.86	0.9	13	13	13	Dermal and ingestion
Benzo(ghi)Perylene	mg/kg	44	46	47	650	660	660	Dermal and ingestion
TPH C ₅ -C ₆ Aliphatic	mg/kg	30	55	110	3400	6200	13000	Inhalation
TPH C ₆ -C ₈ Aliphatic	mg/kg	73	160	370	8300	18000	42000	Inhalation
TPH C ₈ -C ₁₀ Aliphatic	mg/kg	19	46	110	2100	5100	12000	Inhalation
TPH C ₁₀ -C ₁₂ Aliphatic	mg/kg	93	230	540	10000	24000	49000	Inhalation
TPH C ₁₂ -C ₁₆ Aliphatic	mg/kg	740	1700	3000	61000	83000	91000	Inhalation
TPH C ₁₆ -C ₃₅ Aliphatic	mg/kg	45000	64000	76000	1600000	1800000	1800000	Inhalation
TPH C ₃₅ -C ₄₄ Aliphatic	mg/kg	45000	64000	76000	1600000	1800000	1800000	Ingestion
TPH C ₅ -C ₇ Aromatic	mg/kg	65	130	280	28000	49000	90000	Inhalation
TPH C ₇ -C ₈ Aromatic	mg/kg	120	270	611	59000	110000	190000	Inhalation
TPH C ₈ -C ₁₀ Aromatic	mg/kg	27	65	151	3700	8600	18000	Inhalation
TPH C ₁₀ -C ₁₂ Aromatic	mg/kg	69	160	346	36000	37000	37800	Ingestion
TPH C ₁₂ -C ₁₆ Aromatic	mg/kg	140	310	593	28000	28000	28000	Ingestion
TPH C ₁₆ -C ₂₁ Aromatic	mg/kg	250	480	770	28000	28000	28000	Ingestion
TPH C ₂₁ -C ₃₅ Aromatic	mg/kg	890	1100	1230	28000	28000	28000	Ingestion
TPH C ₃₅ -C ₄₄ Aromatic	mg/kg	890	1100	1230	28000	28000	28000	Ingestion
Benzene	mg/kg	0.08			95			Inhalation
Toluene	mg/kg	119			4400			Inhalation
Ethylebenzene	mg/kg	65			2800			Inhalation
Xylene	mg/kg	42			3200			Inhalation

Controlled Waters Assessment Reference Values

Determinant	Unit	EQS Freshwater	Uk DWS	WHO
Arsenic	ug/l	50	10	10
Boron	ug/l	2000	1000	0.3
Cadmium	ug/l	5	5	3
Chromium	ug/l	5 – 250	50	50
Lead	ug/l	4 – 250	25	10
Mercury	ug/l	1	1	1
Selenium	ug/l		10	10
Copper	ug/l	1 – 28	20000	2000
Nickel	ug/l	50 – 200	20	70
Zinc	ug/l	8 – 50	5000	3000
Sulphate	mg/l	400	250	250
PAH	ug/l		0.1	
Anthracene	ug/l	0.02		
Napthalene	ug/l	10		
Benzo(a)Pyrene	ug/l	0.03		0.01
Fluoranthene	ug/l	0.02		
Benzene	ug/l	30	1	10
Toluene	ug/l	50		
Ethylebenzene	ug/l	20		
Xylene	ug/l	30		
TPH	ug/l			
C ₅ – C ₆ Aliphatic	ug/l			15000
C ₆ – C ₈ Aliphatic	ug/l			15000
C ₈ – C ₁₀ Aliphatic	ug/l			300
C ₁₀ – C ₁₂ Aliphatic	ug/l			300
C ₁₂ – C ₁₆ Aliphatic	ug/l			300
C ₁₆ – C ₃₆ Aliphatic	ug/l			N/A
C ₆ – C ₇ Aromatic	ug/l			10
C ₇ – C ₈ Aromatic	ug/l	50		10
C ₈ – C ₁₀ Aromatic	ug/l	20		300
C ₁₀ – C ₁₂ Aromatic	ug/l			1000
C ₁₂ – C ₁₆ Aromatic	ug/l			1000
C ₁₆ – C ₂₁ Aromatic	ug/l			90
C ₂₁ – C ₃₅ Aromatic	ug/l			90



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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 14-00513

Issue: 1

Date of Issue: 26/09/2014

Contact: Richard Hamilton

Customer Details: Enzygo - Cromhall
The Granary
Woodend Lane
Cromhall
Gloucestershire

Quotation No: Q14-00007

Order No: CRM734

Customer Reference: CRM.413.106

Date Received: 11/09/2014

Date Approved: 26/09/2014

Details: Wrexham

Approved by:

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 14-00513

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
3320	WS1 0.20	04/09/2014	11/09/2014	Sandy silty loam	g
3321	WS2 0.20	03/09/2014	11/09/2014	Sandy silty loam	f
3322	WS3 0.15	04/09/2014	11/09/2014	Sandy silty loam	
3323	WS4 0.20	03/09/2014	11/09/2014	Sandy silty loam	f
3324	WS5 0.20	03/09/2014	11/09/2014	Sandy silty loam	f
3325	WS6 0.25	03/09/2014	11/09/2014	Sandy silty loam	f
3326	WS7 0.30	03/09/2014	11/09/2014	Sandy silty loam	fg
3327	WS8 0.30	03/09/2014	11/09/2014	Sandy silty loam	f
3328	TP1 0.20	04/09/2014	11/09/2014	Sandy silty loam	g

Results Summary

Report No.: 14-00513

ELAB Reference	3320	3321	3322	3323	3324	3325
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	WS1	WS2	WS3	WS4	WS5	WS6
Sample Depth (m)	0.20	0.20	0.15	0.20	0.20	0.25
Sampling Date	04/09/2014	03/09/2014	04/09/2014	03/09/2014	03/09/2014	03/09/2014

Determinand	Codes	Units	LOD						
Metals									
Arsenic	M	mg/kg	1	7.0	7.0	9.5	5.8	6.6	4.9
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.7	< 0.5
Chromium	M	mg/kg	5	14.6	16.1	17.8	12.3	11.5	8.8
Copper	M	mg/kg	5	15.8	17.3	19.3	16.4	15.7	11.5
Lead	M	mg/kg	5	44.6	51.6	55.6	56.1	65.6	36.2
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	8.5	8.6	10.6	8.6	9.0	8.2
Selenium	M	mg/kg	1	0.8	0.7	0.7	1.5	1.4	0.7
Zinc	M	mg/kg	45	63.4	76.1	88.2	65.6	64.8	< 45.0
Inorganics									
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Total Cyanide	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Miscellaneous									
Acid Neutralisation Capacity	N	mol/kg	0.1	< 0.1	n/t	n/t	n/t	n/t	n/t
Loss Of Ignition (450°C)	N	%	0.01	4.3	n/t	n/t	n/t	n/t	n/t
Moisture Content	N	%	0.1	14.6	10.7	13.8	13.4	12.3	8.0
pH	M	units	0.1	6.4	n/t	n/t	n/t	n/t	n/t
Stones Content	N	%	0.1	4.6	6.5	4.0	13.0	20.0	35.0
Total Organic Carbon	N	%	0.01	1.4	1.9	2.4	1.7	1.7	1.1



Results Summary

Report No.: 14-00513

ELAB Reference	3320	3321	3322	3323	3324	3325
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	WS1	WS2	WS3	WS4	WS5	WS6
Sample Depth (m)	0.20	0.20	0.15	0.20	0.20	0.25
Sampling Date	04/09/2014	03/09/2014	04/09/2014	03/09/2014	03/09/2014	03/09/2014

Determinand	Codes	Units	LOD						
Organics									
>C8-C10 BCB Soil	N	mg/kg	1	< 1.0	f < 1.0	< 1.0	f < 1.0	f < 1.0	f < 1.0
>C10-C12 BCB Soil	N	mg/kg	1	< 1.0	f < 1.0	< 1.0	f < 1.0	f < 1.0	f < 1.0
>C12-C16 BCB Soil	N	mg/kg	1	< 1.0	f < 1.0	< 1.0	f < 1.0	f < 1.0	f < 1.0
>C16-C21 BCB Soil	N	mg/kg	1	< 1.0	f < 1.0	< 1.0	f < 1.0	f < 1.0	f < 1.0
>C21-C35 BCB Soil	N	mg/kg	1	3.6	f 1.9	< 1.0	f 4.2	f 9.5	f < 1.0
>C35-C40 BCB Soil	N	mg/kg	1	2.3	f 1.4	1.4	f 1.7	f 4.2	f < 1.0
Total (>C8-C40) BCB Soil	N	mg/kg	1	5.9	f 3.3	1.4	f 6.0	f 13.6	f < 1.0
Phenols									
Phenol	M	mg/kg	1	< 1	< 1	< 1	< 1	< 1	< 1
M,P-Cresol	N	mg/kg	1	< 1	< 1	< 1	< 1	< 1	< 1
O-Cresol	N	mg/kg	1	< 1	< 1	< 1	< 1	< 1	< 1
3,4-Dimethylphenol	N	mg/kg	1	< 1	< 1	< 1	< 1	< 1	< 1
2,3-Dimethylphenol	M	mg/kg	1	< 1	< 1	< 1	< 1	< 1	< 1
Trimethylphenol	M	mg/kg	1	< 1	< 1	< 1	< 1	< 1	< 1
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5	< 5	< 5	< 5	< 5
Polyaromatic hydrocarbons									
Naphthalene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	< 0.5
Pyrene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (a) anthracene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	< 0.5
Benzo (b) fluoranthene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (k) fluoranthene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	0.6
Benzo (a) pyrene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibenzo(a,h)anthracene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(ghi)perylene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.8
Total PAH(16) Speciated	M	mg/kg	2	< 2	< 2	< 2	< 2	4	4
Total PAH (Including Coronene)	N	mg/kg	2.1	< 2	n/t	n/t	n/t	n/t	n/t
BTEX									
Total BTEX	M	mg/kg	0.01	g < 0.01	n/t	n/t	n/t	n/t	n/t
Total Petroleum Hydrocarbons									
Mineral Oil	U	mg/kg	1	4	n/t	n/t	n/t	n/t	n/t
PCB (ICES 7 congeners)									
PCB (Total of 7 Congeners)	M	mg/kg	0.03	< 0.03	n/t	n/t	n/t	n/t	n/t



Results Summary

Report No.: 14-00513

ELAB Reference	3326	3327	3328
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	WS7	WS8	TP1
Sample Depth (m)	0.30	0.30	0.20
Sampling Date	03/09/2014	03/09/2014	04/09/2014

Determinand	Codes	Units	LOD			
Metals						
Arsenic	M	mg/kg	1	4.0	7.6	n/t
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	n/t
Chromium	M	mg/kg	5	10.9	13.3	n/t
Copper	M	mg/kg	5	9.3	18.6	n/t
Lead	M	mg/kg	5	21.3	93.2	n/t
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	n/t
Nickel	M	mg/kg	5	10.1	10.1	n/t
Selenium	M	mg/kg	1	0.5	1.4	n/t
Zinc	M	mg/kg	45	< 45.0	65.7	n/t
Inorganics						
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	n/t
Total Cyanide	M	mg/kg	1	< 1.0	< 1.0	n/t
Miscellaneous						
Acid Neutralisation Capacity	N	mol/kg	0.1	< 0.1	n/t	< 0.1
Loss Of Ignition (450°C)	N	%	0.01	2.2	n/t	4.7
Moisture Content	N	%	0.1	5.5	13.1	n/t
pH	M	units	0.1	6.1	n/t	6.2
Stones Content	N	%	0.1	41.8	15.0	n/t
Total Organic Carbon	N	%	0.01	1.0	2.5	1.9



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Results Summary

Report No.: 14-00513

ELAB Reference	3326	3327	3328
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	WS7	WS8	TP1
Sample Depth (m)	0.30	0.30	0.20
Sampling Date	03/09/2014	03/09/2014	04/09/2014

Determinand	Codes	Units	LOD			
Organics						
>C8-C10 BCB Soil	N	mg/kg	1	f < 1.0	f < 1.0	n/t
>C10-C12 BCB Soil	N	mg/kg	1	f < 1.0	f < 1.0	n/t
>C12-C16 BCB Soil	N	mg/kg	1	f 1.7	f < 1.0	n/t
>C16-C21 BCB Soil	N	mg/kg	1	f 15.1	f < 1.0	n/t
>C21-C35 BCB Soil	N	mg/kg	1	f 334	f < 1.0	n/t
>C35-C40 BCB Soil	N	mg/kg	1	f 98.7	f 1.4	n/t
Total (>C8-C40) BCB Soil	N	mg/kg	1	f 450	f 1.4	n/t
Phenols						
Phenol	M	mg/kg	1	< 1	< 1	n/t
M,P-Cresol	N	mg/kg	1	< 1	< 1	n/t
O-Cresol	N	mg/kg	1	< 1	< 1	n/t
3,4-Dimethylphenol	N	mg/kg	1	< 1	< 1	n/t
2,3-Dimethylphenol	M	mg/kg	1	< 1	< 1	n/t
Trimethylphenol	M	mg/kg	1	< 1	< 1	n/t
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5	n/t
Polyaromatic hydrocarbons						
Naphthalene	M	mg/kg	0.5	< 0.5	< 0.5	n/t
Acenaphthylene	M	mg/kg	0.5	< 0.5	< 0.5	n/t
Acenaphthene	M	mg/kg	0.5	< 0.5	< 0.5	n/t
Fluorene	M	mg/kg	0.5	< 0.5	< 0.5	n/t
Phenanthrene	M	mg/kg	0.5	1.1	< 0.5	n/t
Anthracene	M	mg/kg	0.5	< 0.5	< 0.5	n/t
Fluoranthene	M	mg/kg	0.5	2.0	< 0.5	n/t
Pyrene	M	mg/kg	0.5	1.7	< 0.5	n/t
Benzo (a) anthracene	M	mg/kg	0.5	0.9	< 0.5	n/t
Chrysene	M	mg/kg	0.5	1.9	< 0.5	n/t
Benzo (b) fluoranthene	M	mg/kg	0.5	0.8	< 0.5	n/t
Benzo (k) fluoranthene	M	mg/kg	0.5	1.7	< 0.5	n/t
Benzo (a) pyrene	M	mg/kg	0.5	1.0	< 0.5	n/t
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.5	1.2	< 0.5	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.5	< 0.5	< 0.5	n/t
Benzo(ghi)perylene	M	mg/kg	0.5	1.8	< 0.5	n/t
Total PAH(16) Speciated	M	mg/kg	2	15	< 2	n/t
Total PAH (Including Coronene)	N	mg/kg	2.1	17	n/t	< 2
BTEX						
Total BTEX	M	mg/kg	0.01	fg < 0.01	n/t	g < 0.01
Total Petroleum Hydrocarbons						
Mineral Oil	U	mg/kg	1	f 283	n/t	3
PCB (ICES 7 congeners)						
PCB (Total of 7 Congeners)	M	mg/kg	0.03	< 0.03	n/t	< 0.03

Results Summary

Report No.: 14-00513

WAC Analysis

Elab Ref:	3328					Landfill Waste Acceptance Criteria Limits		
Sample Date:	04/09/2014					Inert Waste Landfill	Stable Non-reactive Hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:	TP1							
Depth:	0.2							
Site:	Wrexham							
Determinand		Code	Units					
Total Organic Carbon		N	%		1.9	3	5	6
Loss on Ignition		M	%		4.7	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		3	500	--	--
Total (of 17) PAHs		N	mg/kg		< 2	100	--	--
pH		M			6.2	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate

Eluate Analysis

			2:1	8:1	10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
			mg/l	mg/l	mg/kg			
Arsenic		N	0.027	0.007	0.10	0.5	2	25
Barium		N	0.134	0.025	0.39	20	100	300
Cadmium		N	< 0.001	< 0.001	< 0.01	0.04	1	5
Chromium		N	0.035	0.006	0.10	0.5	10	70
Copper		N	0.127	0.036	0.48	2	50	100
Mercury		N	< 0.005	< 0.005	< 0.01	0.01	0.2	2
Molybdenum		N	0.020	0.006	0.07	0.5	10	30
Nickel		N	0.032	0.008	0.11	0.4	10	40
Lead		N	0.149	0.015	0.32	0.5	10	50
Antimony		N	0.010	< 0.005	< 0.05	0.06	0.7	5
Selenium		N	0.005	< 0.005	< 0.05	0.1	0.5	7
Zinc		N	0.157	0.042	0.57	4	50	200
Chloride		N	< 5	< 5	< 50	800	15000	25000
Fluoride		N	< 1	< 1	< 10	10	150	500
Sulphate		N	3.000	3.000	28.20	1000	20000	50000
Total Dissolved Solids		N	< 10	< 10	< 100	4000	60000	100000
Phenol Index		N	< 0.01	< 0.01	< 0.10	1	-	-
Dissolved Organic Carbon		N	34.300	10.900	139.00	500	800	1000

Leach Test Information

Eluent Volume (ml)		N	225	1150				
pH		N	7.8	7.5				
Conductivity (uS/cm)		N	83	41				
Temperature (°C)		N	20	20				

Solid Information

Dry mass of test portion (g)			176					
Moisture (%)			16.7					

Results are expressed on a dry weight basis, after correction for moisture content where applicable

Stated limits are for guidance only and ELAB cannot be held responsible for any discrepancies with current legislation

Results Summary

Report No.: 14-00513

WAC Analysis

Elab Ref:	3326					Landfill Waste Acceptance Criteria Limits		
Sample Date:	03/09/2014					Inert Waste Landfill	Stable Non-reactive Hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:	WS7							
Depth:	0.3							
Site:	Wrexham							
Determinand		Code	Units					
Total Organic Carbon		N	%		1.0	3	5	6
Loss on Ignition		M	%		2.2	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		283	500	--	--
Total (of 17) PAHs		N	mg/kg		17.0	100	--	--
pH		M			6.1	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate

Eluate Analysis

			2:1	8:1	10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
			mg/l	mg/l	mg/kg			
Arsenic		N	0.015	0.020	0.19	0.5	2	25
Barium		N	0.164	0.061	0.77	20	100	300
Cadmium		N	< 0.001	< 0.001	< 0.01	0.04	1	5
Chromium		N	< 0.005	< 0.005	< 0.05	0.5	10	70
Copper		N	0.052	0.045	0.46	2	50	100
Mercury		N	< 0.005	< 0.005	< 0.01	0.01	0.2	2
Molybdenum		N	0.052	0.021	0.26	0.5	10	30
Nickel		N	0.019	0.011	0.12	0.4	10	40
Lead		N	0.008	0.015	0.14	0.5	10	50
Antimony		N	0.014	0.005	0.07	0.06	0.7	5
Selenium		N	0.006	< 0.005	< 0.05	0.1	0.5	7
Zinc		N	0.045	0.036	0.38	4	50	200
Chloride		N	< 5	< 5	< 50	800	15000	25000
Fluoride		N	< 1	< 1	< 10	10	150	500
Sulphate		N	62.000	6.000	150.00	1000	20000	50000
Total Dissolved Solids		N	230.000	110.000	1290.00	4000	60000	100000
Phenol Index		N	< 0.01	< 0.01	< 0.10	1	-	-
Dissolved Organic Carbon		N	29.800	13.600	162.00	500	800	1000

Leach Test Information

Eluent Volume (ml)		N	280	1140				
pH		N	8	7.8				
Conductivity (uS/cm)		N	330	126				
Temperature (°C)		N	20	20				

Solid Information

Dry mass of test portion (g)			176					
Moisture (%)			7.5					

Results are expressed on a dry weight basis, after correction for moisture content where applicable

Stated limits are for guidance only and ELAB cannot be held responsible for any discrepancies with current legislation

Results Summary

Report No.: 14-00513

WAC Analysis

Elab Ref:	3320					Landfill Waste Acceptance Criteria Limits		
Sample Date:	04/09/2014					Inert Waste Landfill	Stable Non-reactive Hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:	WS1							
Depth:	0.2							
Site:	Wrexham							
Determinand		Code	Units					
Total Organic Carbon		N	%		1.4	3	5	6
Loss on Ignition		M	%		4.3	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		4	500	--	--
Total (of 17) PAHs		N	mg/kg		< 2	100	--	--
pH		M			6.4	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate
Eluate Analysis			2:1	8:1	10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
			mg/l	mg/l	mg/kg			
Arsenic		N	0.035	0.013	0.15	0.5	2	25
Barium		N	0.124	0.039	0.50	20	100	300
Cadmium		N	< 0.001	< 0.001	< 0.01	0.04	1	5
Chromium		N	0.024	0.008	0.10	0.5	10	70
Copper		N	0.082	0.044	0.49	2	50	100
Mercury		N	< 0.005	< 0.005	< 0.01	0.01	0.2	2
Molybdenum		N	0.027	0.015	0.16	0.5	10	30
Nickel		N	0.014	0.008	0.09	0.4	10	40
Lead		N	0.183	0.027	0.47	0.5	10	50
Antimony		N	0.010	0.005	0.06	0.06	0.7	5
Selenium		N	< 0.005	< 0.005	< 0.05	0.1	0.5	7
Zinc		N	0.090	0.045	0.50	4	50	200
Chloride		N	< 5	< 5	< 50	800	15000	25000
Fluoride		N	< 1	< 1	< 10	10	150	500
Sulphate		N	4.000	3.000	35.50	1000	20000	50000
Total Dissolved Solids		N	150.000	< 10	193.00	4000	60000	100000
Phenol Index		N	< 0.01	< 0.01	< 0.10	1	-	-
Dissolved Organic Carbon		N	36.500	11.900	151.00	500	800	1000

Leach Test Information

Eluent Volume (ml)		N	226	1270				
pH		N	8.1	7.6				
Conductivity (uS/cm)		N	149	76				
Temperature (°C)		N	20	20				
Solid Information								
Dry mass of test portion (g)			176					
Moisture (%)			14.4					

Results are expressed on a dry weight basis, after correction for moisture content where applicable

Stated limits are for guidance only and ELAB cannot be held responsible for any discrepancies with current legislation



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Results Summary

Report No.: 14-00513

Asbestos Qualitative Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Result
3320	0.20	WS1	Sandy silty loam	No asbestos detected
3321	0.20	WS2	Sandy silty loam	No asbestos detected
3322	0.15	WS3	Sandy silty loam	No asbestos detected
3323	0.20	WS4	Sandy silty loam	No asbestos detected
3324	0.20	WS5	Sandy silty loam	No asbestos detected
3325	0.25	WS6	Sandy silty loam	No asbestos detected
3326	0.30	WS7	Sandy silty loam	No asbestos detected
3327	0.30	WS8	Sandy silty loam	No asbestos detected

Method Summary

Report No.: 14-00513

Parameter	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil				
Hexavalent chromium	As submitted sample	15/09/2014	110	Colorimetry
Aqua regia extractable metals	Air dried sample	16/09/2014	118	ICPMS
Phenols in solids	As submitted sample	15/09/2014	121	HPLC
Polyaromatic hydrocarbons (GC-FID)	As submitted sample	15/09/2014	133	GC-FID
Total cyanide	As submitted sample	16/09/2014	204	Colorimetry
Basic carbon banding in soil	As submitted sample	15/09/2014	218	GC-FID
Asbestos identification	As submitted sample	25/09/2014	PMAN	Microscopy
Leachate				
Arsenic*		25/09/2014	101	ICPMS
Cadmium*		25/09/2014	101	ICPMS
Chromium*		25/09/2014	101	ICPMS
Lead*		25/09/2014	101	ICPMS
Nickel*		25/09/2014	101	ICPMS
Copper*		25/09/2014	101	ICPMS
Zinc*		25/09/2014	101	ICPMS
Mercury*		25/09/2014	101	ICPMS
Selenium*		25/09/2014	101	ICPMS
Antimony		25/09/2014	101	ICPMS
Barium*		25/09/2014	101	ICPMS
Molybdenum*		25/09/2014	101	ICPMS
pH Value*		25/09/2014	113	Electrometric
Electrical Conductivity*		25/09/2014	136	Probe
Dissolved Organic Carbon		25/09/2014	102	TOC analyser
Chloride*		25/09/2014	131	Ion Chromatography
Fluoride*		25/09/2014	131	Ion Chromatography
Sulphate*		25/09/2014	131	Ion Chromatography
Total Dissolved Solids		25/09/2014	144	Gravimetric
Phenol index		25/09/2014	121	HPLC
WAC Solids analysis				
pH Value**	Air dried sample	25/09/2014	113	Electrometric
Total Organic Carbon	Air dried sample	25/09/2014	210	IR
Loss on Ignition**	Air dried sample	25/09/2014	129	Gravimetric
Acid Neutralization Capacity to pH 7	Air dried sample	25/09/2014	NEN 737	Electrometric
Total BTEX**	As submitted sample	25/09/2014	181	GCMS
Mineral Oil**	As submitted sample	25/09/2014	117	GCFID
Total PCBs (7 congeners)	Air dried sample	25/09/2014	120	GCMS
Total PAH (17)**	As submitted sample	25/09/2014	133	GCFID



Report Information

Report No.: 14-00513

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
I/S	Insufficient Sample
U/S	Unsuitable sample
n/e	not evaluated
<	means "less than"
>	means "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



Geosynthetics Soil & Steel Laboratories Ltd

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CONFIDENTIAL SOILS TEST REPORT

24 September 2014

FAO Mr Steve Rhodes

Enzygo Ltd
The Granary
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

Tel/Fax: +44 (0) 1454 269237

Dear Steve,

Thank you for consulting GSSL Ltd for your Geotechnical testing needs. GSSL Ltd is pleased to submit this **final interim** test report for laboratory testing.

Client Ref/Order No: CRM.735

Test Report Number: GS-CRM.413.106

Contract Reference: Wrexham

Client ID, Visual Sample Descriptions: Page 2

Results: Page 3-10

Test(s) Requested;

Determination of Chemical properties of Soil: Water Soluble Sulphate & pH Value	{BS 1377-3:1990 Cl.3-9}
Determination of Moisture Content Oven Drying Method	{BS 1377-2:1990 Cl.3.2}
Determination of the Liquid Limit – Cone Penetrometer (Definitive Method)	{BS 1377-2:1990 Cl. 4.3}
Determination of the Plastic Limit, Plasticity Index	{BS 1377-2:1990 Cl. 5}
Determination of Particle Size Distribution by Dry sieving method	{BS 1377-2:1990 Cl. 9.3}
Determination of the California Bearing Ratio (Lab CBR Un-soaked / Top & Bottom ends)	{BS 1377-4: 1990 Cl.7}

If you have any questions or require additional information, then please do not hesitate to contact us.

Yours Sincerely

Tony Dixon
Managing Director

Any opinions and interpretations expressed within this report are outside the scope of our UKAS Accreditation.

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Summary of laboratory soil descriptions

Contract Ref: Wrexham

Report Ref. No: GS-CRM.413.106

Client ID	Depth (m)	Description of Sample
TP1	0.50	Gravelly SAND
WS1	1.00	Gravelly SAND
WS5	1.00	Gravelly SAND
WS1	2.00	Gravelly SAND
WS2	1.00	Gravelly SAND
WS2	2.00	
WS3	1.00	
WS3	1.70	
WS4	1.00	
WS4	1.90	
WS1	2.80-3.00	Gravelly SAND
WS1	3.80-4.00	
WS1	4.60-5.00	
WS2	3.00	
WS2	4.00	
WS2	5.00	
WS3	3.00	
WS3	4.00	
WS3	5.00	
WS4	3.00	
WS4	4.00	
WS5	1.00	Gravelly SAND
WS5	2.00	
WS6	1.00-1.20	
WS6	1.30-2.80	
WS7	1.00	
WS7	1.80-2.80	Gravelly SAND
WS8	1.80-2.00	
WS5	2.90-3.00	
WS5	3.50-3.70	
WS6	2.40-3.00	
WS6	4.00	
WS7	3.00	
WS7	4.00	
WS8	2.80-3.00	

Certification:-

Test results reported herein do not apply to samples other than those supplied. GSSL Ltd neither accepts responsibility for nor makes claim as to the final use & purpose of the materials(s).

Approved Signatory:

Date Reported: 24/09/14

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Page 2 of 10



Geosynthetics Soil & Steel Laboratories Ltd

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Chemical properties of Soil Water Soluble Sulphate & Ph Value. BS 1377:1990: Part 3 cl.3-9.

Contract Ref: Wrexham

Report Ref. No: GS-CRM.413.106

CLIENT ID	DEPTH (m)	Material passing 2mm BS Test Sieve (% dry mass of original sample)	Water Soluble Sulphate 2:1		pH Value
			Sulphate content as SO ₃ of 2:1 soil/water extract (g/l)	Sulphate content as SO ₄ of 2:1 soil/water extract (g/l)	
WS1	2.00	100	0.1	0.2	8.4
WS2	1.00	100	<0.1	0.1	8.2
WS2	2.00				
WS3	1.00				
WS3	1.70				
WS4	1.00				
WS4	1.90				
WS1	2.80-3.00	100	0.1	0.2	8.7
WS1	3.80-4.00				
WS1	4.60-5.00				
WS2	3.00				
WS2	4.00				
WS2	5.00				
WS3	3.00				
WS3	4.00				
WS3	5.00				
WS4	3.00				
WS4	4.00				
WS5	1.00	100	<0.1	0.1	8.3
WS5	2.00				
WS6	1.00-1.20				
WS6	1.30-2.80				
WS7	1.00				
WS7	1.80-2.80				
WS8	1.80-2.00				
WS5	2.90-3.00	100	0.1	0.2	8.7
WS5	3.50-3.70				
WS6	2.40-3.00				
WS6	4.00				
WS7	3.00				
WS7	4.00				
WS8	2.80-3.00				

Certification:-

Test results reported herein do not apply to samples other than those supplied. GSSL Ltd neither accepts responsibility for nor makes claim as to the final use & purpose of the materials(s).

Approved Signatory:

Date Reported: 24/09/14

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Determination of Particle Size Distribution (Dry Sieving)

Report Ref. No: GS-CRM.413.106

GSSL Sample ID A1

Client ID WS2 @ 1.00 & 2.00m, WS3 @ 1.00 & 1.70m, WS4 @ 1.00 & 1.90m

Client: Enzygo Ltd
Site: Wrexham

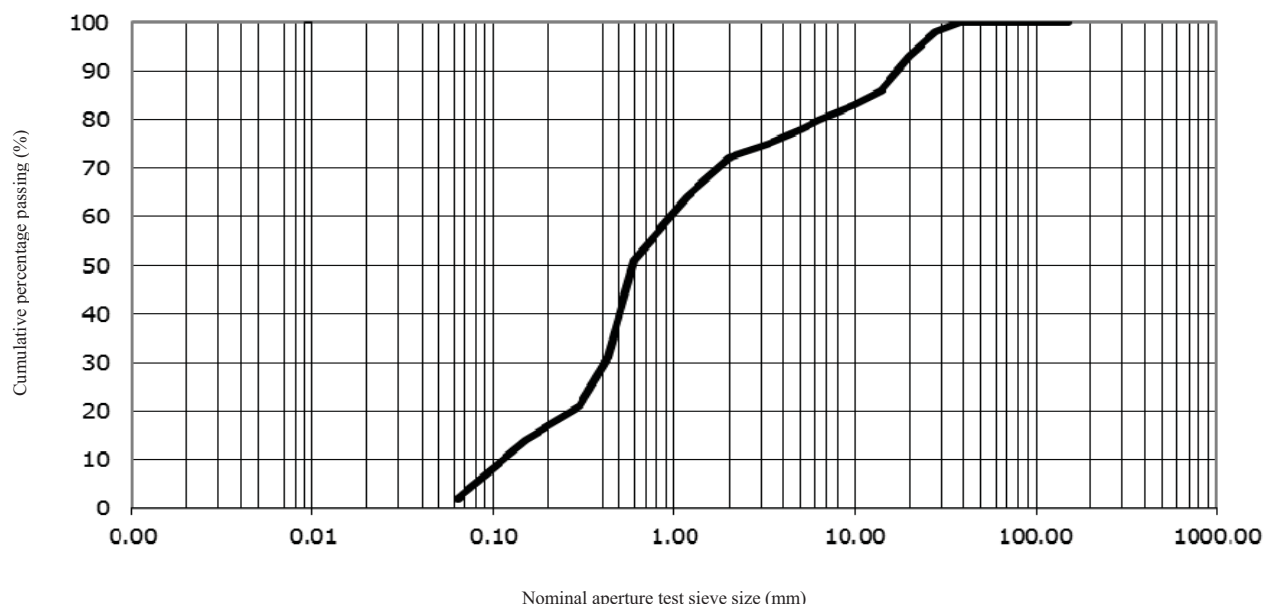
Date Sampled: N/A
Sampled from: -

Material Specification: N/A
Sample Description: Gravelly SAND
Sample Type: Disturbed
Sampled by: Client
Date Sampled: N/A

Remarks: -

BS Test Sieve (mm)	% Material Passing
125	100
90	100
75	100
63	100
50	100
40	100
37.5	100
28	98
20	93
14	86
10	83
6.3	80
5	78
3.35	75
2	72
1.18	64
0.6	51
0.425	31
0.3	21
0.15	14
0.063	2

Soil Fraction	Total Percentage
COBBLES	-
GRAVEL	28
SAND	70
SILT / CLAY	2



Sample Preparation: In accordance with BS 1377-1 & 2:1990

Certification:-

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Approved Signatory:

Date Reported: 24/09/14

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Determination of Particle Size Distribution (Dry Sieving)

Report Ref. No: GS-CRM.413.106

GSSL Sample ID A2

Client ID WS1 @ 2.8-3.00m, WS1 @ 3.80-4.00m, WS1 @ 4.60-5.00m, WS2 3.00-5.00m
WS3 3.00-5.00m & WS4 3.00-4.00m

Client: Enzygo Ltd
Site: Wrexham

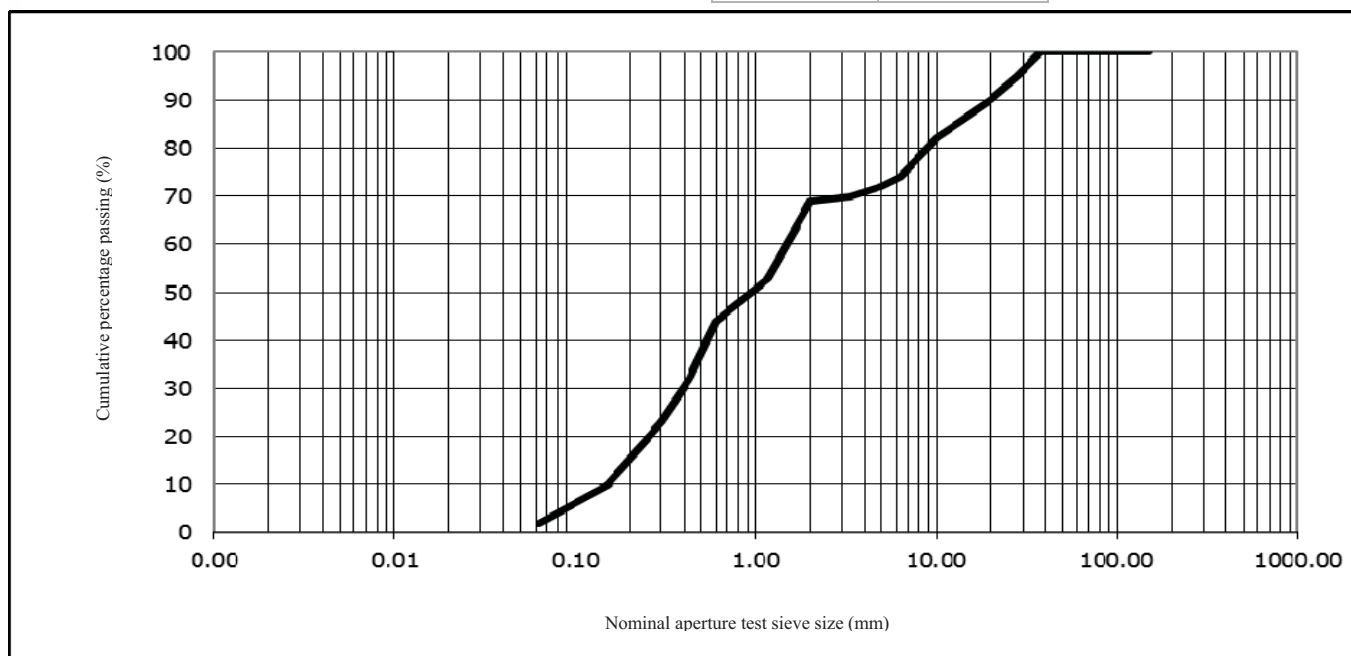
Date Sampled: N/A
Sampled from: -

Material Specification: N/A
Sample Description: Gravelly SAND
Sample Type: Disturbed
Sampled by: Client
Date Sampled: N/A

Remarks: -

BS Test Sieve (mm)	% Material Passing
125	100
90	100
75	100
63	100
50	100
40	100
37.5	100
28	95
20	90
14	86
10	82
6.3	74
5	72
3.35	70
2	69
1.18	53
0.6	44
0.425	32
0.3	23
0.15	10
0.063	2

Soil Fraction	Total Percentage
COBBLES	-
GRAVEL	31
SAND	67
SILT / CLAY	2



Sample Preparation: In accordance with BS 1377-1 & 2:1990

Certification:-

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Approved Signatory:

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Determination of Particle Size Distribution (Dry Sieving)

Report Ref. No: GS-CRM.413.106

GSSL Sample ID A3

Client ID WS5 @ 1.00-2.00m, WS6 1-1.20m, WS6 1.30-2.80m, WS7 1.00, WS7 1.80-2.80m & WS8 @ 1.00-2.00m

Client: Enzygo Ltd

Site: Wrexham

Date Sampled: N/A

Sampled from: -

Material Specification: N/A

Sample Description: Gravelly SAND

Sample Type: Disturbed

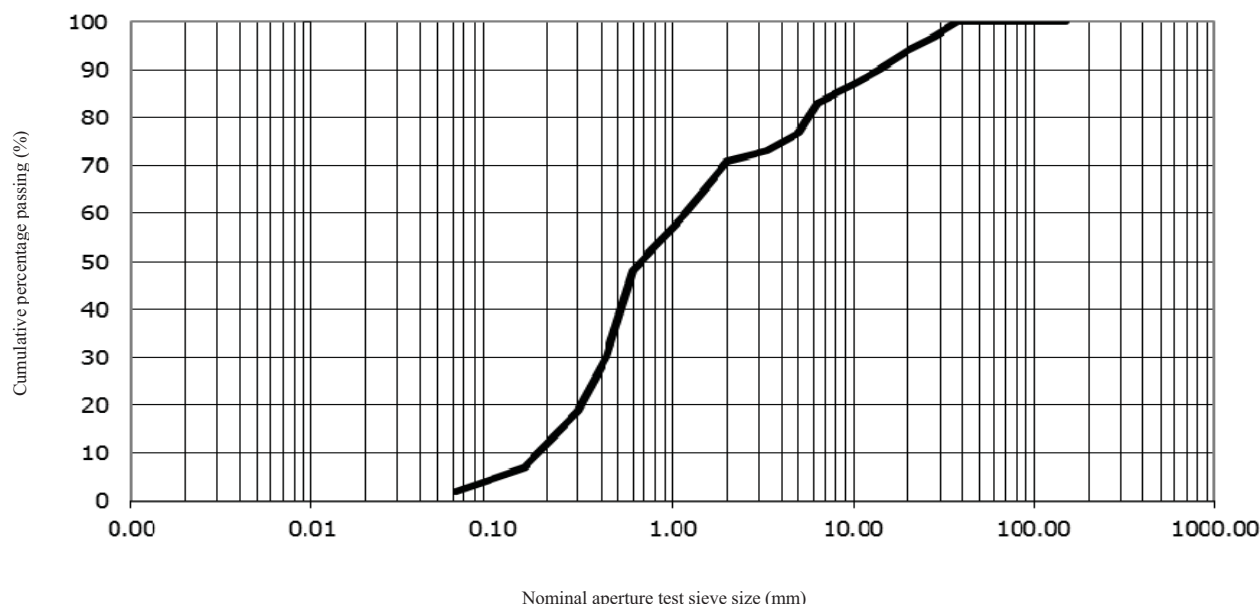
Sampled by: Client

Date Sampled: N/A

Remarks: -

BS Test Sieve (mm)	% Material Passing
125	100
90	100
75	100
63	100
50	100
40	100
37.5	100
28	97
20	94
14	90
10	87
6.3	83
5	77
3.35	73
2	71
1.18	60
0.6	48
0.425	30
0.3	19
0.15	7
0.063	2

Soil Fraction	Total Percentage
COBBLES	-
GRAVEL	29
SAND	69
SILT / CLAY	2



Sample Preparation: In accordance with BS 1377-1 & 2:1990

Certification:-

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Approved Signatory:

Date Reported: 24/09/14

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Determination of Particle Size Distribution (Dry Sieving)

Report Ref. No: GS-CRM.413.106

GSSL Sample ID A4

Client ID WS5 @ 2.90-3.00m, WS5 @ 3.50-3.70m, WS6 @ 2.40-3.00m, WS6 @ 4.00m
WS7 @ 3.00-4.00 & WS8 @ 2.80-3.00m

Client: Enzygo Ltd
Site: Wrexham

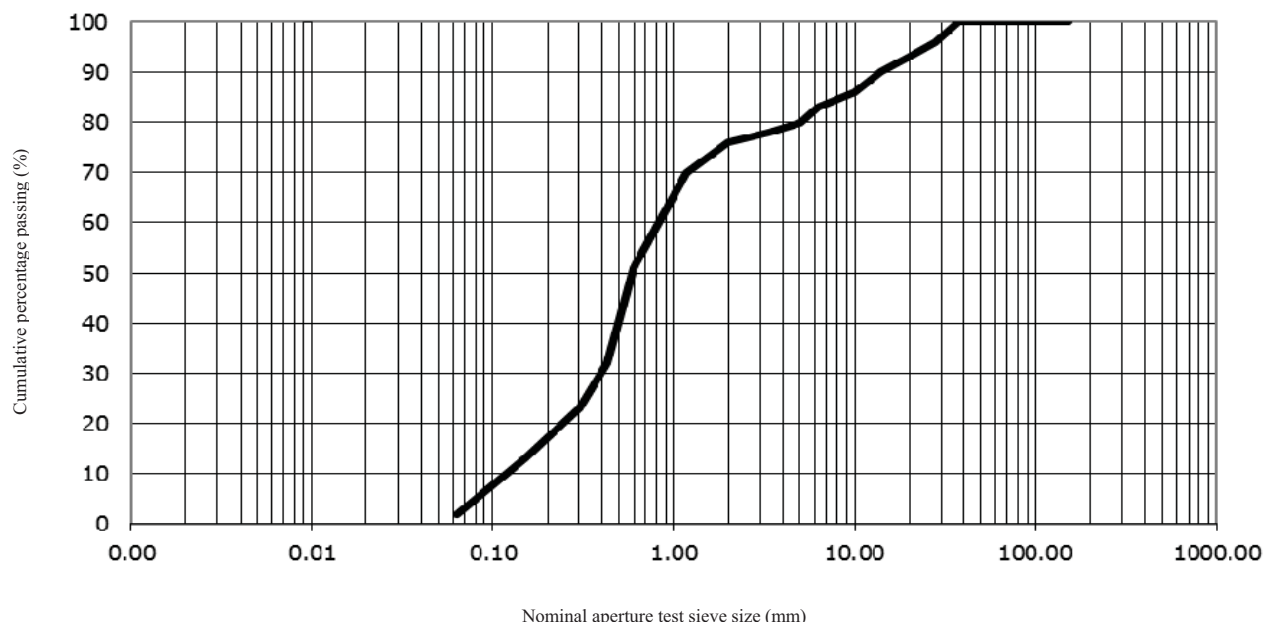
Date Sampled: N/A
Sampled from: -

Material Specification: N/A
Sample Description: Gravelly SAND
Sample Type: Disturbed
Sampled by: Client
Date Sampled: N/A

Remarks: -

BS Test Sieve (mm)	% Material Passing
125	100
90	100
75	100
63	100
50	100
40	100
37.5	100
28	96
20	93
14	90
10	86
6.3	83
5	80
3.35	78
2	76
1.18	70
0.6	51
0.425	32
0.3	23
0.15	13
0.063	2

Soil Fraction	Total Percentage
COBBLES	-
GRAVEL	24
SAND	74
SILT / CLAY	2



Sample Preparation: In accordance with BS 1377-1 & 2:1990

Certification:-

Test results reported herein do not apply to samples other than those supplied. GSSL Ltd neither accepts responsibility for nor makes claim as to the final use & purpose of the materials(s)

Approved Signatory:

Date Reported: 24/09/14

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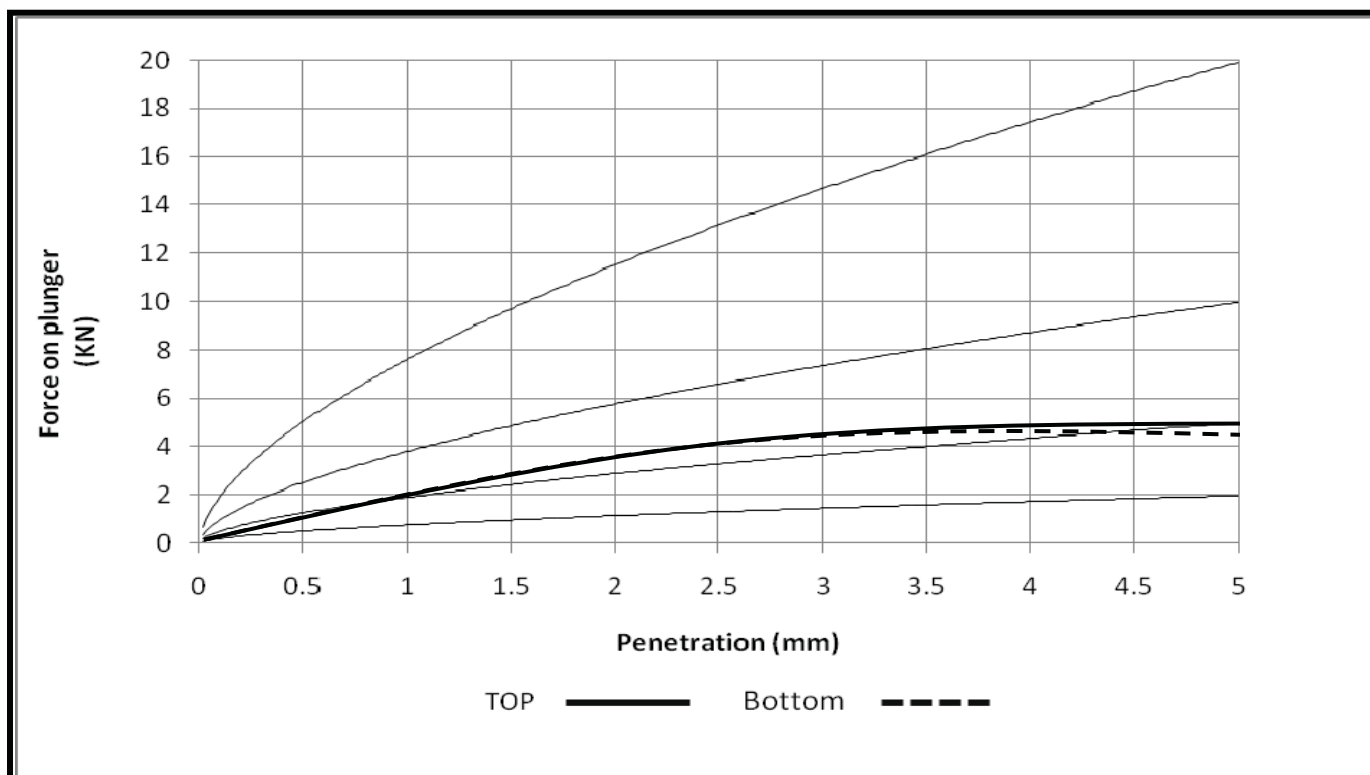
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Determination of California Bearing Ratio BS 1377: Part 4:1990

Contract Ref: Wrexham
Sample description: Gravelly SAND
Client Sample ID: TP1 @ 0.50m

Report Ref. No: GS-CRM.413.106

INITIAL SAMPLE CONDITIONS		TEST CONDITIONS		Method of compaction:	
Moisture Content %:	15.0	Surcharge Kg:	13	Final Moisture Content %	2.5kg rammer
Bulk Density (measured) Mg/m ³ :	2.02	Soaking Time hrs:	-	Sample Top	15.0
Dry Density (measured) Mg/m ³ :	1.73	Swelling mm:	-	Sample Bottom	15.0
Percentage retained on 20mm BS test sieve:	10	Remarks: Tested in accordance with BS1377: 1990 Part 4 Sample preparation method 2.5kg rammer			
				Calculated CBR Value %	
				CBR @ 2.5mm = 31.3 CBR @ 5.0mm = 24.6	
				CBR @ 2.5mm = 31.0 CBR @ 5.0mm = 21.1	



Certification:-

Sample Preparation: In accordance with BS 1377-4: 1990 : Clause 7.2.4.4. Moisture Content determined in accordance with BS 1377-2: 1990 Clause 3.2.
CBR Tested in accordance with BS 1377-4: 1990 Clause 7

Approved Signatory:

Date Reported: 24/09/14



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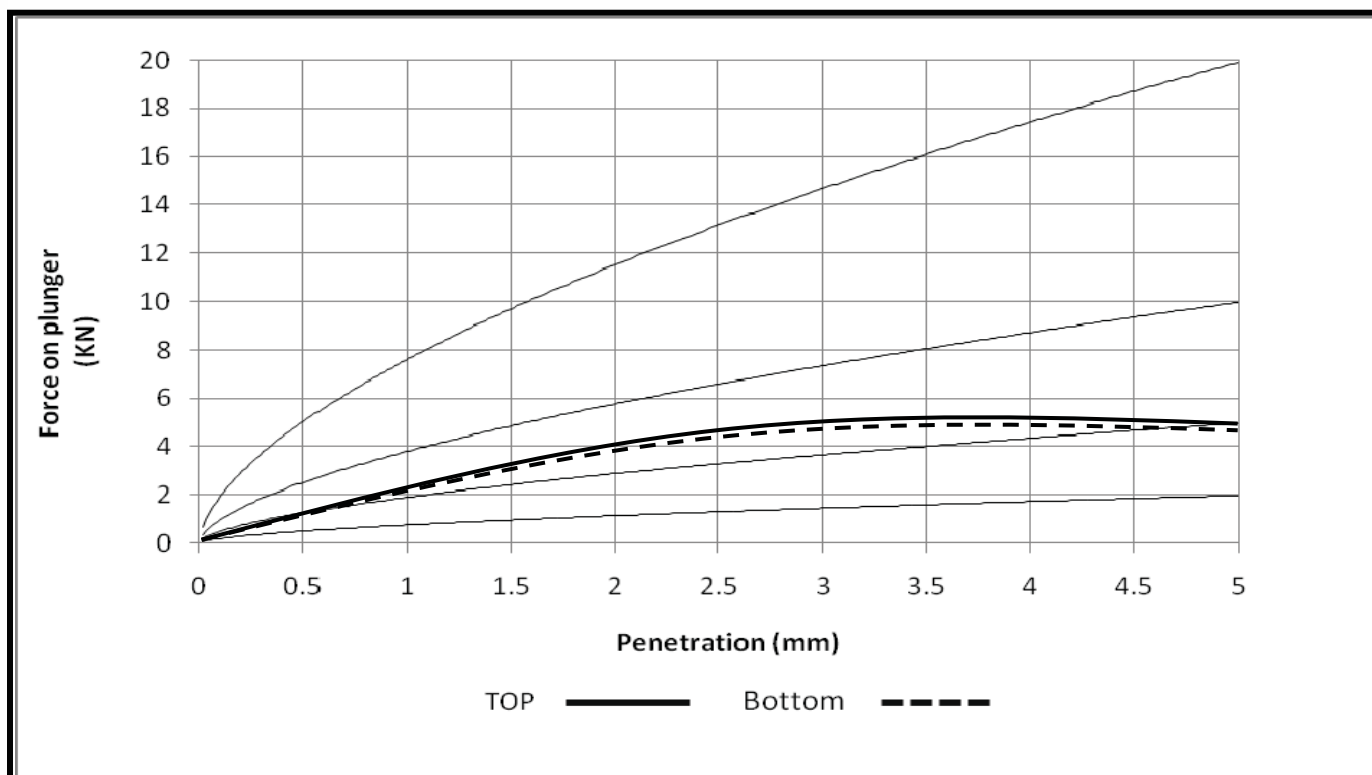
E: info@geosynthetics-lab.com W: www.geosynthetics-lab.com

Determination of California Bearing Ratio BS 1377: Part 4:1990

Contract Ref: Wrexham
Sample description: Gravelly SAND
Client Sample ID: WS1 @ 1.00m

Report Ref. No: GS-CRM.413.106

INITIAL SAMPLE CONDITIONS		TEST CONDITIONS		Method of compaction:	
Moisture Content %:	16.9	Surcharge Kg:	13	Final Moisture Content %	2.5kg rammer
Bulk Density (measured) Mg/m ³ :	2.03	Soaking Time hrs:	-	Sample Top	16.9
Dry Density (measured) Mg/m ³ :	1.76	Swelling mm:	-	Sample Bottom	16.9
Percentage retained on 20mm BS test sieve:	6	Remarks: Tested in accordance with BS1377: 1990 Part 4 Sample preparation method 2.5kg rammer			
				Calculated CBR Value %	
				CBR @ 2.5mm = 34.6 CBR @ 5.0mm = 25.0	
				CBR @ 2.5mm = 32.5 CBR @ 5.0mm = 23.9	



Certification:-

Sample Preparation: In accordance with BS 1377-4: 1990 : Clause 7.2.4.4. Moisture Content determined in accordance with BS 1377-2: 1990 Clause 3.2.
CBR Tested in accordance with BS 1377-4: 1990 Clause 7

Approved Signatory:

Date Reported: 24/09/14



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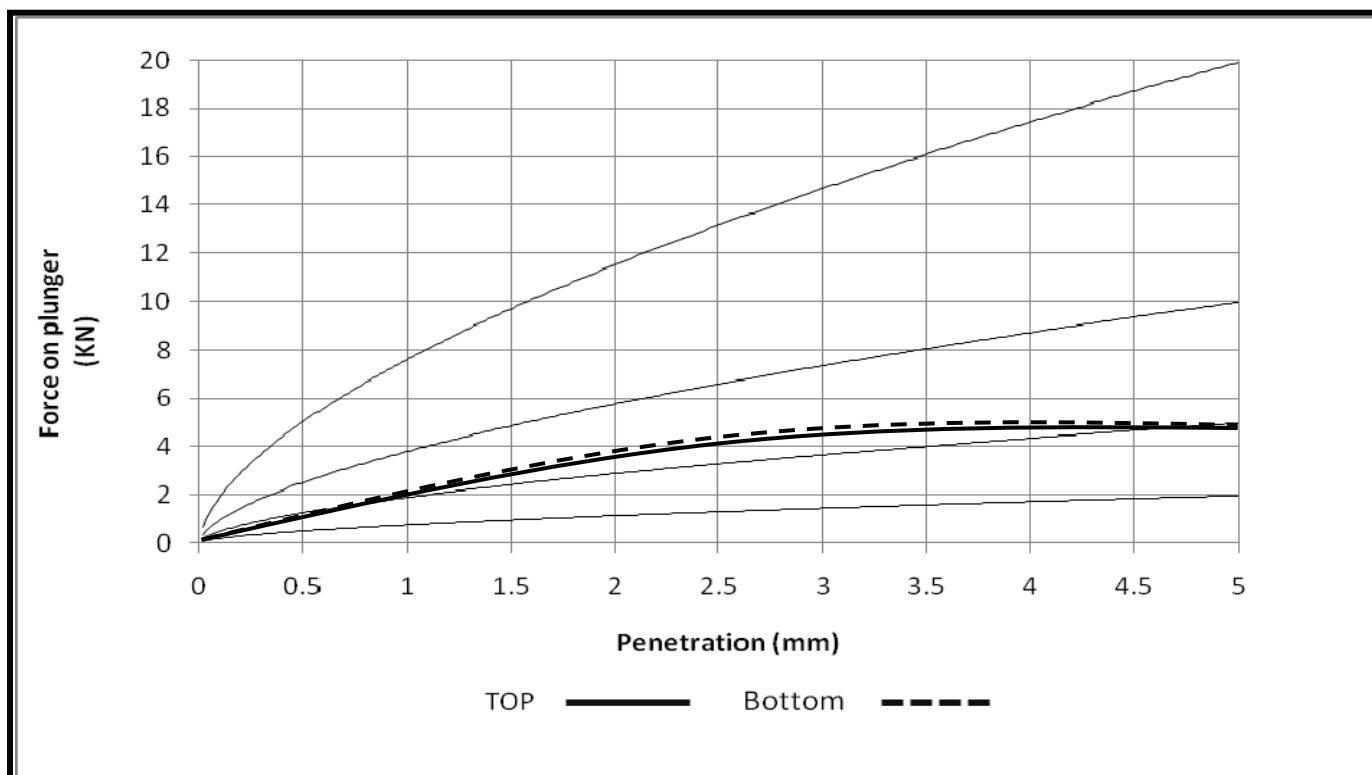
E: info@geosynthetics-lab.com W: www.geosynthetics-lab.com

Determination of California Bearing Ratio BS 1377: Part 4:1990

Contract Ref: Wrexham
Sample description: Gravelly SAND
Client Sample ID: WS5 @ 1.00m

Report Ref. No: GS-CRM.413.106

INITIAL SAMPLE CONDITIONS		TEST CONDITIONS		Method of compaction:	
Moisture Content %:	17.5	Surcharge Kg:	13	Final Moisture Content %	2.5kg rammer
Bulk Density (measured) Mg/m ³ :	2.02	Soaking Time hrs:	-	Sample Top	17.5
Dry Density (measured) Mg/m ³ :	1.75	Swelling mm:	-	Sample Bottom	17.5
Percentage retained on 20mm BS test sieve:	8	Remarks: Tested in accordance with BS1377: 1990 Part 4 Sample preparation method 2.5kg rammer			
				Calculated CBR Value %	
				CBR @ 2.5mm = 31.5 CBR @ 5.0mm = 23.9	
				CBR @ 2.5mm = 33.1 CBR @ 5.0mm = 24.5	



Certification:-

Sample Preparation: In accordance with BS 1377-4: 1990 : Clause 7.2.4.4. Moisture Content determined in accordance with BS 1377-2: 1990 Clause 3.2.
CBR Tested in accordance with BS 1377-4: 1990 Clause 7

Approved Signatory:

Date Reported: 24/09/14



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