



CONSULTING ENGINEERS

CIVIL • STRUCTURAL
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**PROPOSED RESIDENTIAL DEVELOPMENT
GRESFORD ROAD,
LLAY, WREXHAM
FOR
ANWYL CONSTRUCTION & BELLWAY HOMES LTD**

FINAL ISSUE

JULY 2017

**GEO-ENVIRONMENTAL INVESTIGATION REPORT
17040/GEIR**

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EXECUTIVE SUMMARY

Site	The site is irregular in shape and extends to an area of approximately 15.63 hectares. It is situated upon the northern eastern side of Gresford Rd, Llay approximately 6.0km north of Wrexham town centre.
NGR	SJ 33697 562657
Site History	The site has remained in agricultural usage throughout its history. Former ponds located within the central area of the site have been infilled. A review of the surrounding areas has identified infilled features to the east and west of the site.
Investigations	The investigations have extended to:- • Walkover survey • Desk study • Extensive intrusive investigations by window sample, cable percussion boreholes and trial pits • Chemical analyses of soil samples • Ground gas monitoring
Ground Conditions	Topsoil has been identified over the whole site area present at varying thicknesses between 0.2 – 0.6m. Localised deposits of made ground has been identified within positions TP17, TP35, TP44 – TP47, WS7, BH3 at depths between 0.0 – 2.0m bgl comprising of intermixed soils with anthropogenic materials. Underlying the topsoil and made ground strata the majority of the natural strata within the site comprises of firm to stiff clays which have been identified at depths between 0.2 – 6.45m bgl. Within the eastern half of the site medium dense sand units are more prominent and have been identified at depths between 0.2 – 7.45m bgl. Within position WS6 brown clayey gravel is present at depths between 1.8 – 2.1m bgl. At position WS8 a brown sandy silt is present at depths between 1.8 – 2.1m bgl.
Groundwater	Ground water ingress has been identified within positions TP7, TP9, TP17, TP22, TP24, TP27, and TP30, TP32 – TP33, TP35, TP44, BH3, BH4, BH8 at depths between 0.5 – 3.5m bgl which is considered to represent the perched water within the made ground and natural strata.
Environmental	Chemical analysis has not identified any harmful concentrations of the determinands considered and the topsoil material is considered suitable for reuse within the site. Chemical analysis of the made ground material has confirmed that it is suitable for retention within the site and asbestos screening has confirmed the absence of asbestos fibres.
Trees	The site contains a number of trees located around all site boundaries and along field boundaries. The cohesive strata identified on site is classified as having a low volume change potential. A full arboriculturist report is required.
Foundations	Strip footings formed on natural clay strata with a safe bearing capacity of 100kN/m ² at a minimum depth of 0.9m below finished ground level and 0.6m below finished floor level within granular deposits. Foundation depths expected to be in the range of 0.9 - 1.5m below ground level except in areas of tree root effects where foundations may extend to depths up to 2.5m. There will be a requirement for nominal reinforcement within foundations due to variable ground conditions. Within the localities of made ground deposits associated within infilled ponds, ground works and animal burial, piled foundations may be required.
Slabs	Reinforced suspended ground floor slabs are recommended for the proposed dwelling. A full programme of ground gas monitoring has identified CS1 (NHBC Green) ground gas conditions. However, there will be a requirement to incorporate basic radon ground gas precautions within all properties of this development.
Remediation	No specific program of remediation required. The topsoil within the site is considered to be suitable for reuse within a residential environment.
Animal Burials	Targeted investigation has identified animal carcasses within positions TP32 – TP33 at depths between 0.8 – 2.0m bgl. The APHA should be notified of these so appropriate disposal should be carried out. The remaining two locations identified by the landowner have not identified animal carcasses and there will be a requirement for further investigation at these locations.
Further Works	Further investigation is required into the remaining areas where animal carcasses have not been confirmed. Investigation will be required within the locality of the existing concrete slab adjacent to Home Farm to confirm ground conditions.

This brief summary should not be assumed to represent a complete account of all the potential geo-environmental issues that may exist at the site. As such it is strongly recommended that the report be read in its entirety.

GEO-ENVIRONMENTAL INVESTIGATION WORKS

GRESFORD ROAD, LLAY, WREXHAM.

1.0 INTRODUCTION

1.1 Instructions

1.1.1 We are instructed by Anwyl Construction, Anwyl House, Clos Dewi Sant, St David's Park, Ewloe, Deeside, CH5 3DT and Bellway Homes Ltd, 2 Alderman Road, Speke, Liverpool, L24 9LR to undertake a program of ground investigation works at a site located north east of Gresford Road, Llay, Wrexham which they intend to re-develop in a residential manner.

1.2 Object

1.2.1 The object of these investigations are as follows:

- To determine the engineering properties of the soils present within the site to form a basis upon which foundation and general infrastructure recommendations and design may be based;
- To enable sufficient information regarding ground conditions to be obtained from which risks to end users and the environment can be assessed;
- To utilise the information obtained from the investigations to provide recommendations for remediation measures where required.

1.3 Scope

1.3.1 The investigations considered within this report have comprised of the following elements:

- An initial environmental and engineering desk study based upon existing reports, services location information, geological, hydrogeology and hydrological information, a commercially available database and old Ordnance Survey maps;
- An initial walkover survey of the site has been undertaken prior to any intrusive investigations being commenced to determine the presence of any visible hazards or features which may affect the design of the ground investigation works;
- Undertake ground investigation works by trial pitting, cable percussion and window sample boreholes;
- Determine the presence, nature and extent of any soil and groundwater contamination at the site;
- Determine the presence of any toxic or explosive gasses from areas of infilling within or adjacent to the site;
- Determination of the engineering properties of the soils present within the site to form a basis upon which recommendations for foundations and infrastructure construction may be based;
- Identify the potential requirements for any remedial action, where required.

1.4 Development Proposals

- 1.4.1 *We understand that it is our client's intention that the site will be developed by the construction of three hundred and sixty two (362 No.) residential units with associated road access, garden areas and areas of POS.*
- 1.4.2 *At the time of undertaking these ground investigation works a site layout drawing, drawing reference SK01P4 has been appended to this report for reference. It is however recognised that the development proposals may be amended as a result of the planning process. If the general principles of the development proposals vary from the assumptions made within this report, than any subsequent recommendations may become inappropriate and require reassessment in the light of further information.*

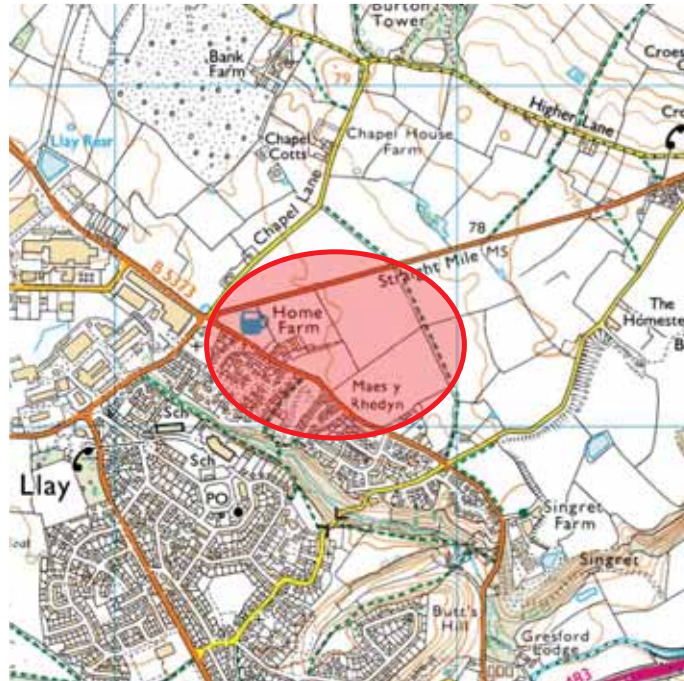
1.5 Services

- 1.5.1 *Information regarding the possible presence of live public services has been provided by our client and a drainage survey has identified the presence of a sewer located centrally within the site. It enters the site from the north west and trends in a south easterly direction towards the centre of the site where it then splits and travels in a general east to west direction and also continues south east. The drainage survey has also identified the presence of surface water outfall located within the southern corner of the site which trends in a north east to south west direction and then turns 90 degrees and travels in a south easterly direction. All remaining service drawings indicate utilities located outside of the site boundary mainly within pavement and road areas.*
- 1.5.2 *Although service information has been provided we are aware that private services may also be present thus due regard to potential live services was undertaken prior to investigation with a cable avoidance tool (CAT) and to an appropriate depth.*

2.0 THE SITE

2.1 Location

- 2.1.1 *The site is irregular in shape and extends to an area of approximately 15.63 hectares. It is located upon the north eastern side of Gresford Road, Llay approximately 6.0km north of Wrexham town centre. The site is located at an approximate National Grid Reference SJ 33697 562657 and comprises of multiple parchments of agricultural land. The site location is also shown in figure 1 overleaf.*

Figure 1 - Site Location

2.2 Boundaries

2.2.1 The northern boundary of the site is formed by Straight Mile (B5102) and the north eastern boundary is formed by a hedgerow that leads on to further agricultural fields. The south eastern boundary is formed by further agricultural fields and residential property Fernyfield. The south western boundary is formed by Home Farm and Gresford Road (B5373).

2.3 Access

2.3.1 Access to the site is gained via a private access road located at Home Farm, however it is anticipated that multiple new accesses will be created prior to development and will be agreed with the local authority.

2.4 Topography

2.4.1 The general topography of the site slopes towards the east at a general gradient of 1 : 90 however general topography across the site undulates and topographical lows are located within the most southern part of the site where seasonal ponds form. These gradients are not considered to pose potential issues in relation to this development but may need to be considered locally where they may impact upon roads and other infrastructure.

2.5 Site Conditions

2.5.1 At the time of the investigation the site was utilised as agricultural land mainly for the purpose of grazing with the presence of two seasonal ponds located within the southern area of the site.

2.6 Trees

- 2.6.1 *There are a numerous trees and shrubs located along the majority of the site boundaries as well as internal field boundaries.*
- 2.6.2 *It is strongly recommended that all trees within the proposed development area should be subject to a detailed arboriculturist report prior to any trees being removed. It is also recommended that the arboriculturist report should extend to all trees which lie outside the site area but which may lie within potentially influencing distance of any proposed buildings.*

2.7 Walkover Survey

2.7.1 *Prior to commencing the ground investigation works we have undertaken an initial walkover survey of the site to identify any areas which may impact upon the proposed site redevelopment works. These features are identified upon the appended walkover survey plan which is appended to this report for reference along with site walkover photographs and the Site Walkover Photograph Plan. However the main features of the site are as follows:-*

- The whole site is utilised as agricultural land mainly for the purpose of grazing and crops;*
- Two topographical lows have been identified within the southern part of the land which also contain standing water following a period of inclement weather;*
- The general gradient of the site slopes towards the east where there are numerous local variations in topography;*
- Manholes have been identified within the central area of the site which are considered to relate to the existing drainage sewer;*
- Manholes have also been identified within the southern area of the site catered in areas of topographical low;*
- A concrete yard area has been identified which is utilised for the storage of farming equipment and consumables;*
- A former vehicle repair shop has been identified across Gresford Road adjacent to the western corner of the site which appears to be no longer in operation.*

2.8 Animal Burials

2.8.1 *During the site walkover the landowner indicated that he has previously buried farm animals that died of natural causes within the site. These locations are marked on the walkover survey plan. The landowner has indicated that within each location potentially three to four animals have been buried comprising of sheep and cattle. It is indicated that these have been buried at depths in excess of 2.5m below ground level. There will be a requirement for targeted investigations within these locations to identify any potential animal carcasses.*

2.8.2 *After receiving this information we have contact the Animal and Plant Health Agency (APHA) for any further information on potential animal burials within the site. The APHA have indicated no records of burials or outbreaks were identified within the site, however prior 2001 on farm burials were common place and may be present within the site itself. We have appended their response to this report for reference and a Code of Practice to prevent the spread of animal and poultry disease. They have confirmed that if animal carcasses are identified during the intrusive investigation, then these will remain in position and backfilled immediately upon identification and the positions of these carcasses will be recorded and provided to the APHA for further guidance.*

3.0 DESK STUDY

3.0.1 As part of our environmental desk studies we have commissioned an Enviro-Insight report by Groundsure which gives details of all recorded environmental features relating to the site and its immediately surrounding area. We have also obtained copies of all available old Ordnance Survey maps for the area and these give some historical guidance regarding the former usage of the site area and its immediate vicinity. A Geo-Insight report has also been commissioned which assesses the geological structures within the general area of the site.

2.1 Historical Land Uses

2.1.1 The Enviro-Insight report has identified forty (40 No.) records of potentially contaminative past land uses within 500m of the search boundary. The first record is located 8m south and relates to earth works. This is located upon the south western side of Gresford Road which has now been redeveloped in the form of Oakfield Park Home Estate. All remaining records are located in excess of 30m from the site boundary and relate to wind pump, railway siding, colliery, industrial estate, sand pit, unspecified pit, gravel pit, nursery and police station. These potentially contaminated past land uses are not considered to pose a potential source of contamination to this development.

3.1.2 The Enviro-Insight report has identified nine (9 No.) records of historical tanks within 500m of the search boundary however these are all located in excess of 385m from the site boundary.

3.1.3 The Enviro-Insight report has identified nineteen (19 No.) records of historical energy features within 500m of the search boundary however these are all located in excess of 104m from the site boundary and relate to electricity sub stations.

3.1.4 The Enviro-Insight report has identified sixteen (16 No.) records of historical garage and motor vehicle repair sites within 500m of the site boundary. Of these, five records are located 7 – 9m south west which relate to a garage. This garage has been identified during the site walkover and is considered to represent a vehicle repair site which is no longer in operation. This site is not considered to pose a potential off site source of hydrocarbon contamination to this development. All remaining records are located within excess of 320m from the site boundary.

3.1.5 The Enviro-Insight report has identified sixty (60 No.) potentially infilled features within 500m of the study site. The first four records are located on site and relate to a pond which is located south of Home Farm, this infilled pond may indicate localised deposits of made ground and may pose a source of explosive and toxic gases within the site. Therefore there would be a requirement for ground gas monitoring that will be incorporated into the intrusive investigation within the site. Numerous potentially infilled features have been identified to the west and the south east relating to sand pits, unspecified pits and collieries. These off site infilled features pose potential sources of explosive and toxic gases to this development therefore a programme of ground gas monitoring will be required.

3.2 Environmental Permits, Incidents and Registers

3.2.1 The Enviro-Insight report has identified two (2 No.) records of historic IPC authorisation within 500m of the study site. Both records are located 409m north west which relate to Magellan Aerospace and relate to the pre-organic chemical processes.

Due to its remote locality this IPC authorisation is not considered to pose a potential source of contamination to this development.

- 3.2.2 The Enviro-Insight report has identified two (2 No.) records of Part A (2) and Part B activities within 500m of the study site. Both records are located in excess of 380m from the site boundary and are noted to be Part B type permits. Due to the remote locality they are not considered to pose a potential source of contamination to this development.*
- 3.2.3 The Enviro-Insight report has identified eight (8 No.) records of Licensed Discharge Consents within 500m of the study site. All records are located in excess of 238m from the site boundary and are not considered to pose a potential contaminative hazard to this development.*
- 3.2.4 The Enviro-Insight report has identified thirty eight (38 No.) records of National Incidents Recording System (NIRS) List 2. All records are located within excess of 65m from the site boundary and have recorded impacts to land, water and air between Category 4 (no impact) and Category 3 (minor).*
- 3.2.5 The Enviro-Insight report has identified a National Incidents Recording System (NIRS) List 1 record located 230m south west where a significant impact to water is noted, no impact to land and air. This incident is not considered to pose a potential source of contamination to this development.*

3.3 Landfill Sites

- 3.3.1 The environmental report has identified one (1 No.) records of Environment Agency landfills located 376m north and the landfill type is noted to be household, commercial & industrial waste, due to its remote locality this landfill is not considered to pose a potential off site source of explosive and toxic gases to this development.*
- 3.3.2 The Enviro-Insight report has identified six (6 No.) records of Environment Agency historical landfill sites within 1500m of the study site. The first record is located 197m south east and relates to Singret Quarry which is noted to receive inert industrial waste. Due to its close proximity to the site this historical landfill may pose a potential source of explosive and toxic gases to this development therefore there would be a requirement for a programme of ground gas monitoring within the intrusive investigations. All remaining historical landfill records are located in excess of 625m from the site boundary.*
- 3.3.3 The Enviro-Insight report has identified one (1 No.) record of Local Authority landfill located 700m north west. This is not considered to pose a ground gas hazard to this development.*
- 3.3.4 The Enviro-Insight report has identified thirty five (35 No.) records of Environment Agency waste sites within 1500m of the study site boundary. All records are located in excess of 535m of the site boundary and are considered to remote to have any potential environmental impact upon the development of the site.*

3.4 Current Land Uses

- 3.4.1 The Enviro-Insight report has identified seven (7 No.) records of potentially contaminative industrial sites within 250m of the study site.*

The first record is located 25m to the south west and relates to Blackbrook Motors which was identified during the site walkover. The remaining records are all located in excess of 30m from the site boundary. All potentially contaminative industrial sites are not considered to pose a potential hazard to the development of this site.

- 3.4.2 The Enviro-Insight report has identified a petrol or fuel site located 108m south west however this is now noted to be obsolete. Aerial photographs confirm that this area has now been redeveloped in the form of Oakfield Park Home Estate.*
- 3.4.3 The environmental report has not identified any National Grid high voltage underground electricity transmission cables or high pressure gas transmission pipelines within 500m of the study site boundary.*

3.5 Hydrogeology & Hydrology

- 3.5.1 The superficial deposits within the vicinity of the site are designated as Secondary A and unproductive. Within the eastern half of the site superficial deposits are designated as unproductive which relates to layers of drift deposits with low permeability that have negligible significance of water supply or rover base flow. The eastern half of the site comprises of secondary A aquifer which contains permeable layers capable of supporting water supplies at local rather than strategic scale and in some cases forming an important source of base flow to rivers.*
- 3.5.2 The site is located above Secondary (A) aquifer rocks which contain permeable layers capable of supporting water supplies at local rather than strategic scale and in some cases forming an important source of base flow to rivers. The development of this site in a residential manner is not considered to pose a potential hazard to the underlying aquifers within the superficial deposits and bedrock.*
- 3.5.3 The Enviro-Insight report has not identified any abstraction license within 870m of the site boundary, however records do exist beyond this distance.*
- 3.5.4 The environmental report has provided Environment Agency information on groundwater vulnerability and soil leaching potential and is classified as minor aquifer/low leaching potential with a Soil Vulnerability Category HU – L.*
- 3.5.5 The environmental report has identified four (4 No.) records of detailed river networks within 500m of the study site however these are located in excess of 210m from the site boundary. Development of the site is not considered to pose a potential hazard to these river networks.*
- 3.5.6 The environmental report has identified seven (7 No.) records of surface water features within 250m of the study site however these are located in excess of 170m of the site boundary. Development of this site is not considered to pose a hazard to these surface water features.*

3.6 Flooding

- 3.6.1 The environmental report does not indicate that the site lies within an Environment Agency flood plain area and the risk of flooding from rivers and the sea (RoFRaS) flood rating of very low. The environmental report however does identify groundwater flooding susceptibility areas within 50m of the boundary of the site and relates to superficial deposits flooding with 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 to take no further action in relation to ground water flooding hazard. A high confidence is given to this flooding susceptibility.

3.7 Environmentally Sensitive Areas

- 3.7.1 The environmental report has not identified any environmentally sensitive areas within 170m of the site boundary although records do exist beyond this distance.*

3.8 Geology

- 3.8.1 The Geo-Insight report has not identified any made ground deposits within the site however large deposits of made ground have been identified 77m to the west which therefore may pose a potential off site source of explosive or toxic gases to this development.*
- 3.8.2 The superficial deposits within this site are divided into two equal formations. The eastern half of the site comprises of glaciofluvial sheet deposits which are considered to comprise of sand and gravels with alternating clay and silt units. The western half of the site comprises of glacial till considered to comprise mainly of cohesive clays, minor granular units.*
- 3.8.3 The solid geology below the site comprises of the Salop Formation which is Westphalian D and is considered to comprise of mudstone with minor units of sandstone and conglomerates.*
- 3.8.4 The geological report has identified one geological fault located 439m north. This geological fault is not considered to pose a potential hazard to the development in terms of minor ground movements.*
- 3.8.5 The site is located within an area where between 5 – 10% of properties are above the action level for radon gas and therefore there is a requirement for basic radon protective measures within the development.*
- 3.8.6 The geological report has identified numerous historical surface ground working features within 250m. The first four records are located on site and relate to a pond which is located south of Home Farm. This surface ground working feature may represent localised deposits of made ground within the development and will require targeted investigation. The remaining records are all located outside of the site boundary and are not considered to pose a potential hazard in relation to this development.*
- 3.8.7 The geological report has identified seven (7 No.) historical underground working features. All records are located in excess of 50m from the site boundary and relate to a colliery, unspecified mine and disused shafts.*
- 3.8.8 The Geo-Insight report has identified twelve (12 No.) records of BGS current ground workings within 1000m of the study site. All records are located in excess of 89m from the site boundary and relate to sand quarries, clay pits and collieries. These current ground workings are not considered to pose a potential hazard to the development of this site.*

3.8.9 The site has been identified within a coal mining area and a Coal Authority report has been obtained. The Coal Authority report has indicated that the site is in a surface area that could be effected by underground mining and five seams of coal at depths between 660 – 1000m depth and were last worked in 1966. Any movement in the ground due to coal mining activity should have stopped. Considering the depth of coal seams are in excess of 660m below the site any potential future collapses would choke themselves out for transmitting to the surface of the site and therefore the site is not considered to be at risk from minor ground movements associated with the collapse of coal workings. Therefore there is no requirement for intrusive investigations in relation to shallow coal mine workings.

3.8.10 The geological report has identified one non coal mining site located 706m north west relating to a vein mineral. The assessment of likelihood is that its sporadic underground mining of restricted extent may have occurred. The site is not considered to be at risk of collapse of vein mineral iron workings.

3.9 Boreholes

3.9.1 The Geological report has identified four (4 No) BGS borehole records within 250m of the study site boundary. These borehole records indicate varying glacial till and glaciofluvial sand deposits identified within the desk study information.

3.10 Background Soil Chemistry

3.10.1 The Geo-Insight report includes an estimated geometric mean soil concentration of various elements. Assessment of this information suggests that the majority of soil concentrations are anticipated to be below tier 1 assessment criteria in relation to human health effects.

3.11 Site History

3.11.1 Table 1 – Review of Historical Maps

Date	Site	Adjacent Land
1872	The site comprises of two parchments of agricultural land. A pond is located centrally within the site and also two ponds located just south of Home Farm adjacent to the south western boundary.	The majority of the surrounding land comprises of further agricultural fields with sporadic ponds. The site is bounded to the north and the south east by roadways. Home Farm is located adjacent to the south east boundary.
1900	The site is now split in five parchments of land similar to its current layout.	Adjacent to the south east boundary earth works are shown and a sand pit is located approximately 100m to the south east adjacent to Oak Cottage and Vaddock Cottage.
1909	No significant change.	No significant changes.
1938	No significant change.	No significant change.
1949	No significant change.	A large gravel pit has been identified approximately 750m to the east. Large ground workings have also been identified to the west approximately 150m. These ground workings also have railway sidings associated with Llay main colliery.
1964	No significant change.	Gravel pit to the east has now extended to approximately 500m from the site boundary. Ground working railway sidings to the west have also expanded.
1981	Both ponds located within the site are no longer represented on mapping they are assumed to be infilled.	The large gravel pit to the east is noted to be disused. Partial development has taken place to the west of the former railway sidings. Earth works adjacent to the south eastern boundary are now shown to be a caravan park.
1992	A roadway is now shown to extend from Home Farm to the centre of the site.	No significant changes.
2002	No significant change.	Land to the west has now been redeveloped into a Llay industrial estate.
2010 - 2014	No significant change.	No significant change.

3.11.2 Careful appraisal of the historical maps has identified that the site remained as agricultural land throughout its entire history however ponds located within the central area of the site have now been infilled. Assessment of the surrounding land has identified ground workings located to the east and west in relation to gravel pits and railway sidings and also identified adjacent to the south eastern boundary.

3.12 Anticipated Ground Conditions

3.12.1 Based upon the information obtained during the initial desk study phase, the anticipated ground conditions are expected to comprise of strata as detailed in table 2 below.

Table 2 – Anticipated Ground Conditions

Ground Material	Anticipated Condition
Topsoil	Topsoil is assumed to be present over the majority of the site area.
Made Ground	Possible localised deposits of made ground within the areas of infilled ponds.
Glacial Till Deposits	Where present, it is anticipated that it will consist of firm to stiff sandy boulder clay with silt and sand lenses.
Glacial Fluvial Deposits	Where present, these are anticipated to consist of sands and gravels with minor clay units.
Bedrock	The underlying geology comprises of Salop formation which is considered to be at a significant depth below the site.
Ground Water	Expected to lie at depth within the bedrock aquifer and localised areas of perched water within the superficial deposits.

3.12.2 Based upon the data available within the desk study and tables 1 and 2 above, potential ground related issues associated with the proposed redevelopment of this site are likely to include the elements noted in table 3 overleaf.

Table 3 – Potential Ground Related Issues

Type of Issue	Site Specific issue	Remarks (refer to walk over survey plan)
Potential on Site Contamination Sources	- Localised areas of made ground associated with the previously infilled pond. - Naturally occurring contaminates within the topsoil.	Refer to the desk study.
Potential off Site Contamination Sources	Potential ground gas migration from the former infilled gravel pit ground workings.	Refer to desk study.
Potential Geotechnical Hazards	Soft / loose ground.	Potential loose made ground.

3.13 Preliminary Conceptual Model

3.13.1 The information presented within this Desk Study section of this report has been used to compile a preliminary conceptual model for the site. The identified potential contaminant and receptors have been considered along with any possible pathways that may link them. The resulting pollution linkages are considered in Table 4 below. The risk classification has been estimated in accordance with the terms and definitions based upon CIRIA C552 Contaminated Land Risk Assessment, A Guide to Good Practice.

Table 4 – Preliminary Conceptual Site Model

Potential Source	Potential Receptor	Possible Pathway	Probability	Consequence	Risk	Mitigation / Investigation
Contaminated Soils	Site personnel during construction	Direct contact of soils Inhalation or ingestion of soil / dust	Lw	Md	Moderate / Low	Soil sampling during intrusive investigations. Laboratory analysis of samples
	Future site users	Direct contact of soils Inhalation or ingestion of soil / dust	Li	Md	Moderate	
	Surface water in the vicinity of the site	Leaching of contaminants through drainage system	Lw	Mi	Low	
	Ground water in aquifer	Leaching of contaminants to ground water	Lw	Sv	Moderate	
	Future site users	Vapour migration from soils	Li	Md	Moderate	
	Proposed buildings and services	Direct contact with contaminated soils	Lw	Mi	Low	
	Plants in gardens and soft landscaping	Direct contact	Lw	Mi	Low	
Contaminated ground water	Site personnel during construction	Water entering excavations	Lw	Mi	Low	Sampling of ground water (where encountered)
	Future site Users	Retained surface water	Lw	Mi	Low	
Toxic and explosive gases	Proposed buildings and occupiers	Ground gas migration into buildings	Li	Md	Moderate	Program of ground gas monitoring to be conducted
Radon gases	Proposed buildings and occupiers	Ground gas migration into buildings	Lw	Md	Moderate/Low	Basic radon gas precautions required
Key: Probability: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor Consequence: Hi = High, Li = Likely, Lw = Low Likelihood, Ul = Unlikely						

4.0 SITE WORKS

4.1 Intrusive Works

4.1.1 The ground conditions at this site have been investigated by the excavation of forty seven (47 No.) trial pits along with eleven (11 No.) window sample boreholes. These trial pits and boreholes have been intended to investigate the shallow ground conditions present within the site and the window sample boreholes have been utilised to facilitate the installation of ground gas monitoring wells within the superficial deposits. These ground investigation works have also been supplemented by the drilling of eight (8 No.) cable percussion boreholes we utilised to identify deeper ground conditions and to also facilitate the installation of ground gas monitoring wells. Trial pit excavations were supervised by a REFA engineer and the boreholes conducted by Geo-Ventures (UK) Ltd., who are a specialist ground investigation contractor.

- 4.1.2 *During the excavations and drilling works representative samples of soils encountered have been obtained for laboratory analysis and testing where considered to be appropriate.*

4.2 Locations

- 4.2.1 *The locations of the trial pits and boreholes have been chosen by ourselves in conjunction with the proposed site layout in an effort to identify the representative ground conditions present across the site area.*
- 4.2.2 *The locations of the boreholes and trial pits are indicated upon the appended exploratory hole location plan in relation to the site features present at the time of the investigation.*
- 4.2.3 *At the time of the intrusive investigation, investigations were unable to be carried out within the yard area located immediately south of Hope Farm at the request of the land owner. There will be a requirement of further investigation within this area following the removal of the concrete slab.*

4.3 Records

- 4.3.1 *During the investigations records of the strata types, water entries, ground conditions and levels within each borehole and trial pit have been maintained. This information has been collated into a series of borehole and trial pit journals which are appended to this report for reference. Representative samples of the strata encountered have been retained for laboratory testing as required and where appropriate.*

4.4 Targeting

- 4.4.1 *It has been considered that the whole of this site has been in agricultural usage throughout its recorded history. Generally a non-targeted sampling regime has been adopted for these investigations in accordance with the recommendations laid down in BS10175 : 2011 : "Investigation Of Potentially Contaminated Sites". However, some specific areas have been targeted as outlined below. Representative samples of the strata at this location have been retained for chemical analyses.*
- 4.4.2 *The window sample and cable percussion boreholes have been utilised to allow the installation of gas monitoring equipment to assess potential ground gas migration from the infilled features.*
- 4.4.3 *Trial pits TP15, TP16, TP22, TP23, TP32 and TP33 have all been targeted within the potential burial site area as indicated by the farmer to investigate the potential presence of animal remains.*
- 4.4.4 *Positions TP 17, BH 3 and WS 7 have been targeted within areas of infilled pond to identify any potential made ground and to facilitate the installation of ground gas monitoring pipes.*
- 4.4.5 *During the intrusive investigation the landowner indicated an area located centrally within the site adjacent to the infilled pond that he utilised to dispose of demolition rubble and therefore position TP 35, TP 43 – TP 47 have been targeted within these areas to identify any potential made ground deposits.*

Table 5 - Initial Ground Investigation Strategy

Exploratory Hole No.	Target	Purpose
TP 1 – TP14, TP18 – TP21, TP24 – TP31, TP34, TP36 – TP42 WS2 – WS6, WS9 – WS11 BH2, BH4 – BH6 & BH8	General ground conditions	To determine the general nature of underlying soils and geology including: 1. Nature, distribution and thickness of made ground 2. Nature, degree and extent of potential contamination 3. Content of unacceptable material eg biodegradable matter etc. 4. Suitability of the ground for the founding of structures 5. Engineering properties of the ground 6. Monitor ground gases to assess potential risk
TP 17, BH3 & WS7	Infilled pond areas	1. Identify any potential animal carcasses
TP35, TP43 – TP47	Infilled groundworks	
TP15, TP16, TP22, TP23, TP32, TP33	Burial Sites	
BH1, BH7, WS1, WS8	Shallow ground conditions and possible ground gases	1. Monitor ground gases to assess potential risk

5.0 GROUND CONDITIONS

5.0.1 These intrusive investigations have identified variable ground conditions across the whole site and therefore table 6 below provides a geological summary of the ground conditions identified during the intrusive investigations.

5.1 Topsoil

5.1.1 These investigations have located the presence of surface topsoil across the majority of the site at varying thicknesses between 0.2 – 0.6m bgl. This has identified a significant volume of topsoil for potential reuse on site following chemical assessment.

Table 6 – Geological Summary							
Stratum	Description	SPT 'N' Value	Typical Depth: (m bgl)				Location
			TOP:		BASE:		
			MIN	MAX	MIN	MAX	
TOPSOIL	Brown silty sandy clay with rootlets	N/A	0.0	0.0	0.1	0.6	TP1 – TP4, BH1 – BH8, WS1 – WS11
MADE GROUND	Intermixed soils with anthropogenic materials	10 - 11	0.0	0.8	0.7	2.0	TP17, TP35, TP44 – TP47, WS7, BH3
ANIMAL REMAINS	Intermixed soils with animal remains	N/A	0.3	0.3	2.0	2.0	TP32 – TP33
Firm to Stiff CLAY	Firm to stiff slightly sandy slightly gravelly CLAY	9 - 33	0.2	5.0	0.5	6.45	TP1 – TP6, TP8 –TP26, TP29 – TP31, TP33 – TP47, WS1 – WS2, WS4 – WS10, BH1 – BH8
Medium dense SAND	Brown silty clayey gravelly fine to coarse SAND	7 -31	0.2	6.10	0.6	7.45	TP1 – TP4, TP7 – TP9, TP22, TP24, TP26 – TP28, WS1 – WS5, WS7, WS11, BH4 – BH7
SILT	Brown slightly sandy SILT	N/A	1.8	1.8	2.1	2.1	WS8
GRAVEL	Brown clayey fine to coarse surrounded GRAVEL	N/A	1.8	1.8	2.1	2.1	WS6

5.2 Made Ground

5.2.1 Within positions TP17, TP32 – TP33, TP35, TP44 – TP46, WS7 and BH3 made ground deposits have been identified comprising of intermixed soils with anthropogenic materials. This made ground strata has been proven to a maximum depth of 2.0m bgl. No visual or olfactory evidence of contamination was identified within the made ground strata however the presence of anthropogenic materials indicates the potential for non-visible contaminants.

5.2.2 The made ground strata is to be variable in consistency and therefore is considered unsuitable of offering a uniform safe bearing capacity.

5.2.3 Within position TP32 and TP33 evidence of animal remains were identified within the made ground material. Upon the identification of these remains trial pits were terminated and back filled immediately. These remains will require reporting to the APHA who will then in turn contact the duty vet for the appropriate disposal of animal remains prior to development proceeding.

5.3 Natural Strata

- 5.3.1 Majority of exploratory holes within this site have identified firm to stiff clays which have been proven to a maximum depth of 6.45m bgl. During the field work insitu hand shear vane testing were conducted within the cohesive materials and recorded hand shear values between 31 – 129 kPa. Within the boreholes standard penetration tests (SPT's) recorded "N" values between 9 – 33 blows/300mm. Assessment of these results indicates that the natural clay strata within this site is capable of offering a safe bearing capacity of at least 100kN/m² at a minimum depth of 0.9m bgl. Greater bearing capacities may be achieved with depth in agreement with the Building Inspector and foundations engineer.
- 5.3.2 Within the eastern half of the site sand units become more prominent have been identified at depths varying between 0.2m – 7.45m bgl. The presence of these sand units within the eastern half of the site confirm the desk study information indicating glaciofluvial deposits within this half of the site. SPT's generated within the sand deposits recorded "N" values between 7 – 31 blows/300mm and therefore sand within the clays is considered capable of offering a safe bearing capacity of at least 100kN/m² at a minimum depth of 0.6m bgl.
- 5.3.3 Within position WS 8 brown slightly sandy silt was identified at depths between 1.8m - 2.1m and a brown clay fine to coarse gravel was identified within position WS 6 at depths between 1.8m – 2.1m.

5.4 Bedrock

- 5.4.1 These investigations have not identified the presence of bedrock within the site and it is anticipated that bedrock lies at a significant depth below the site.

5.5 Groundwater

- 5.5.1 During these investigations groundwater ingress has been identified within positions BH 3, BH 4, BH 8, TP 7, TP 9, TP 17, TP 22, TP 24, TP 27, TP 30, TP 32, TP 33, TP 35 and TP 44 at depths between 0.5m – 3.0m. This groundwater ingress is considered to represent perched water within the made ground and natural strata and groundwater table was considered to lie at significant depth below the site.
- 5.5.2 Although no significant evidence of water ingress has been identified across the site, it can be considered that the groundwater table is present at significant depth within the bedrock and within areas where cohesive natural strata is present, perched water may be present during inclement weather but may be remediated with simple sump pumping techniques, though more extensive management may be required in more extreme cases.

5.6 Excavations

- 5.6.1 The majority of natural strata within this site comprises of firm to stiff clays and expectations are considered capable of remaining open for significant periods of time. However within the eastern half of the site sand deposits are more prominent and these are anticipated to suffer instability over periods of time and are considered incapable open for significant periods of time. The sudden catastrophic collapse of any excavation made within this site is considered to represent a high risk.

- 5.6.2 *It is essential that personnel should not be allowed to approach or enter any excavation made upon this site unless appropriate precautions have been adopted to ensure that hazardous side instability has been prevented. This is particularly important in relation to foundation and drainage construction where operatives may be specifically required to enter excavations. Reference should be made to HSE Publication HSG 150 "Health and Safety in Construction" for guidance.*

5.7 Contamination

- 5.7.1 *These investigations have identified the presence of localised deposits of made ground within the site however no visual or olfactory evidence of contamination has been identified. However the presence of anthropogenic materials within the made ground indicate the potential for contaminants.*

5.8 Sampling

- 5.8.1 *Based upon the previous usage of the site representative samples of the strata encountered during these investigations have been retained for chemical analyses. This analysis has been intended to determine the potential presence of any contaminants which may represent a hazard to site operatives or end users of the site. This section of the work is considered in more detail in section 7 and 8 of this report.*

5.9 Index Testing

- 5.9.1 *Where cohesive deposits have been identified they have been considered to be potentially subject to volumetric change as a result of variation in moisture content. Accordingly a series of twenty (20 No.) samples of clay strata have been submitted to a civil engineering laboratory to determine the index properties of the clays present. Index testing undertaken upon these samples have confirmed that the soils within this site have a plasticity index in the range of 12% - 22%. Sample TP27 at 1.0m has been recorded as non-plastic and confirms that the strata within this location comprises of very clayey fine to coarse sand.*
- 5.9.2 *Nineteen of the twenty samples have recorded plasticity indices <20% and therefore the cohesive strata within this site can be considered to have a low volume change potential in relation to tree root effects in accordance with NHBC Handbook Chapter 4.2.*

5.10 Ground Gases

- 5.10.1 *The desk study information has identified infilled features within the site and to the east and west of the site and therefore there is a potential for ground gas migration to the site.*
- 5.10.2 *Six (6 No.) boreholes have been utilised for the installation of ground gas monitoring standpipes to assess the potential risk of ground gas migration from the identified infilled areas within the desk study.*

5.11 SUDS

- 5.11.1 *Assessment of the ground conditions present within this site in terms of sustainable urban drainage suggests that the majority of the site is effectively impermeable natural deposits at shallow depth will not allow the dissipation of surface water within the site area. Even where granular deposits are more prominent within the eastern half of the site there appears to be no lateral continuity and therefore variable permeability rates are assumed.*

It is our opinion based upon the results of these investigations that the ground conditions within this site are not conducive to the adoption of a soakaway or other ground infiltration system of drainage for surface water disposal.

6.0 GAS MONITORING

6.1 General

6.1.1 *The initial desk study for this site has identified the potential for migration of toxic and explosive gasses from previously infilled areas located to the east and west of the site. Accordingly a program of ground gas monitoring has been included within these investigations to determine the extent of any potential hazard.*

6.2 Installation

6.2.1 *To identify the presence of possible ground gases six (6 No.) boreholes have been completed as permanent gas monitoring points. These boreholes and standpipes have been targeted to the east and west of the site and identify migrating gases off site. A standpipe has been installed within position BH03 to identify any potential ground gas generated from the infilled pond area. The response zones within the stand pipes have been constructed at depths varying between 0.5 – 7m bgl.*

6.2.2 *The installations have included for the insertion of high density polyethylene 50mm diameter plain and slotted standpipes. The annulus space around the standpipe has been filled with non-calcareous pea gravel in the range of 2mm – 5mm. The upper 1.0m of the borehole (upper 0.5m BH3) has been sealed with bentonite clay and both positions have been finished with a gas tap and lockable steel cover. Full details of the installations are appended to this report for reference.*

6.3 Dates

6.3.1 *A complete programme of ground gas monitoring has now been completed which commenced on the 27th March 2017 and continued until 6th July 2017.*

6.3.2 *During the monitoring programme position WS07 was not monitored on the final monitoring visit on the 6th July as this was damaged and lost due to farming activity. Position WS8 was not monitored on the final visit on the 27th May and 6th July due to agricultural activity and damaged covers. However at least three (3 No.) standpipes have been monitored six times over a period of 3 months in accordance with the guidance CIRIA C665.*

6.4 Procedure

6.4.1 *The installation of the gas wells and gas monitoring procedures have been based upon the recommendations laid in CIRIA C665 "Assessing Risks Posed by Hazardous Ground Gasses to Buildings". In accordance with that documentation, it is intended that the period of monitoring will be up to 3 months with at least six gas monitoring visits being undertaken during that period. This assessment is based upon tables 5.5a and 5.5b and relates to a residential development with a very low potential source of gas.*

6.5 Range

6.5.1 *The installed wells are to be monitored for flammable gas (calibrated to methane, carbon dioxide, oxygen and gas flow) using a portable infrared gas analyser. Full details of the analysis program and assessment are presented within the appendix of this report.*

6.6 Monitoring

6.6.1 The recommendations require that gas monitoring rounds should encompass various climatic conditions particularly in relation to atmospheric pressure but including at least one period of falling pressure with one during and after heavy rainfall.

6.7 Results

6.7.1 A full programme of ground gas monitoring has been conducted and this is presented within the appendix of this report. However a summary of the monitoring results are detailed in table 7 below.

Table 7: Summary Of Gas Monitoring Results (complete)

Location	No Of Monitoring Occasions	Methane % v/v	Carbon Dioxide % v/v	Oxygen %	Flow l/hr	W.L. Depth	Base of Installation (m)	Atmospheric Pressure (mB)
BH1	6	0.0 - 0.1	0.2 - 0.4	17.4 - 20.3	0.0	Dry - 5.52	6.0	1013 - 1022
BH3	6	0.0	0.6 - 1.9	19.7 - 20.2	0.0	0.26 - 0.73	2.5	1013 - 1022
BH7	6	0.0 - 0.1	0.0 - 1.2	19.3 - 20.6	0.0	0.67 - 6.6	7.0	1013 - 1022
WS1	6	0.0 - 0.1	0.0 - 0.4	19.9 - 20.6	0.0	DRY	4.0	1013 - 1022
WS7	5	0.0	0.0 - 0.1	20.4 - 20.6	0.0	0.7 - 0.78	4.0	1013 - 1022
WS8	4	0.0	0.0 - 0.1	20.4 - 20.6	0.0	0.82 - 1.02	4.0	1013 - 1022

Note ND - none detected

6.7.2 Based upon the monitoring data calculations we have confirmed that the maximum gsv for methane is 0.0001l/hr and 0.0019l/hr for carbon dioxide. Reference to table 8.5 of CIRIA C665 confirms that based upon these gsv values this site should be classified as Characteristic Situation 1 (NHBC Green). There are no recorded incidences of methane above 1.5% or carbon dioxide above 5% and therefore there is no requirement to raise the Characteristic Situation by one level. Although the ground gas monitoring indicates no requirement for ground gas precautions within the development, the site is located within an area where **basic radon ground gas precautions** are required within all property within this development.

7.0 CONTAMINATION ANALYSIS & ASSESSMENT CRITERIA

7.1 Sampling

7.1.1 A total of twenty five (25 No.) samples of topsoil and made ground encountered during these investigations have been retained for chemical analyses. Generally these samples relate to the topsoil and made ground conditions located within the site. These samples are considered to be representative of the shallow ground conditions within the site and form a basis for assessment of their potential for reuse within a residential environment.

7.1.2 All samples obtained from this site were considered to be subject to a program of PAH analyses. Accordingly, all samples have been placed into a 250ml wide necked brown glass jar. All soil samples have been stored in cool boxes at temperatures of approximately 4° (+/- 2° centigrade) until delivery in the selected laboratory. All sample containers were marked with the site address, trial pit and borehole number, depth and date of sampling.

All samples have been tested within the specified handling period to accord with the sampling protocol presented by Exova Laboratories.

7.2 Range

These investigations have identified the presence of three distinct strata types within this site.

- 7.2.1 The site contains a layer of topsoil over all areas of the site and varies in thickness from 0.2 – 0.6m. The topsoil strata is considered to represent material that can be potentially reused on site following chemical analysis.*
- 7.2.2 Localised areas of made ground have been identified and may hold the potential for contaminants. Accordingly a sampling and testing program has been undertaken upon these made ground materials and the samples have been obtained from varying depths to determine any variation in contaminant content and vertical profile.*
- 7.2.3 The natural strata identified within this site comprises mainly of slightly sandy clays, more prominent sand units are present within the eastern half of the site. This material is normally considered free from any potential contaminative influences and reference to the initial desk study has confirmed no evidence to suggest naturally arising elevated concentrations of contaminants within the natural strata.*

7.3 Laboratory

- 7.3.1 All samples selected for chemical analyses have been returned to Exova (UK) Laboratories who are an MCERTS and UKAS accredited laboratory facility. Each sample has been subject to a range of chemical analyses to determine the concentrations of a wide range of common contaminants and confirmation of the UKAS and MCERTS accreditation for each test is indicated within the results.*

7.4 Development Proposals

- 7.4.1 We are aware that the site is to be re-developed on a private residential basis and that the proposals include for the preparation of private garden areas. The majority of the site will be covered by buildings, hard standing and access road ways. Clearly however it is essential to ensure that the materials present within the sensitive garden areas are suitable for retention within a residential environment.*

7.5 Analysis Range

- 7.5.1 The initial desk study and preliminary conceptual model confirm that this site is unlikely to have been affected by contamination based upon its history. However a number of issues relating to the site may have generated potentially hazardous contamination and these are as follows:-*
 - Possible contamination within localised deposits of made ground;*
 - Naturally occurring contaminants within the topsoil.*
- 7.5.2 Table 8 below confirms the range of analyses undertaken upon the samples of soil obtained from this site.*

Table 8 – Table of Chemical Testing

Analysis Suite	Determinands	No. of Samples
<i>Metals</i>	<i>Arsenic, Cadmium, Chromium (total), Copper, Lead, Mercury, Nickel, Selenium, Zinc</i>	25
<i>Organics 1</i>	<i>PAH – USEPA 16 suite, Phenol</i>	25
<i>Organics 2</i>	<i>TPH (CWG), BTEX</i>	3
<i>Inorganics</i>	<i>Cyanide, Soluble sulphates, Sulphide, pH, Organic matter</i>	25
<i>Asbestos</i>	<i>Asbestos Screen</i>	5

7.6 Results

7.6.1 The full results of the testing program are appended to this report and should be read in conjunction with the comments and recommendations regarding risk assessments.

7.7 Approach

7.7.1 The current UK approach to the consideration of contaminated land is based upon the principles of risk assessment. This in turn is founded upon the use of a source-pathway-target principle in order to establish the presence of a potential pollutant linkage. Our approach to the risk assessment is consistent with UK guidance and best practice. As advocated in the EA Policy Statement : Guidelines For Environmental Risk Assessment And Management a tiered approach has been adopted. This tiered approach is central to Part IIA of the Environmental Protection Act 1990 and the Town and Country Planning Act 1990.

7.8 Site Classification

7.8.1 The current development proposals for this site confirm that the site will be developed on a private residential basis utilising large areas of private gardens. Accordingly the site usage has been considered on the basis of an end land use of residential as defined by EA Science Report SC050021/SR3 2009 in relation to the most recent soil guideline values.

7.9 Criteria

7.9.1 The concentrations of contaminants within the ground have been compared to a range of generic soil guideline values that have been prepared by DEFRA and the Environment Agency. Where published, soil guideline values (sgv) have been utilised as intervention values for the purpose of an initial tier 1 assessment.

7.9.2 At the time of the preparation of this report soil guideline values were available only for a limited number of contaminants and the development of both the CLEA model and additional soil guideline values is on-going.

Where published soil guideline values are available they have been utilised as intervention values for the purposes of an initial tier 1 assessment. A number of sgv's have recently been updated to reflect a modern approach to the protection of human health.

7.9.3 In March 2014 the Department for Environment Food & Rural Affairs published SP1010 : Development of Category 4 Screening Levels for Assessment of Land Affected by

Contamination Policy Companion Document. This document provides a series of Category 4 screening levels based upon differing land uses. Reference has been made to the values presented within this report in relation to the appropriate land usage.

7.9.4 *Where soil guideline values were not published at the time of preparing this report, generic assessment criteria (GAC) published by Land Quality Management Ltd., in conjunction with the Chartered Institute Of Environmental Health have been adopted. The values published in the LQM/CIEH S4UL's for Human Health Risk Assessment" Registration No. S4UL3265.*

7.9.5 *Reference has also been made to published soil screening values presented by Atkins Ltd., under their Atrisk Subscription Service. The SSVs have been adopted where SGVs or GACs are not available. The remaining contaminants have been considered based upon information that was the best available at the time of the study.*

8.0 RESULTS OF ANALYSIS & QUALITATIVE RISK ASSESSMENT

8.1 *Model*

8.1.1 *As discussed above, assessment of contaminated land is based upon a simple assessment of pollutant linkages referred to as the source-pathway-target model. This assessment considers the current or proposed usage of the site in terms of suitability for use. This implies the use of risk assessment in principle in order to evaluate the potential effects and concerns of contamination on a site-specific basis.*

8.1.2 *Initial assessment of the chemical analyses results has been undertaken to assess the concentrations of determinands in relation to tier 1 assessment criteria. The summary of these test results is detailed overleaf.*

8.2 *Results Summary*

8.2.1 *The following tables 9 - 12 have been prepared as a summary of the laboratory analyses depending upon the class of analyses undertaken. The test results have been compared to the adopted assessment criteria, relating to a proposed residential land usage.*

8.2.2 *All samples obtained during these investigations have been considered in each table. Principally the tables below relate to topsoil and made ground strata and assess its suitability for reuse.*

Table 9: Summary of Contamination Analysis: Metals & Inorganics					
	No. of Samples	Range of Values (mg/kg)	Assessment Criteria (mg/kg)	No. of Samples Failing	Locations
Arsenic	25	<2.0 – 43.0	37 ³	1	TP44 – 0.4m
Cadmium	25	<1.0 – 2.0	11.0 ³	0	-
Chromium (total)	25	9.0 – 29.0	910 ³	0	-
Copper	25	11.0 – 200.0	2400 ³	0	-
Lead	25	28.0 – 233.0	200 ¹	1	TP46 – 0.2m
Mercury	25	<1.0	40 ³	0	-
Nickel	25	9.0 – 47.0	180 ³	0	-
Selenium	25	<1.0	250 ³	0	-
Zinc	25	42.0 – 490.0	3700 ³	0	-
Total Cyanide	25	<1.0 – 2.0	34.0 ²	0	-
Phenol	25	<1.0 – 3.0	200 ³	0	-
pH	25	5.86 – 7.49	-	0	-
SOM %	25	2.4 – 11.1	-	0	-
SO ₄ (2:1)	25	0.01 – 0.07	0.5 ⁴	0	-
Asbestos	5	ND	Absent/Present	0	-
¹ DEFRA : SP1010 : Category 4 Screening Levels ² Atkins Atrisk SSV residential with home grown produce (1% SOM) ³ LQM and CIEH S4UL's for Human Health Risk Assessment (Registration No. S4UL 3265) Residential with home grown produce (2.5% SOM) ⁴ BRE Special Digest 1:2005 DS-1 (units in g/l) ND – None Detected					

8.3 Metals & Inorganics

- 8.3.1 Reference to table 9 above confirms the range of contaminants considered within this series. One exceedance of arsenic has been identified within sample TP44 at 0.4m which relates to made ground material. The adopted assessment criteria for arsenic is 37mg/kg and the exceedance has recorded 43mg/kg which is considered only to be a marginal exceedance and does not pose a potential hazard to long term end users of the site.
- 8.3.2 An exceedance of lead has been identified within sample TP46 at 0.2m which also relates to made ground material. The assessment criteria for lead is 200mg/kg and the exceedance has recorded 233mg/kg. This again is considered to be a marginal exceedance of the assessment criteria and no further elevated lead concentrations were identified. Therefore this lead concentration is not considered to pose a potential hazard to long term end users of the site.
- 8.3.3 Where made ground has been accounted containing demolition material samples have been screened for the presence of asbestos. Five (5 No.) samples of made ground confirmed the absence of asbestos fibres within the made ground. Therefore there is no requirement for remediation due to asbestos fibres within the site.

Table 10: Summary of Contamination Analysis: Organics: PAH USEPA 16 Suite

	No. of Samples	Range of Values (mg/kg)	Assessment Criteria ¹ (mg/kg)	No. of Samples Failing	Locations
Acenaphthene	25	<0.1	510	0	-
Acenaphthylene	25	<0.1	420	0	-
Anthracene	25	0.1	5400	0	-
Benzo[a]anthracene	25	<0.1 – 0.6	11.0	0	-
Benzo[a]pyrene	25	<0.1 – 0.8	5.0 ²	0	-
Benzo[b]fluoranthene	25	<0.1 – 1.2	3.3	0	--
Benzo[ghi]perylene	25	<0.1 – 0.6	340	0	-
Benzo[k]fluoranthene	25	<0.1 – 0.5	93	0	-
Chrysene	25	<0.1 – 0.9	22.0	0	-
Dibenz[ah]anthracene	25	<0.1 – 0.2	0.28	0	-
Fluoranthene	25	<0.1 – 0.9	560	0	-
Fluorene	25	<0.1	400	0	-
Indeno[123-cd]pyrene	25	<0.1 – 0.5	36.0	0	-
Naphthalene	25	<0.1	5.6	0	-
Phenanthrene	25	<0.1 – 0.4	220	0	-
Pyrene	25	<0.1 – 0.9	1200	0	-

¹ LQM & CIEH S4UL's for human health risk assessment (Registration No. S4UL 3265) – Residential with home grown produce (2.5% SOM)

² DEFRA : SP1010 : Category 4 Screening Levels

8.4 Speciated PAH

8.4.1 The soil samples retained from these investigations have been subject to a programme of analyses which have assessed the concentrations of the individual constituents of the polycyclic aromatic hydrocarbon series. A summary of the topsoil and made ground samples are shown in tables 10 above. The assessment criteria utilised are based upon the presence of 2.5% soil organic matter within the samples generally. Reference to the tests results does however show variable soil organic matter content.

8.4.2 Assessment of table 10 above confirms that the topsoil and made ground samples show no exceedances of various PAH compounds in relation to the adopted assessment criteria. No specific remediation is required in terms of PAH compounds.

Table 11: Summary of Contamination Analysis: Organics: TPH (CWG) Suite

	No. of Samples	Range of Values mg/kg	Assessment* Criteria mg/kg	No. of Samples Failing	Notes
Aliphatic EC> 5 – 6	3	<0.01	78.0	0	
Aliphatic EC> 6 – 8	3	<0.01	230	0	
Aliphatic EC> 8 - 10	3	<1.0	65.0	0	
Aliphatic EC> 10 - 12	3	<1.0	330	0	
Aliphatic EC> 12 - 16	3	<1.0	2400	0	
Aliphatic EC> 16 - 35	3	2.2 – 9.0	92000	0	
Aliphatic EC> 35 - 44	3	<1.0	92000	0	
Aromatic EC> 5 - 7	3	<0.01	140	0	
Aromatic EC> 7 - 8	3	<0.01	290	0	
Aromatic EC> 8 - 10	3	<1.0	83.0	0	
Aromatic EC> 10 - 12	3	<1.0	180	0	
Aromatic EC> 12 - 16	3	<1.0	330	0	
Aromatic EC> 16 - 21	3	<1.0 – 1.6	540	0	
Aromatic EC> 21 - 35	3	2.0 – 5.0	1500	0	
Aromatic EC> 35 - 44	3	<1.0	1500	0	

*Criteria values based upon LQM and CIEH S4UL's for human health risk assessment (Registration No. S4UL 3265) – Residential with home grown produce (2.5% SOM)

8.5 Speciated TPH (CWG)

- 8.5.1 The presence of made ground has raised the potential for hydrocarbon contamination being present. All samples of the made obtained from this site has been subject to detailed analysis to determine the presence of petroleum hydrocarbons. The results of this testing program are summarised in table 11 above.
- 8.5.2 The summaries clearly demonstrate that hydrocarbons are not present at elevated concentrations in any of the made ground samples selected for testing. These results indicate that the soil samples tested do contain hydrocarbons, although they are below the detectable limit. This site does not require any specific remediation in terms of hydrocarbon contamination.

Table 12: Summary of Contamination Analysis: Organics: BTEX Suite					
	No. of Samples	Range of Values (mg/kg)	Assessment* Criteria (mg/kg)	No. of Samples Failing	Notes
Benzene	3	<0.01	0.17	0	
Toluene	3	<0.01	290	0	
EthylBenzene	3	<0.01	110	0	
M/P Xylenes	3	<0.01	140	0	
O Xylene	3	<0.01	140	0	
Methyl tert-Butyl Ether	3	<0.01	20 ¹	0	
* Criteria values based upon LQM & CIEH S4UL's for human health risk assessment (Registration No. S4UL 3265) – Residential with home grown produce (2.5% SOM)					
¹ Atkins Atrisk SSV residential with home grown produce (1% SOM)					

8.6 BTEX

- 8.6.1 As part of the analysis for petroleum hydrocarbons the BTEX factions have also been assessed. Reference to table 12 above confirms no elevated concentrations of any of the BTEX factions within samples representative of the made ground strata. Widespread hydrocarbon contamination is therefore not considered to represent a hazard at this site.

8.7 Sulphates

- 8.7.1 Within the program of laboratory testing each sample has also been analysed to determine the concentration of water soluble sulphates within the ground. Reference to the laboratory results presented by Exova confirms that soluble sulphates are present at concentrations are between 0.01 – 0.07g/l. Reference to BRE Special Publication 1 : 2005 "Concrete in Aggressive Ground" confirms that at <0.5g/l, the design sulphate class for this site is DS-1. Accordingly the ACEC class for the site is assessed to be AC-1s on the basis that the site does not have mobile groundwater and the pH value is >5.5. Reference to Table D of BRE Special Publication 1 indicates that the DC class for this site should be considered to be DC-1.

9.0 DISCUSSIONS

9.1 General

- 9.1.1 *The initial desk study of this site has identified a history which has been consistent with agricultural usage although infilling works have taken place adjacent to the south western boundary in relation to a historic pond.*

A review of the surrounding land has also indicated numerous infilled features located to the east and west that may pose a potential ground gas source. The initial walkover survey of the site has identified the presence of agricultural fields used for grazing and our initial appraisal of the site has not identified any direct visible evidence of any potentially hazardous contamination but nevertheless consideration of possible non-visible contamination has been considered within this report.

- 9.1.2 *The results of the chemical analyses undertaken upon representative samples of the strata obtained from this site have been assessed in section 7 above and are subject to further discussion below.*

- 9.1.3 *Prior to the intrusive investigation the land owner indicated to us the presence of buried farm animals within the site, these have been identified and targeted within the investigations. Of the three locations one location has proven to contain animal remains and will require consultation with the APHA and appropriate disposal. Further investigation is required in the remaining two locations.*

9.2 Metals & Inorganics

- 9.2.1 *The analysis undertaken upon this suite of determinands has identified one marginally elevated concentration of arsenic and one marginally elevated concentration of lead. Consideration of these concentrations is not considered to pose a potential hazard to the long term end users of the site. Therefore topsoil material and made ground is suitable for retention within the proposed development.*

9.3 PAH Suite

- 9.3.1 *The analysis has confirmed that no elevated concentrations of PAH compounds are present within the samples of topsoil and made ground. No specific remediation is required in terms of PAH contamination.*

9.4 Petroleum Hydrocarbons

- 9.4.1 *A program of analysis to determine the presence of the speciated fractions of the TPH (CWG) grouping have been undertaken on all of soil obtained from this site. The chemical analyses results demonstrate that the soils within this site are not affected by any significant hydrocarbon contamination. Accordingly no specific remediation measures are proposed.*

- 9.4.2 *It is important to recognise that the investigations have been limited to the sampling of trial pits and boreholes. Where any visual or olfactory evidence of hydrocarbon contamination becomes apparent during the subsequent development activities, it is strongly recommended that the attention of the appropriate authorities should be drawn to these materials to ensure that appropriate assessments are undertaken.*

9.5 BTEX

9.5.1 As part of the TPH analyses an assessment of the presence of the BTEX compounds has also been undertaken. The results demonstrate that the soils within this site are again effectively uncontaminated in respect of BTEX compounds and no remediation is considered to be necessary.

9.6 Asbestos

9.6.1 Samples of made ground screened for asbestos fibres have not identified any presence of asbestos fibres and therefore no remediation is required in terms of asbestos.

9.7 Ground Gases

9.7.1 The initial desk study has identified an infilled pond within the site and two significant infilled areas located to the east and west of the site. Therefore there is a requirement for a programme of ground gas monitoring as part of the intrusive investigation.

9.7.2 A full programme of ground gas monitoring has been conducted and identified CS1 (NHBC Green) ground gas conditions. Based upon this information there is no requirement for ground gas precautions to be incorporated within the proposed development, however the desk study in formation has identified that the site is in an area where 5 – 10% of properties are above the action level for radon gases and therefore **basic radon protective measures** are required in all properties within the site.

9.8 Conceptual Site Model

9.8.1 As a result of these intrusive ground investigations and subsequent program of chemical analyses, it has been possible to revise the preliminary conceptual site model presented in section 3. The revised conceptual site model is now shown in table 13 below.

Table 13 – Revised Conceptual Site Model

Potential Source	Potential Receptor	Possible Pathway	Probability	Consequence	Risk	Mitigation / Investigation
Contaminated Soils	Site personnel during construction	Direct contact of soils Inhalation or ingestion of soil / dust	UI	Md	low	No specific remediation required. Topsoil considered suitable for reuse.
	Future site users	Direct contact of soils Inhalation or ingestion of soil / dust	Li	Mi	Low	
	Surface water in the vicinity of the site	Leaching of contaminants through drainage system	Lw	Mi	Low	
	Ground water in aquifer	Leaching of contaminants to ground water	UI	Md	Low	
	Future site users	Vapour migration from soils	UI	Mi	Very Low	
	Proposed buildings and services	Direct contact with contaminated soils	Lw	Mr	Very Low	
	Plants in gardens and soft landscaping	Direct contact	Lw	Mi	Low	
Contaminated ground water	Site personnel during construction	Water entering excavations	Lw	Mr	Very Low	No significant ground water presence
	Future site Users	Retained surface water	UI	Mr	Very Low	
Toxic and explosive gasses	Proposed buildings and occupiers	Ground gas migration into buildings	UI	Md	Low	CS 1 (NHBC Green)

Radon gases	Proposed buildings and occupiers	Ground gas migration into buildings	Lw	Md	Moderate/Low	Basic radon gas precautions required
Key: Probability: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor Consequence: Hi = High, Li = Likely, Lw = Low Likelihood, Ul = Unlikely						

9.9 Preliminary Remediation Proposals

- 9.9.1 Chemical analysis has confirmed that the topsoil within the site is suitable for reuse within the proposed development. The analysis has also confirmed that the made ground present within this site is also suitable for retention within the proposed development however any large physical hazards should be removed from this made ground material and placed under areas of hard standing.
- 9.9.2 It is important to note that should any visual or olfactory evidence of potential contamination become apparent during the development works, then these areas must be drawn to the attention of the appropriate authorities to allow inspection, sampling, testing and assessment to be carried out to ensure that these materials do not represent a hazard to site operatives or end users. It is important that site staff are aware that any suspicious ground conditions should be reported to the site supervisor and works suspended until investigations have been completed.
- 9.9.3 A full programme of ground gas monitoring has been completed and has identified a CS1 (NHBC Green) ground gas conditions. However there will be a requirement for basic radon ground gas precautions to be incorporated within the proposed development.
- 9.9.4 These investigations have targeted areas indicated by the land owner, where farm animals have been buried. Targeted investigations have confirmed the presence of buried animals within one location and there will be a requirement for further more extensive investigation within the two remaining areas to confirm the presence of animal bodies. Where remains have been identified there will be a requirement to consult the APHA and to carry out appropriate disposal. Based upon the results of this investigation there is a high likelihood of animal carcasses being present in the identified locations.
- 9.9.5 Copies of this ground investigation should be presented to the regulatory authorities for confirmation of their acceptance of these recommendations.

9.10 Foundations

- 9.10.1 The ground investigations have identified superficial deposits consisting of sandy clays over the majority of the site and this natural strata is considered to offer a safe bearing capacity of at least 100kN/m² at a minimum depth of 0.9m in cohesive material and 0.6m within granular strata. Due to the variance of ground conditions within the eastern half of the site it is anticipated that there will be a requirement for reinforced concrete spread strip foundation to protect against possible residual differential settlements. With close proximity to trees, tree roots may influence foundation depths which may mean they may have to extend to depths of 2.5m. Cohesive material within the site is considered to have a low volume change potential as defined by NHBC Handbook Chapter 4.2.
- 9.10.2 This ground investigation has targeted areas indicated by the land owner containing animal burial. The site investigation has confirmed one location of buried animals which will need to be dealt with by the APHA and the duty vet. During ground works if animal carcasses are identified then works should stop and the appropriate authorities should be notified.

9.10.3 This investigation has identified deposits of made ground associated with the infilling of ponds and previous ground works. Within these areas it is anticipated that deep foundations may be required and it may require piled foundations due to the instability of the made ground. A constraints plan has been appended to this report for reference.

9.11 Ground Floor Construction

9.11.1 It is recommended that all properties within this site should be provided with a suspended ground floor construction. This may be of a specialist manufactured precast concrete beam and block type arrangement, or of a designed cast insitu construction. In areas where tree root effects are critical, it will be necessary for the foundations to be designed in accordance with the requirements of the NHBC Handbook Chapter 4.2 in conjunction with the arboriculturist report. The clay soils within this site are considered to have a low volume change potential for design purposes.

9.11.2 The site is located within an area where 5 % - 10% of properties are above the action level for radon gas and therefore basic radon ground gas precautions are required within the ground floor construction of all properties on this site in accordance with BR211 : Radon "Guidance on Protective Measures for new Dwellings".

10.0 CONCLUSIONS & RECOMMENDATIONS

10.1 Remediation

10.1.1 This program of intrusive ground investigations and laboratory analyses has not identified any elevated concentrations above the adopted assessment criteria within any samples collected from topsoil or made ground. No specific program of remediation is required within this site and the topsoil material is considered suitable for reuse within the garden and soft landscaped areas of this development.

10.1.2 This investigation targeted localities where the landowner has indicated previously buried farm animals. This investigation has confirmed the location of one burial site however two burial sites have not been identified and there will be a requirement for further investigation within these locations to identify animal burials and to contact the APHA for the appropriate removal of these carcasses.

10.2 Foundations

10.2.1 The ground investigations have identified superficial deposits consisting of sandy clays over the majority of the site and this natural strata is considered to offer a safe bearing capacity of at least 100kN/m² at a minimum depth of 0.9m in cohesive material and 0.6m within granular strata. Due to the variance of ground conditions within the eastern half of the site it is anticipated that there will be a requirement for reinforced concrete spread strip foundation to protect against possible residual differential settlements. With close proximity to trees, tree roots may influence foundation depths which may mean they may have to extend to depths of 2.5m. Cohesive material within the site is considered to have a low volume change potential.

10.2.2 This ground investigation has targeted areas indicated by the land owner containing animal burial. The site investigation has confirmed one location of buried animals which will need to be dealt with by the APHA and the duty vet. During ground works if animal carcasses are identified then works should stop and the appropriate authorities should be notified.

10.2.3 This investigation has identified deposits of made ground associated with the infilling of ponds and previous ground works. Within these areas it is anticipated that deep foundations may be required and it may require piled foundations due to the instability of the made ground. A constraints plan has been appended to this report for reference.

10.3 Ground Floor Construction

10.3.1 It is recommended that all properties within this site should be provided with a suspended ground floor construction. This may be of a specialist manufactured precast concrete beam and block type arrangement, or of a designed cast insitu construction. In areas where tree root effects are critical, it will be necessary for the foundations to be designed in accordance with the requirements of the NHBC Handbook Chapter 4.2 in conjunction with the arboriculturist report. The clay soils within this site are considered to have a low volume change potential for design purposes.

10.3.2 The site is located within an area where 5 % - 10% of properties are above the action level for radon gas and therefore basic radon ground gas precautions are required within the ground floor construction of all properties on this site in accordance with BR211 : Radon "Guidance on Protective Measures for new Dwellings".

10.4 SUDS

10.4.1 Assessment of the ground conditions present within this site comprise mainly of effectively impermeable clay. Permeable sand deposits are more prominent within the eastern half of the site although there appears to be little lateral continuity of these granular units. It is therefore unlikely that surface water falling onto the site will percolate readily through the shallow strata and localised ponding with run off will occur.

10.4.2 It is our opinion based upon the results of these investigations that this site is not conducive to the adoption of a soakaway or other ground infiltration system of drainage for surface water disposal. It will be necessary for surface water to be disposed utilising an adjacent existing drainage system.

10.5 Precautions

10.5.1 Excavations within the cohesive strata on this site are considered likely to stay open for significant periods of time, although granular sand and gravel deposits have also been identified in this site and these are considered to be capable of sudden and catastrophic collapse without warning. Suitable precautions should be adopted to all excavations to ensure the health and safety of all site operatives and visitors regardless of ground conditions.

10.5.2 Ground workers should be made aware of the previous coal mining activities within the site and if they identify areas of irregular ground condition or the presence of colliery spoil, then they must stop and seek the advice of an experienced engineer to determine the possible presence of any unrecorded coal mining features.

10.5.3 If during ground works animal carcasses are identified within the ground then works must stop and the APHA must be notified.

10.6 Further Works

10.6.1 If any unusual or suspicious strata or ground conditions are encountered during the subsequent site stripping and preparation works it will be necessary for these areas to be brought to the attention of the appropriate authorities so that all necessary inspection, sampling and testing may be undertaken to determine whether these materials represent a hazard to human health. It is incumbent upon the site contractors to advise a responsible authority of any unusual findings within the site which may then be further investigated.

10.6.2 This investigation has targeted three animal burial sites but has only confirmed one location containing animal carcasses. Two remaining sites will require further investigation to identify the presence of animal carcasses within the site.

10.6.3 Further investigation will be required below the footprint of the existing concrete slab utilised as a storage area.

11.0 NOTES

11.1 *All reports are for advisory purposes only and all design decisions are the ultimate responsibility of others.*

11.2 *Unless stated otherwise the investigation has been undertaken in general accordance with the recommendations given in BS 5930 : 1999 "A Code of Practice for site Investigations" and the laboratory testing has been carried out in accordance with BS 1377 : 1990 "Methods of Test for Civil Engineering Purposes".*

11.3 *Soil and rock descriptions are generally based on the scales of strength and relative density within BS 5930 although it should be noted that in certain circumstances descriptions are based on site records or a qualitative assessment without the benefit of in-situ or laboratory test results.*

11.4 *The assessment of ground conditions given in this report is based on the results of the fieldwork and laboratory testing carried out and there may be other conditions at the site not encountered by these works, which have not been taken into account.*

11.5 *The scope of the investigation and information provided may not necessarily reflect all the geotechnical and environmental aspects related to the site, and the omission of certain items does not mean that the site is unaffected by such problems.*

11.6 *It should be noted that groundwater levels can vary and may at times be significantly different to those recorded during the investigation and attention is drawn to BS 5930 which indicates that measurements may be necessary over an extended period of time to investigate changes in groundwater pressures due to seasonal, tidal and other causes.*

11.7 *Any recommendations on construction methods within this report are for initial guidance only and all design proposals remain the responsibility of the appropriate contractor/consultant.*

11.8 *Further assessment, investigation, construction activities or time may reveal conditions that were not found during the period of investigation and, therefore, could not have been taken into account in the preparation of the report and where such information might impact upon the stated opinion R. E. Fry & Associates Ltd request the opportunity to review such information and modify the report if necessary.*

- 11.9** Where information has been obtained from sources other than the direct findings of the investigation, R. E. Fry & Associates Ltd cannot and does not guarantee the authenticity or reliability of this information.
- 11.10** Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by R. E. Fry & Associates Ltd for the effects of any future changes to such guidelines and legislation.
- 11.11** This report has been prepared on the instructions and to the requirements of the named client and any unauthorised party using this information for any purpose does so at his own risk and any duty of care to that party is excluded.

Signed for and on behalf of
R E FRY & ASSOCIATES LIMITED

A handwritten signature in black ink, appearing to read "Mark Davies", written over a light blue horizontal line.

Mark Davies B Sc (Hons)

Signed for and on behalf of
R E FRY & ASSOCIATES LIMITED

A handwritten signature in blue ink, appearing to read "R. E. Fry", written over a light blue horizontal line.

R E FRY B Sc (Hons), C Eng., MI Struct.E.

APPENDIX A



CENTREMAPS

Open Space, Upper Interfields,
Worcester, WR14 1UT

Groundsure CMAPS-CM-605307-30974-
Reference: 070317EDR

Your Reference: 30974

Report Date 7 Mar 2017

Report Delivery Email - pdf
Method:

Groundsure Enviro Insight

Address: 4 Gresford Road, Llay, LL12 0NW

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

Enc.

Groundsure Enviroinsight

Groundsure Enviro Insight

Address: 4 Gresford Road, Llay, LL12 0NW
Date: 7 Mar 2017
Reference: CMAPS-CM-605307-30974-070317EDR
Client: CENTREMAPS

NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 09-Jun-2013
Grid Reference: 333640,356235
Site Size: 15.63ha

Report Reference: CMAPS-CM-605307-30974-070317EDR
Client Reference: 30974

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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: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	2	20	18
1.2 Additional Information – Historical Tank Database	0	0	0	9
1.3 Additional Information – Historical Energy Features Database	0	0	7	12
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	5	0	11
1.6 Potentially Infilled Land	4	10	29	17
Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	2
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	1	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	2
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	2	6
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	24	14
2.3.2 National Incidents Recording System, List 1	0	0	1	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	1	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	1	0	4	1
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	1	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	22	13

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	3	4	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	1	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m					
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
6.2 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
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	1	3
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	2	1	0	3	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

0-500m

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	Yes	No
6.10 Detailed River Network entries within 500m of the site	0	0	1	3	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	No
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	1	0	2
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	2	2	23	48
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	1
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?

Very Low

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

Very Low

9.1.2 What is the maximum Landslides hazard rating identified on the study site?

Very Low

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

Negligible

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

Negligible

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

Very Low

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

Very Low

9.2 Radon

9.2.1 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.

9.2.2 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.

Section 10: Mining

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

Yes

10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?

No

10.3 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. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. 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.

3. 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.

4. 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 gas pipelines and underground electricity transmission lines.

5. Geology

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

6. 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.

7. Flooding

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

8. 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.

9. 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 and radon.

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. 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.

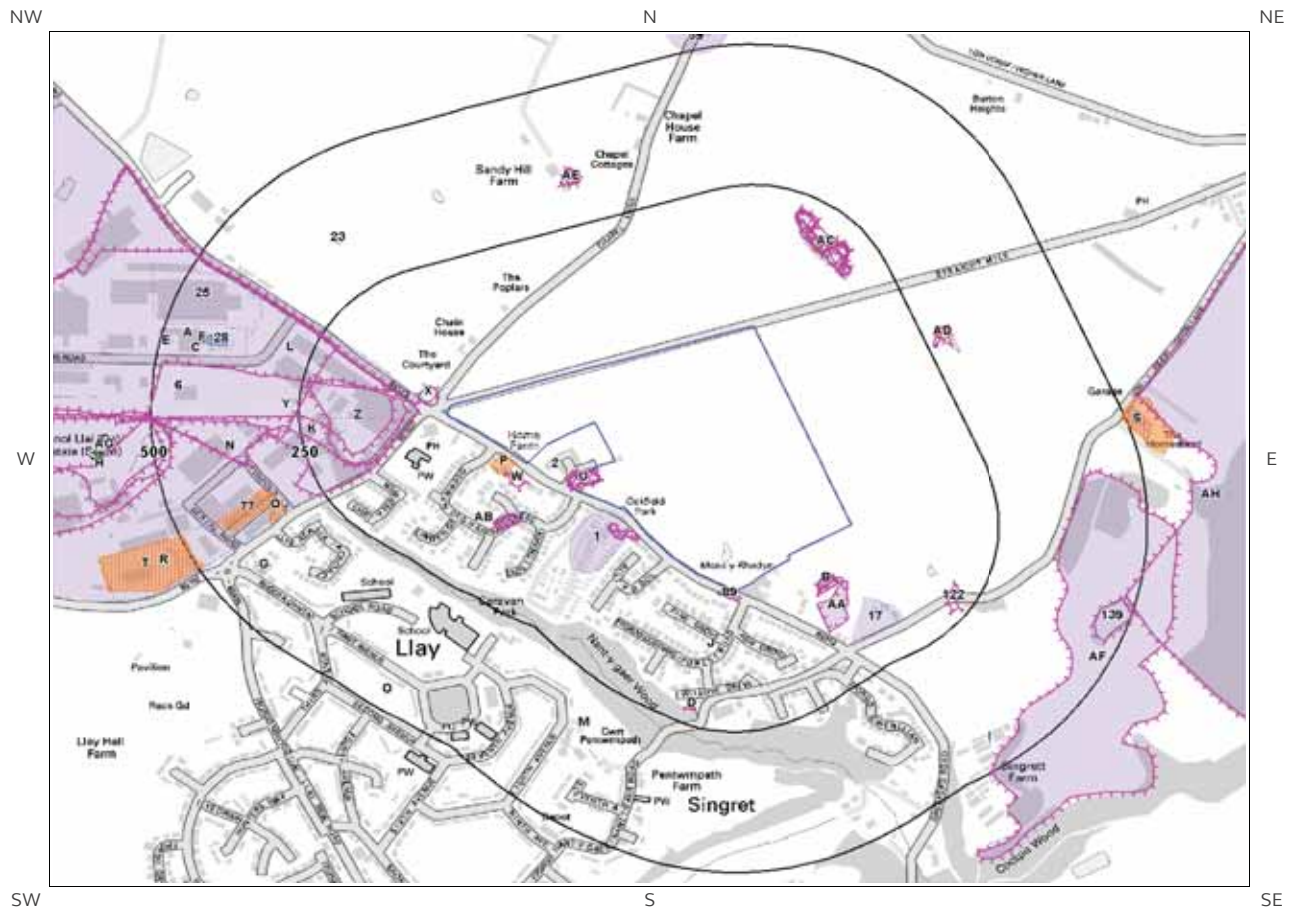
Note: Maps

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).

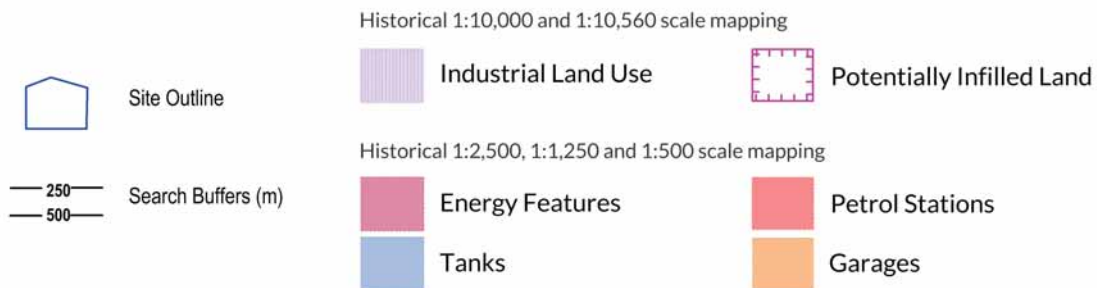
Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

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. Historical Land Use



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1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 40

ID	Distance [m]	Direction	Use	Date
1	8	S	Earthwork	1909
2	30	NW	Wind Pump	1909
3A	51	W	Railway Sidings	1949
4Y	51	W	Refuse Heap	1949
5A	51	W	Colliery	1949
6	58	W	Industrial Estate	1992
7B	58	SE	Sand Pit	1938
8B	59	SE	Sand Pit	1949
9B	61	SE	Sand Pit	1909
10B	61	SE	Sand Pit	1900
11Z	70	W	Unspecified Heap	1979
12AA	84	SE	Unspecified Pit	1872
13A	93	W	Railway Sidings	1968
14A	93	W	Railway Sidings	1960
15C	93	W	Unspecified Mine	1968
16C	93	W	Unspecified Mine	1960
17	124	SE	Nursery	1992
18D	211	S	Gravel Pit	1938
19D	214	S	Gravel Pit	1949
20D	214	S	Gravel Pit	1909
21E	215	NW	Colliery	1938
22E	215	NW	Colliery	1938
23	342	NW	Magazine	1949
24F	353	W	Unspecified Factory	1979
25	353	NW	Unspecified Works	1979
26AF	355	E	Sand and Gravel Pit	1979
27F	378	W	Unspecified Tanks	1992
28	378	W	Unspecified Tanks	1979
29G	395	SW	Police Station	1979
30G	395	SW	Police Station	1968
31G	395	SW	Police Station	1992
32G	395	SW	Police Station	1960
33R	430	SW	Unspecified Factory	1979
34AG	466	W	Unspecified Disused Tip	1979

35H	470	W	Refuse Heap	1968
36H	470	W	Refuse Heap	1960
37AH	480	E	Disused Sand and Gravel Pit	1992
38	480	W	Refuse Heap	1949
39	492	N	Smithy	1872
40S	496	E	Garage	1992

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary:

9

ID	Distance (m)	Direction	Use	Date
41F	388	W	Tanks	1996
42F	389	W	Tanks	1974
43F	390	W	Tanks	1990
44F	390	W	Tanks	1984
45F	390	W	Tanks	1986
46F	390	W	Tanks	1990
47I	445	SE	Unspecified Tank	1987
48I	445	SE	Unspecified Tank	1989
49I	446	SE	Unspecified Tank	1993

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary:

19

ID	Distance (m)	Direction	Use	Date
50J	104	S	Electricity Substation	1983
51J	105	SW	Electricity Substation	1980
52J	105	SW	Electricity Substation	1990
53AB	122	SW	Electricity Substation	1990
54K	229	W	Electricity Substation	1959
55K	229	W	Electricity Substation	1984
56K	229	W	Electricity Substation	1990
57L	282	W	Electricity Substation	1984
58L	282	W	Electricity Substation	1990

59M	327	SW	Electricity Substation	1983
60M	328	SW	Electricity Substation	1990
61M	328	SW	Electricity Substation	1980
62N	369	W	Electricity Substation	1984
63N	369	W	Electricity Substation	1990
64N	369	W	Electricity Substation	1986
65O	466	SW	Electricity Substation	1969
66O	466	SW	Electricity Substation	1983
67O	468	SW	Electricity Substation	1990
68O	468	SW	Electricity Substation	1980

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 16

ID	Distance (m)	Direction	Use	Date
69P	7	SW	Garage	1961
70P	7	SW	Garage	1974
71P	9	SW	Garage	1990
72P	9	SW	Garage	1959
73P	9	SW	Garage	1984
74Q	320	SW	Vehicle Storage Depot	1990
75Q	320	SW	Vehicle Storage Depot	1959
76Q	320	SW	Vehicle Storage Depot	1984
77	328	SW	Vehicle Storage Depot	1974
78R	487	SW	Vehicle Testing Centre	1996
79S	493	E	Garage	1987
80T	494	SW	Vehicle Testing Centre	1974
81T	496	SW	Vehicle Testing Centre	1990
82T	496	SW	Vehicle Testing Centre	1990
83T	496	SW	Vehicle Testing Centre	1986
84T	496	SW	Vehicle Testing Centre	1984

1.6 Potentially Infilled Land

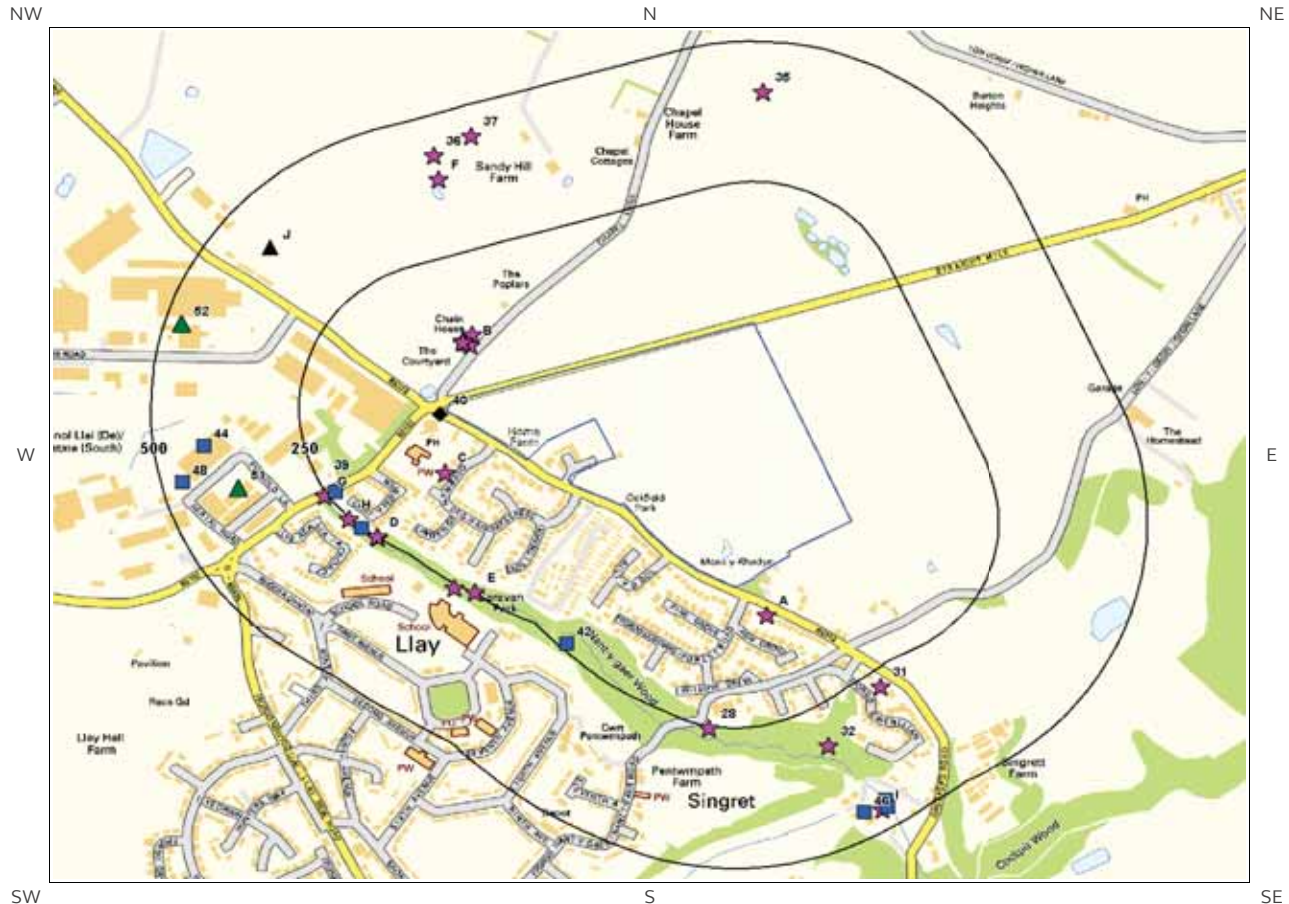
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 60

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
85U	0	On Site	Pond	1968
86U	0	On Site	Pond	1960
87U	0	On Site	Pond	1900
88U	0	On Site	Ponds	1872
89	7	SW	Pond	1872
90V	13	SW	Ponds	1900
91V	13	SW	Ponds	1872
92V	14	SW	Ponds	1949
93W	26	SW	Pond	1960
94W	26	SW	Pond	1968
95X	30	NW	Pond	1968
96X	30	NW	Pond	1979
97X	30	NW	Pond	1992
98X	30	NW	Pond	1960
99Y	51	W	Refuse Heap	1949
100A	51	W	Colliery	1949
101B	58	SE	Sand Pit	1938
102B	59	SE	Sand Pit	1949
103B	61	SE	Sand Pit	1909
104B	61	SE	Sand Pit	1900
105Z	70	W	Unspecified Heap	1979
106AA	84	SE	Unspecified Pit	1872
107AB	90	S	Ponds	1938
108AB	91	S	Ponds	1900
109AB	91	S	Ponds	1872
110AB	91	S	Ponds	1949
111C	93	W	Unspecified Mine	1960
112C	93	W	Unspecified Mine	1968
113AC	170	NE	Ponds	1938
114AC	170	NE	Ponds	1909
115AC	171	NE	Ponds	1992
116AC	171	NE	Ponds	1960
117AC	171	NE	Ponds	1979
118AC	171	NE	Ponds	1968
119AC	172	NE	Ponds	1949
120AC	173	NE	Water Body	1900
121AC	173	NE	Ponds	1872
122	203	SE	Ponds	1872

123D	211	S	Gravel Pit	1938
124D	214	S	Gravel Pit	1949
125D	214	S	Gravel Pit	1909
126E	215	NW	Colliery	1938
127E	215	NW	Colliery	1938
128AD	260	NE	Pond	1872
129AD	275	NE	Pond	1992
130AD	275	NE	Pond	1960
131AD	275	NE	Pond	1979
132AD	275	NE	Pond	1968
133AE	323	N	Ponds	1900
134AE	323	N	Ponds	1949
135AE	323	N	Pond	1979
136AE	323	N	Pond	1968
137AE	323	N	Pond	1960
138AF	355	E	Sand and Gravel Pit	1979
139	446	E	Pond	1992
140AG	466	W	Unspecified Disused Tip	1979
141AG	470	W	Refuse Heap	1968
142AG	470	W	Refuse Heap	1960
143AH	480	E	Disused Sand and Gravel Pit	1992
144H	480	W	Refuse Heap	1949

2. Environmental Permits, Incidents and Registers Map



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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 |
| | Search Buffers (m) | | Water Industry Referrals | | COMAH / NIHHS Sites |
| | | | Licensed Discharge Consents | | Sites Determined as Contaminated Land |
| | | | Red List Discharge Consents | | Hazardous Substance Consents and Enforcements |

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

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

2

The following IPC Authorisations are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
53J	409	NW	333000 356600	Operator: Magellan Aerospace Corporation Ltd Address: Rackery Lane, Llay, Wrexham, Clwyd, LL12 0PB Process: Inorganic Chemical Processes	Permit Number: BD0150 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked - Now Ippc
54J	409	NW	333000 356600	Operator: Magellan Aerospace Corporation Ltd Address: Rackery Lane, Llay, Wrexham, Clwyd, LL12 0PB Process: Inorganic Chemical Processes	Permit Number: AO6880 Original Permit Number: IPCAPP Date Approved: 21-4-1995 Effective Date: 25-4-1995 Status: Superseded By Variation

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

0

Database searched and no data found.

2.1.3 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.

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

1

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

ID	Distance (m)	Direction	NGR	Details
40	15	W	333287 356306	Name: Trefn Engineering Ltd, Unit 7, Llay Ind.est, Rackery Lane, L Status: Not Active Receiving Water: - Authorised Substances: Cadmium

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

0

Database searched and no data found.

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

2

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
51	380	W	332948 356173	Address: Star Counties Textile Services Ltd, Unit 4, Aerial Road, Llay Industrial Estate, Llay, Wrexham, LL12 0TU Process: Dry Cleaning Status: Current Permit Permit Type: Part B Enforcement: No Enforcement Notified. Date of Enforcement: No Enforcement Notified. Comment: No Enforcement Notified.
52	472	W	332851 356464	Address: Cymru Country Feeds Ltd, Miners Road, Llay, Wrexham, Llay, LL12 0PJ Process: Animal Vegetable and Food Status: Historical Permit Permit Type: Part B Enforcement: Enforcement Notified Date of Enforcement: 14/02/2002 Comment: Animal feed compounding process

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

8

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
41G	238	SW	333110 356170	Address: CHAPEL LANE OPPOSITE GARDEN CENTRE, CHAPEL LANE OPPOSITE GARDEN CENT, OPPOSITE GARDEN CENTRE LLAY ,, LLAY ,, LLAY ,, , , Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: CG0358401 Permit Version: 1 Receiving Water: AFON ALYN TRIBUTARY Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 88) Issue date: 21/07/1994 Effective Date: 21-Jul-1994 Revocation Date: -
42	239	SW	333500 355900	Address: LLAY GRESFORD ROAD, LLAY GRESFORD ROAD, GRESFORD ROAD, UNKNOWN, UNKNOWN, UNKNOWN Effluent Type: UNSPECIFIED Permit Number: CM0065001 Permit Version: 1 Receiving Water: SINGRET BROOK Status: CONSENT EXPIRED - TIME LIMIT Issue date: 24/05/1971 Effective Date: 24-May-1971 Revocation Date: 23/02/1995
43H	251	SW	333155 356106	Address: PUMPING STATION ON DEVELOPMENT LAND, OFF LLAY ROAD, WREXHAM, WALES, UNITED KINGDOM, LL12 0TX Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - NOT WATER COMPANY Permit Number: CG0413901 Permit Version: 1 Receiving Water: SINGRET BROOK Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 22/01/2004 Effective Date: 22-Jan-2004 Revocation Date: -
44	415	W	332890 356250	Address: LLAY IND ESTATE, LLAY IND ESTATE, UNKNOWN, UNKNOWN, UNKNOWN, UNKNOWN Effluent Type: UNSPECIFIED Permit Number: CM0060002 Permit Version: 1 Receiving Water: SINGRET BROOK Status: CONSENT EXPIRED - TIME LIMIT Issue date: 14/10/1969 Effective Date: 14-Oct-1969 Revocation Date: 06/02/1995
45I	452	SE	334036 355622	Address: LLAY SINGRET (BOREEN CAM) CSO, SINGRET HILL, LLAY, WREXHAM, LL12 0NS Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: CM0197701 Permit Version: 2 Receiving Water: SINGRET BROOK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 25/11/2004 Effective Date: 31-Mar-2005 Revocation Date: -
46	454	SE	334000 355600	Address: LLAY SINGRET BOREEN CAM- SSO, LLAY SINGRET BOREEN CAM- SSO, UNKNOWN, UNKNOWN, UNKNOWN, UNKNOWN Effluent Type: UNSPECIFIED Permit Number: CM0197701 Permit Version: 1 Receiving Water: SINGRET BROOK Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 88) Issue date: 20/10/1989 Effective Date: 20-Oct-1989 Revocation Date: 30/03/2005

ID	Distance (m)	Direction	NGR	Details
471	464	SE	334040 355610	Address: LLAY SINGRET SEWERAGE SYSTEM (S'CED, LLAY SINGRET SEWERAGE SYSTEM (S', SINGRET SEWERAGE SYSTEM (S'CED, UNKNOWN, UNKNOWN, UNKNOWN Effluent Type: UNSPECIFIED Permit Number: CM0058601 Permit Version: 1 Receiving Water: SINGRET BROOK Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 16/09/1969 Effective Date: 16-Sep-1969 Revocation Date: 17/02/1986
48	465	W	332853 356187	Address: MARSHALLS MONO PLC LLAY WORKS, MARSHALLS MONO PLC, LLAY WORKS, LLAY INDUSTRIAL ESTATE, LLAY WREXHAM, LL12 0TL Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: CG0401501 Permit Version: 1 Receiving Water: TO GROUND Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 10/01/2003 Effective Date: 10-Jan-2003 Revocation Date: 22/06/2009

2.1.9 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.

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

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

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

0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

38

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

ID	Distance (m)	Direction	NGR	Details
1A	67	SE	333836 355951	Incident Date: 19-May-2001 Incident Identification: 5973 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Other Atmospheric Pollutant or Effect Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
2A	67	SE	333836 355951	Incident Date: 19-May-2001 Incident Identification: 5973 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Other Atmospheric Pollutant or Effect Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
3B	89	N	333336 356430	Incident Date: 16-Dec-2001 Incident Identification: 48422 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
4B	89	N	333336 356430	Incident Date: 16-Dec-2001 Incident Identification: 48422 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
5C	95	SW	333294 356204	Incident Date: 11-May-2001 Incident Identification: 5234 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Sulphide Odour Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
6C	95	SW	333294 356204	Incident Date: 11-May-2001 Incident Identification: 5234 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Sulphide Odour Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
7B	95	N	333331 356435	Incident Date: 15-Dec-2001 Incident Identification: 48308 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
8B	97	N	333324 356435	Incident Date: 01-Mar-2002 Incident Identification: 61231 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
9B	97	N	333324 356435	Incident Date: 01-Mar-2002 Incident Identification: 61231 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

ID	Distance (m)	Direction	NGR	Details	
10B	97	N	333324 356435	Incident Date: 10-Aug-2001 Incident Identification: 23432 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
11B	97	N	333324 356435	Incident Date: 04-Apr-2002 Incident Identification: 68864 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
12B	97	N	333324 356435	Incident Date: 25-Dec-2001 Incident Identification: 49539 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
13B	100	N	333324 356438	Incident Date: 15-Dec-2001 Incident Identification: 48307 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
14B	106	N	333340 356449	Incident Date: 16-Dec-2001 Incident Identification: 48423 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
15B	106	N	333340 356449	Incident Date: 16-Dec-2001 Incident Identification: 48423 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
16B	106	N	333339 356449	Incident Date: 06-Jul-2001 Incident Identification: 14519 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
17B	106	N	333339 356449	Incident Date: 09-May-2001 Incident Identification: 4903 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Sulphide Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
18B	106	N	333339 356449	Incident Date: 31-Aug-2001 Incident Identification: 28237 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
19B	106	N	333339 356449	Incident Date: 26-Jul-2001 Incident Identification: 19467 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
20B	106	N	333339 356449	Incident Date: 06-Jul-2001 Incident Identification: 14519 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
21B	106	N	333339 356449	Incident Date: 06-Aug-2001 Incident Identification: 22099 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

ID	Distance (m)	Direction	NGR	Details	
22B	106	N	333339 356449	Incident Date: 13-Dec-2001 Incident Identification: 47986 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
23E	249	S	333344 355992	Incident Date: 06-Feb-2005 Incident Identification: 291717 Pollutant: Oils and Fuel Pollutant Description: Cutting Oils	Water Impact: Category 2 (Significant) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
24D	250	SW	333180 356091	Incident Date: 30-Apr-2001 Incident Identification: 3861 Pollutant: Sewage Materials Pollutant Description: Storm Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
25D	251	SW	333182 356089	Incident Date: 27-Dec-2001 Incident Identification: 49674 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
26D	251	SW	333182 356089	Incident Date: 27-Dec-2001 Incident Identification: 49674 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
27H	253	SW	333133 356122	Incident Date: 14-Apr-2003 Incident Identification: 150789 Pollutant: Organic Chemicals/Products Pollutant Description: Other Organic Chemical or Product	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
28	254	S	333739 355750	Incident Date: 05-Aug-2009 Incident Identification: 704123 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 2 (Significant) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
29E	256	SW	333310 356000	Incident Date: 20-May-2002 Incident Identification: 80015 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
30G	257	SW	333092 356162	Incident Date: 03-Feb-2005 Incident Identification: 291092 Pollutant: Oils and Fuel Pollutant Description: Cutting Oils	Water Impact: Category 2 (Significant) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
31	279	SE	334027 355823	Incident Date: 15-Dec-2001 Incident Identification: 48343 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
32	321	SE	333940 355719	Incident Date: 27-Oct-2009 Incident Identification: 727899 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 2 (Significant) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
33F	387	N	333283 356725	Incident Date: 04-Sep-2001 Incident Identification: 28772 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
34F	387	N	333283 356725	Incident Date: 04-Sep-2001 Incident Identification: 28772 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
35	410	N	333830 356880	Incident Date: 26-Jul-2002 Incident Identification: 94566 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Distance (m)	Direction	NGR	Details	
36	430	N	333275 356767	Incident Date: 23-Apr-2001 Incident Identification: 3187 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Sulphide Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
37	446	N	333338 356802	Incident Date: 23-Apr-2001 Incident Identification: 3189 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Sulphide Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
38	463	SE	334030 355606	Incident Date: 14-Aug-2003 Incident Identification: 182014 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

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

1

The following NIRS List 1 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
39	230	SW		Incident Date: 01-Sep-1999 Incident Identification: 4813.0 Catchments Name: SINGRET BROOK Water Description: RIVER STRETCH (FRESHWATER) Water Course: SINGRET BROOK Incident Substantiated: Yes	Priority Description: Immediate (2 Hours) Waste Description: Not Available Water Impact: Significant Impact Land Impact: No Impact Air Impact: No Impact Action Taken: Not Available

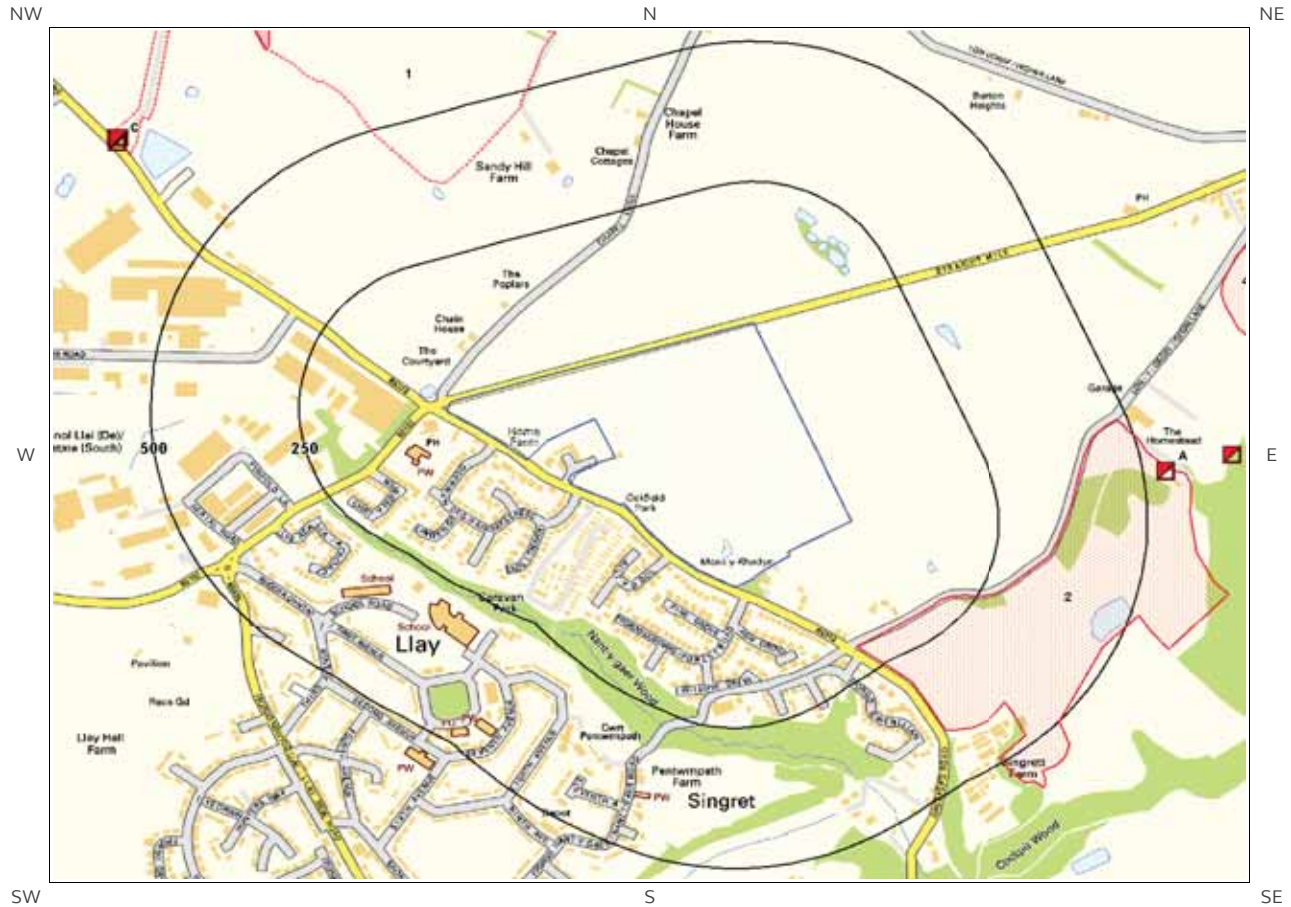
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

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?

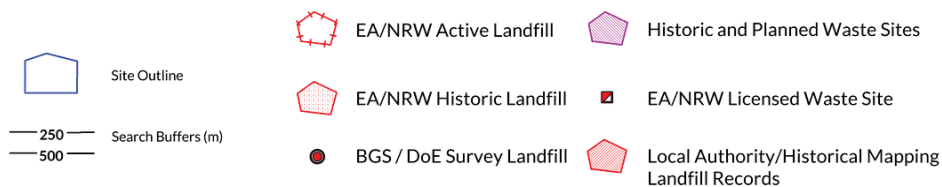
0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

1

The following Environment Agency/Natural Resources Wales landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
1	376	N	332747 356798	Address: Astbury Landfill, Dark Lane, Burton, Wrexham, Clwyd, LL12 0AE Landfill Reference: 37116.0 Environmental Permitting Regulations (Waste) Reference: CAI002 Landfill Type: A4 : Household, Commercial & Industrial Waste Landfill Operator: W R G Environmental Ltd Status: Modified IPPC Reference: EPR Reference:

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

6

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
2	197	SE	334300 355900	Site Address: Singret Quarry, Gresford Road, Llay, Wrexham Waste Licence: Yes Site Reference: WMBC L63, NOW-514-L Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: WW1/L/BOD001 Licence Issue: 31-Dec-1983 Licence Surrendered: 18-Dec-2003 Licence Holder Address: - Operator: Bodfari (quarries) Licence Holder: Tarmac First Recorded: 31-Dec-1976 Last Recorded: 30-Jun-1998
Not shown	625	N	333100 357100	Site Address: Astbury Quarry, Dark Lane, Llay, Wrexham Waste Licence: Yes Site Reference: WMBC L/13, NOW-510-L, 6955/0062 Waste Type: Inert, Industrial, Commercial, Household, Special Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 31-Dec-1983 Licence Surrendered: 31-Dec-1987 Licence Holder Address: - Operator: - Licence Holder: Shanks First Recorded: 31-Dec-1983 Last Recorded: 31-Dec-1987

ID	Distance (m)	Direction	NGR	Details	
4	733	NE	335000 356300	Site Address: Ballswood Quarry, Rossett, Wrexham, Clwyd Waste Licence: Yes Site Reference: WMBC L/47 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 19-Jul-1977 Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: RMC Limited First Recorded: 31-Dec-1977 Last Recorded: 31-Dec-1985
Not shown	747	NW	333100 357100	Site Address: Astbury Quarry, Dark Lane, Llay, Wrexham Waste Licence: Yes Site Reference: WMBC L/13, NOW-510-L, 6955/0062 Waste Type: Inert, Industrial, Commercial, Household, Special Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 31-Dec-1983 Licence Surrendered: 31-Dec-1987 Licence Holder Address: - Operator: - Licence Holder: Shanks First Recorded: 31-Dec-1983 Last Recorded: 31-Dec-1987
Not shown	808	E	335000 356300	Site Address: Ballswood Quarry, Rossett, Wrexham, Clwyd Waste Licence: Yes Site Reference: WMBC L/47 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 19-Jul-1977 Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: RMC Limited First Recorded: 31-Dec-1977 Last Recorded: 31-Dec-1985
Not shown	1236	E	335000 356300	Site Address: Ballswood Quarry, Rossett, Wrexham, Clwyd Waste Licence: Yes Site Reference: WMBC L/47 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 19-Jul-1977 Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: RMC Limited First Recorded: 31-Dec-1977 Last Recorded: 31-Dec-1985

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

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

1

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

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
43	700	NW	332985 356978	Refuse Tip	1996 mapping	Polygon

3.2 Other Waste Sites

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

0

Database searched and no data found.

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

35

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
8A	537	E	334509 356207	Site Address: Gresford Road, Llay, Wrexham, Clwyd, LL12 0NU Type: Landfill taking other wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BOD001 EPR reference: LP3594FP/S002 Operator: Bodfari (quarries) Limited Waste Management licence No: 37032 Annual Tonnage: 150000.0 Issue Date: 25/05/1992 Effective Date: - Modified: - Surrendered Date: 18/12/2003 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Singret Quarry Correspondence Address: -
9A	537	E	334509 356207	Site Address: Gresford Road, Llay, Wrexham, LL12 0NU Type: Landfill taking other wastes Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BOD001 EPR reference: - Operator: Bodfari (quarries) Limited Waste Management licence No: 37032 Annual Tonnage: 0.0 Issue Date: 25/05/1992 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Singret Quarry Correspondence Address: Tunstead House, P O Box 25, Buxton, Derbyshire, SK17 8TG
10A	537	E	334509 356207	Site Address: Gresford Road, Llay, Wrexham, Clwyd, LL12 0NU Type: Landfill taking other wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BOD001 EPR reference: EA/EPR/LP3594FP/S002 Operator: Bodfari (quarries) Limited Waste Management licence No: 37032 Annual Tonnage: 150000.0 Issue Date: 25/05/1992 Effective Date: - Modified: - Surrendered Date: 18/12/2003 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Singret Quarry Correspondence Address: -
11B	652	E	334620 356235	Site Address: Ballswood Quarry, Gergin Lane, Llay, Nr Wrexham, LL12 0NU Type: Physical Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DPW005 EPR reference: EA/EPR/JB3237WU/A001 Operator: D P Williams Holdings Limited Waste Management licence No: 104698 Annual Tonnage: 74999.0 Issue Date: 08/01/2013 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Ballswood Quarry Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details
12B	652	E	334620 356235	Site Address: Inertia Recycling Limited, Ballswood Quarry, Gergin Lane, Nr Wrexham, LL12 0NU Type: Physical Treatment Facility Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: JB3237WU EPR reference: - Operator: Inertia Recycling Limited Waste Management licence No: 104698 Annual Tonnage: 74999.0 Issue Date: 05/11/2015 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: Ballswood Quarry Correspondence Address: -
13B	652	E	334620 356235	Site Address: Ballswood Quarry, Gergin Lane, Llay, Nr Wrexham, Wrexham, LL12 0NU Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: JB3237WU EPR reference: - Operator: Inertia Recycling Limited Waste Management licence No: 0 Annual Tonnage: 74999.0 Issue Date: 05/11/2015 Effective Date: 05/11/2015 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: - Correspondence Address: -
14B	652	E	334620 356235	Site Address: Ballswood Quarry, Gergin Lane, Llay, Nr Wrexham, LL12 0NU Type: Physical Treatment Facility Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: DPW005 EPR reference: JB3237WU/A001 Operator: D P Williams Holdings Limited Waste Management licence No: 104698 Annual Tonnage: 0.0 Issue Date: 08/01/2013 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Ballswood Quarry Correspondence Address: -
15C	727	NW	332743 356790	Site Address: Dark Lane, Burton, Rossett, Wrexham, LL12 0AE Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CAI002 EPR reference: - Operator: Caird Environmental Ltd Waste Management licence No: 37116 Annual Tonnage: 0.0 Issue Date: 17/08/1994 Effective Date: - Modified: 29/01/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Astbury Landfill (rossett) Correspondence Address: Wrg Waste Services Ltd, Ground Floor West, 900, Pavilion Drive, Northampton Business Park, Northampton, NN4 7RG
16C	729	NW	332747 356798	Site Address: Astbury Landfill, Dark Lane, Burton, Wrexham, Clwyd, LL12 0AE Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CAI002 EPR reference: - Operator: Wrg Environmental Ltd Waste Management licence No: 37116 Annual Tonnage: 0.0 Issue Date: 17/08/1994 Effective Date: - Modified: 01/10/2007 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Astbury Landfill (rossett) Correspondence Address: Wrg Waste Services Ltd, Ground Floor West, 900, Pavilion Drive, Northampton Business Park, Northampton, NN4 7RG
17C	729	NW	332747 356798	Site Address: Astbury Landfill (rossett), Burton, Wrexham, Wrexham, LL12 0AE Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: FP3894FP EPR reference: - Operator: W R G Environmental Ltd Waste Management licence No: 0 Annual Tonnage: 0.0 Issue Date: 17/08/1994 Effective Date: 17/08/1994 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: - Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details
18C	729	NW	332747 356798	Site Address: Astbury Landfill, Dark Lane, Burton, Wrexham, Clwyd, LL12 0AE Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CAI002 EPR reference: EA/EPR/FP3894FP/V008 Operator: W R G Environmental Ltd Waste Management licence No: 37116 Annual Tonnage: 0.0 Issue Date: 17/08/1994 Effective Date: - Modified: 03/03/2014 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Astbury Landfill (rossett) Correspondence Address: -
19C	729	NW	332747 356798	Site Address: Astbury Landfill, Dark Lane, Burton, Wrexham, Clwyd, LL12 0AE Type: Household, Commercial & Industrial Waste Landfill Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: CAI002 EPR reference: FP3894FP/V008 Operator: W R G Environmental Ltd Waste Management licence No: 37116 Annual Tonnage: 0.0 Issue Date: 17/08/1994 Effective Date: - Modified: 03/03/2014 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Astbury Landfill (rossett) Correspondence Address: -
20C	734	NW	332741 356798	Site Address: Dark Lane, Burton, Rossett, Wrexham, LL12 0AE Type: Household, Commercial & Industrial Waste Landfill Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CAI002 EPR reference: - Operator: Caird Environmental Ltd Waste Management licence No: 37116 Annual Tonnage: 0.0 Issue Date: 17/08/1994 Effective Date: - Modified: 29/01/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Astbury Landfill (rossett) Correspondence Address: Astbury Landfill (rossett), Dark Lane, Burton, Rossett, Wrexham, LL12 0AE
21C	734	NW	332741 356798	Site Address: Dark Lane, Burton, Rossett, Wrexham, LL12 0AE Type: Co-Disposal Landfill Site Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CAI002 EPR reference: - Operator: Caird Environmental Ltd Waste Management licence No: 37116 Annual Tonnage: 0.0 Issue Date: 17/08/1994 Effective Date: - Modified: 09/07/2002 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Astbury Quarry Correspondence Address: Deerplay, Bacup Road, Cliviger, Burnley, Lancashire, BB11 3RL
Not shown	893	W	332412 356413	Site Address: W H Chaloner & Son Ltd, Miners Road, Llay Industrial Estate, Wrexham, Clwyd, LL12 0PJ Type: Metal Recycling Site (mixed MRS's) Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: CHA002 EPR reference: ZP3594FN/V008 Operator: W H Chaloner & Son Limited Waste Management licence No: 37135 Annual Tonnage: 0.0 Issue Date: 20/07/1995 Effective Date: - Modified: 23/10/2012 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: W H Chaloner & Son Ltd Correspondence Address: -
Not shown	893	W	332412 356413	Site Address: W H Chaloner & Son Ltd, Llay Industrial Estate, Wrexham, Wrexham, LL12 0PJ Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: ZP3594FN EPR reference: - Operator: W H Chaloner & Son Limited Waste Management licence No: 0 Annual Tonnage: 24999.0 Issue Date: 20/07/1995 Effective Date: 20/07/1995 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: - Correspondence Address: -

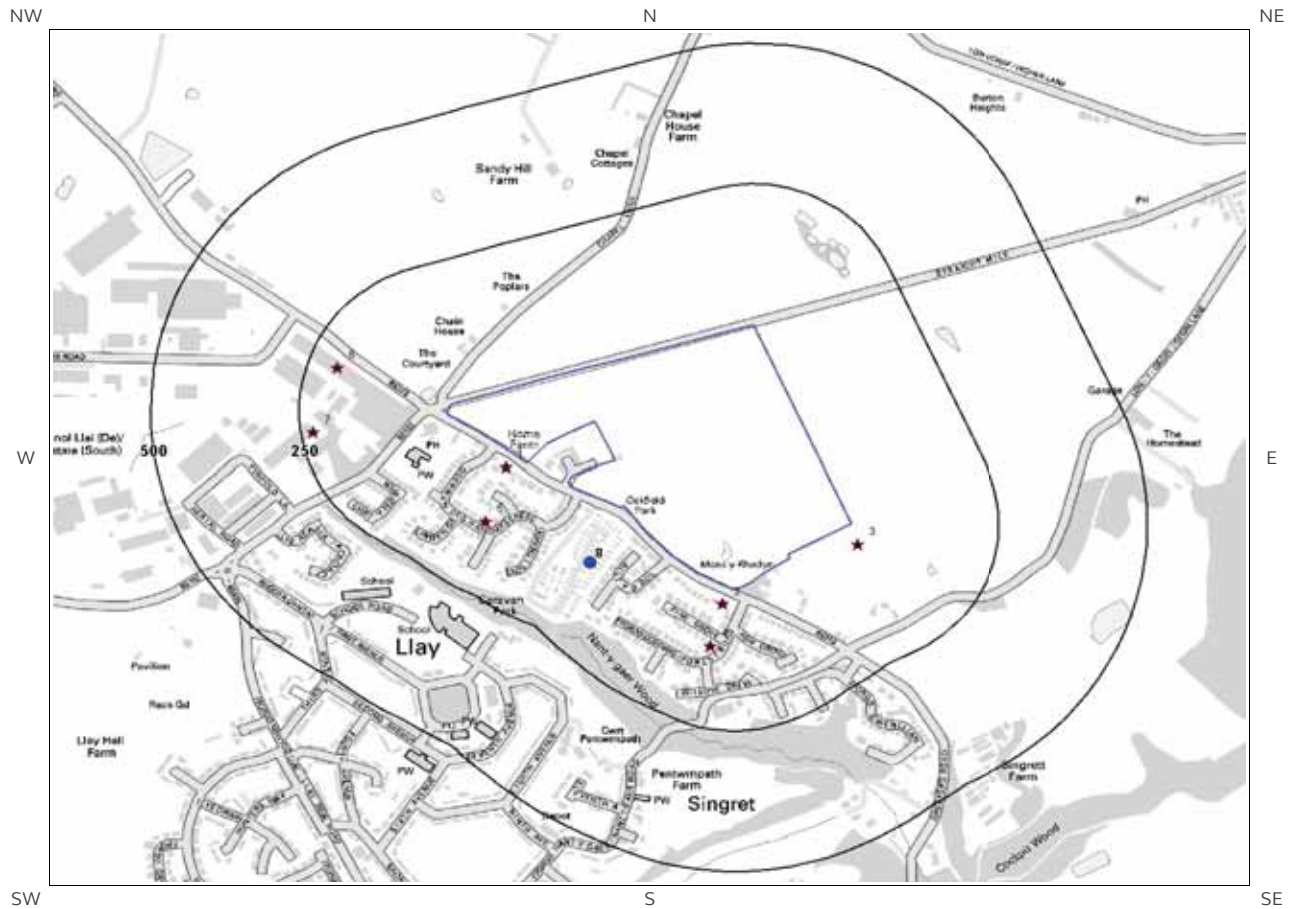
ID	Distance (m)	Direction	NGR	Details
Not shown	893	W	332412 356413	Site Address: W H Chaloner & Son Ltd, Miners Road, Llay Industrial Estate, Wrexham, Clwyd, LL12 0PJ Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CHA002 EPR reference: EA/EPR/ZP3594FN/V008 Operator: W H Chaloner & Son Limited Waste Management licence No: 37135 Annual Tonnage: 24999.0 Issue Date: 20/07/1995 Effective Date: - Modified: 23/10/2012 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: W H Chaloner & Son Ltd Correspondence Address: -
Not shown	893	W	332412 356413	Site Address: Miners Road, Llay Industrial Estate, Llay, Wrexham, LL12 0PJ Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CHA002 EPR reference: - Operator: Chaloner W H & Son Ltd Waste Management licence No: 37135 Annual Tonnage: 0.0 Issue Date: 20/07/1995 Effective Date: - Modified: 29/11/2002 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: W H Chaloner & Sons Ltd Correspondence Address: Park House, Pulford, Chester, Cheshire, CH4 9DG
Not shown	963	N	333200 357300	Site Address: Astbury Landfill Site, Dark Lane, Rossett, Wrexham, Clwyd, LL12 0AE Type: Landfill Gas Engine (<3 mW) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WRG014 EPR reference: - Operator: Wrg Environmental Ltd Waste Management licence No: 220007 Annual Tonnage: 0.0 Issue Date: 13/12/2006 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Rossett Landfill Gas Utilisation Plant Correspondence Address: -
Not shown	963	N	333200 357300	Site Address: Astbury Landfill Site, Dark Lane, Rossett, Wrexham, Clwyd, LL12 0AE Type: Landfill Gas Engine (<3 mW) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WRG014 EPR reference: - Operator: W R G Environmental Ltd Waste Management licence No: 220007 Annual Tonnage: 0.0 Issue Date: 13/12/2006 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Rossett Landfill Gas Utilisation Plant Correspondence Address: -
Not shown	963	N	333200 357300	Site Address: Rossett Landfill Gas Utilisation Plant, Astbury Landfill Site, Dark Lane, Rossett, Wrexham, LL12 0AE Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: AB3096FL EPR reference: - Operator: W R G Environmental Ltd Waste Management licence No: 0 Annual Tonnage: 0.0 Issue Date: 13/12/2006 Effective Date: 13/12/2006 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: - Correspondence Address: -
Not shown	963	N	333200 357300	Site Address: Astbury Landfill Site, Dark Lane, Rossett, Wrexham, Clwyd, LL12 0AE Type: Landfill Gas Engine (<3 mW) Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: WRG014 EPR reference: - Operator: W R G Environmental Ltd Waste Management licence No: 220007 Annual Tonnage: 0.0 Issue Date: 13/12/2006 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Rossett Landfill Gas Utilisation Plant Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details
Not shown	1137	W	332163 356296	Site Address: Miner's Road Depot, Llay Industrial Estate, Wrexham, Wrexham, LL12 0PJ Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: RP3994FN EPR reference: - Operator: Wrexham Borough Council Waste Management licence No: 0 Annual Tonnage: 0.0 Issue Date: 09/05/2002 Effective Date: 09/05/2002 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: - Correspondence Address: -
Not shown	1137	W	332163 356296	Site Address: Wrexham Construction Services, Miners Road, Llay Industrial Estate, Wrexham, Clwyd, LL12 0PJ Type: Physical Treatment Facility Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WRE001 EPR reference: EA/EPR/RP3994FN/A001 Operator: Wrexham County Borough Council Waste Management licence No: 37235 Annual Tonnage: 60692.0 Issue Date: 5/9/2002 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Miner's Road Depot Correspondence Address: Ruthin Road Depot, Ruthin Road, Wrexham, Clwyd, LL13 7TU
Not shown	1137	W	332163 356296	Site Address: Wrexham Construction Services, Miners Road, Llay Industrial Estate, Wrexham, Clwyd, LL12 0PJ Type: Physical Treatment Facility Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WRE001 EPR reference: RP3994FN/A001 Operator: Wrexham Borough Council Waste Management licence No: 37235 Annual Tonnage: 60692.0 Issue Date: 09/05/2002 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Miner's Road Depot Correspondence Address: -
Not shown	1150	W	332152 356241	Site Address: Unit 2, Miners Road, Llay Industrial Park, Llay, Wrexham, LL12 0PJ Type: Inert & excavation Waste TS + treatment Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ROA010 EPR reference: EA/EPR/NB3293HV/A001 Operator: Roadway Civil Engineering & Surfacing Ltd Waste Management licence No: 900110 Annual Tonnage: 75000.0 Issue Date: 12/12/2014 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Llay Depot Correspondence Address: -
Not shown	1150	W	332152 356241	Site Address: Llay Depot, Llay Industrial Park, Llay, Wrexham, LL12 0PJ Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: NB3293HV EPR reference: - Operator: Roadway Civil Engineering & Surfacing Ltd Waste Management licence No: 0 Annual Tonnage: 75000.0 Issue Date: 12/12/2014 Effective Date: 12/12/2014 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: - Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details
Not shown	1150	W	332152 356241	Site Address: Unit 2, Miners Road, Llay Industrial Park, Llay, Wrexham, LL12 0PJ Type: Inert & excavation Waste TS + treatment Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ROA010 EPR reference: NB3293HV/A001 Operator: Roadway Civil Engineering & Surfacing Ltd Waste Management licence No: 900110 Annual Tonnage: 75000.0 Issue Date: 12/12/2014 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Llay Depot Correspondence Address: -
Not shown	1159	W	332141 356302	Site Address: Miners Road, Llay Industrial Estate, Llay, Wrexham Type: Physical Treatment Facility Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WRE001 EPR reference: - Operator: Wrexham County Borough Council Waste Management licence No: 37235 Annual Tonnage: 0.0 Issue Date: 09/05/2002 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Wrexham Construction Services / Llay Correspondence Address: Ruthin Road Depot, Ruthin Road, Wrexham, Wrexham, LL13 7TU
Not shown	1265	W	332035 356286	Site Address: P P S Skip Hire, Llay Industrial Estate, Wrexham, Wrexham, LL12 0PJ Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: RP3894FC EPR reference: - Operator: David Alan Darby Waste Management licence No: 0 Annual Tonnage: 0.0 Issue Date: 04/09/2003 Effective Date: 04/09/2003 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: - Correspondence Address: -
Not shown	1265	W	332035 356286	Site Address: 12, Miners Road, Llay Industrial Estate, Wrexham, Clwyd, LL12 0PJ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DAR003 EPR reference: RP3894FC/A001 Operator: Darby David Alan Waste Management licence No: 37239 Annual Tonnage: 9460.0 Issue Date: 04/09/2003 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: P P S Skip Hire Correspondence Address: -
Not shown	1265	W	332035 356286	Site Address: 12, Miners Road, Llay Industrial Estate, Wrexham, Clwyd, LL12 0PJ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DAR003 EPR reference: EA/EPR/RP3894FC/A001 Operator: Darby David Alan Waste Management licence No: 37239 Annual Tonnage: 9460.0 Issue Date: 04/09/2003 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: P P S Skip Hire Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details
Not shown	1292	SW	333219 354838	Site Address: Foregolf Golf Course & Driving Range, Llay, Wrexham, Wrexham, LL12 0PW Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: QP3695VB EPR reference: - Operator: Fore Golf Discount (Wrexham) Ltd Waste Management licence No: 0 Annual Tonnage: 99999.0 Issue Date: 06/01/2011 Effective Date: 06/01/2011 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: - Correspondence Address: -
Not shown	1292	SW	333204 354844	Site Address: Alyn Waters Country Park, Llay, Wrexham, Clwyd, LL12 0PW Type: Use of waste in construction <100,000 tps Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FOR097 EPR reference: EA/EPR/QP3695VB/A001 Operator: Fore Golf Discount (Wrexham) Ltd Waste Management licence No: 102195 Annual Tonnage: 99999.0 Issue Date: 06/01/2011 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Foregolf Golf Course & Driving Range Correspondence Address: -
Not shown	1292	SW	333204 354844	Site Address: Alyn Waters Country Park, Llay, Wrexham, Clwyd, LL12 0PW Type: Use of waste in construction <100,000 tps Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FOR097 EPR reference: QP3695VB/A001 Operator: Fore Golf Discount (Wrexham) Ltd Waste Management licence No: 102195 Annual Tonnage: 99999.0 Issue Date: 06/01/2011 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Foregolf Golf Course & Driving Range Correspondence Address: -

4. Current Land Use Map



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4. Current Land Uses

4.1 Current Industrial Data

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

7

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	25	SW	Blackbrook Motors	333398 356218	Blackbrook Motors, Gresford Road, Llay, Wrexham, LL12 0NW	Vehicle Repair, Testing and Servicing	Repair and Servicing
2	30	SW	Crimeshield Intruder Alarms	333761 355976	Crimeshield Intruder Alarms, 114, Gresford Road, Llay, Wrexham, LL12 0NW	Electronic Equipment	Industrial Products
3	37	SE	Mast	333990 356082	Mast, LL12	Telecommunications Features	Infrastructure and Facilities
4	107	SW	Electricity Sub Station	333741 355902	Electricity Sub Station, LL12	Electrical Features	Infrastructure and Facilities
5	124	SW	Electricity Sub Station	333363 356123	Electricity Sub Station, LL12	Electrical Features	Infrastructure and Facilities
6	201	W	Magellan Aerospace	333113 356394	Magellan Aerospace, Rackery Lane, Llay, Wrexham, LL12 0PB	Precision Engineers	Engineering Services
7	230	W	Electricity Sub Station	333073 356279	Electricity Sub Station, LL12	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

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

1

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
8	108	SW	333539 356049	Obsolete	Black Brook Motors, B5373, Llay, Wrexham, Clwyd, LL12 0NW	Not Applicable	Obsolete

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site:

0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site:

0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

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

5.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
GFSDD	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
TILLD	TILL, DEVENSIAN	DIAMICTON

5.3 Bedrock and Solid Geology

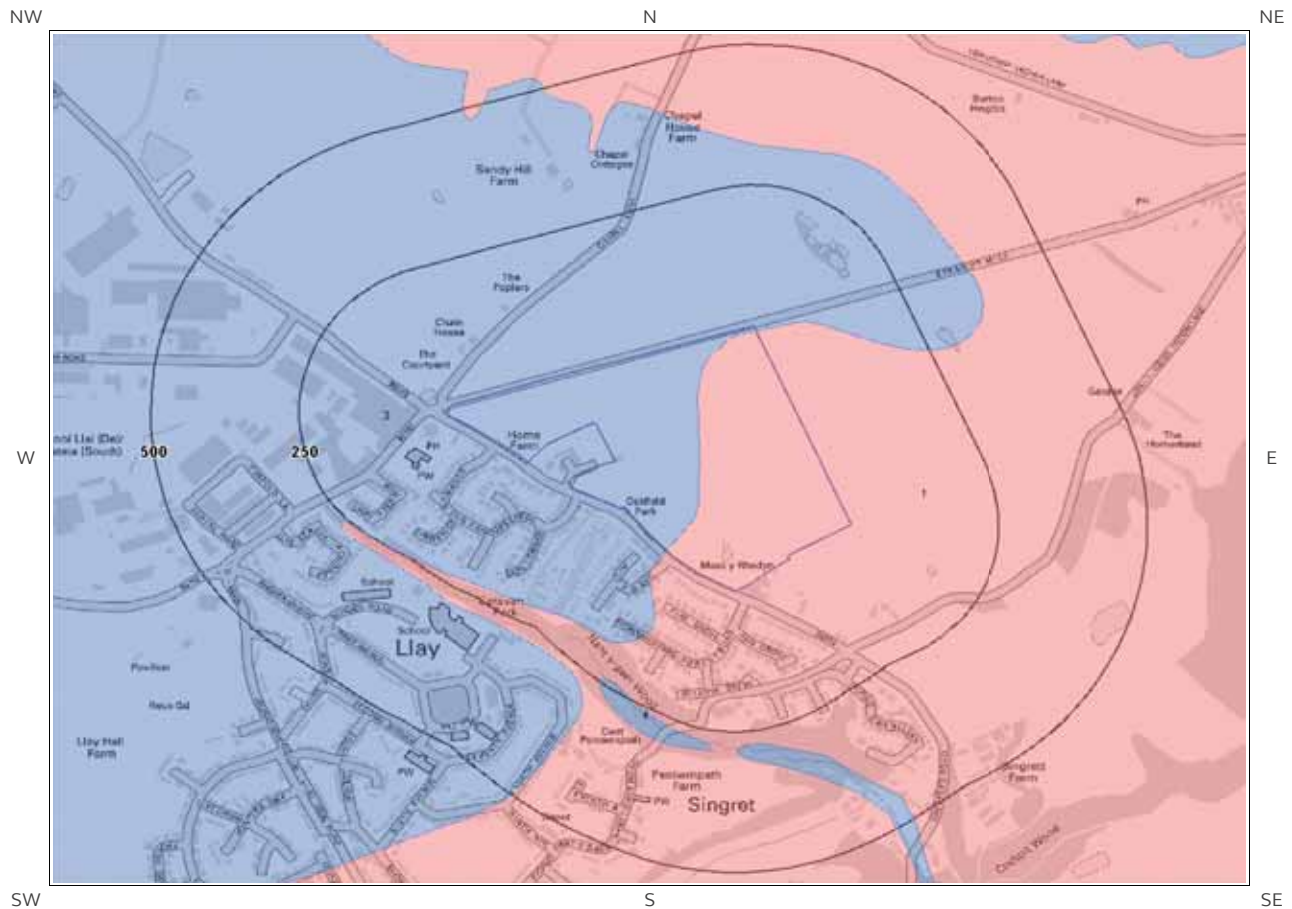
The database has been searched on site, including a 50m buffer.

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

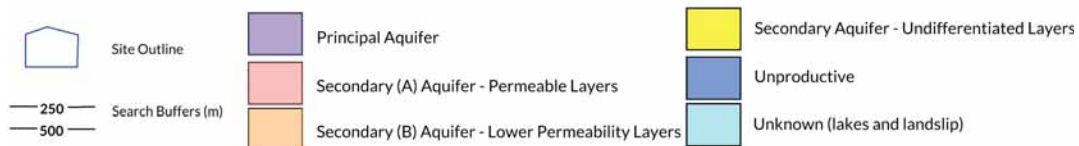
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

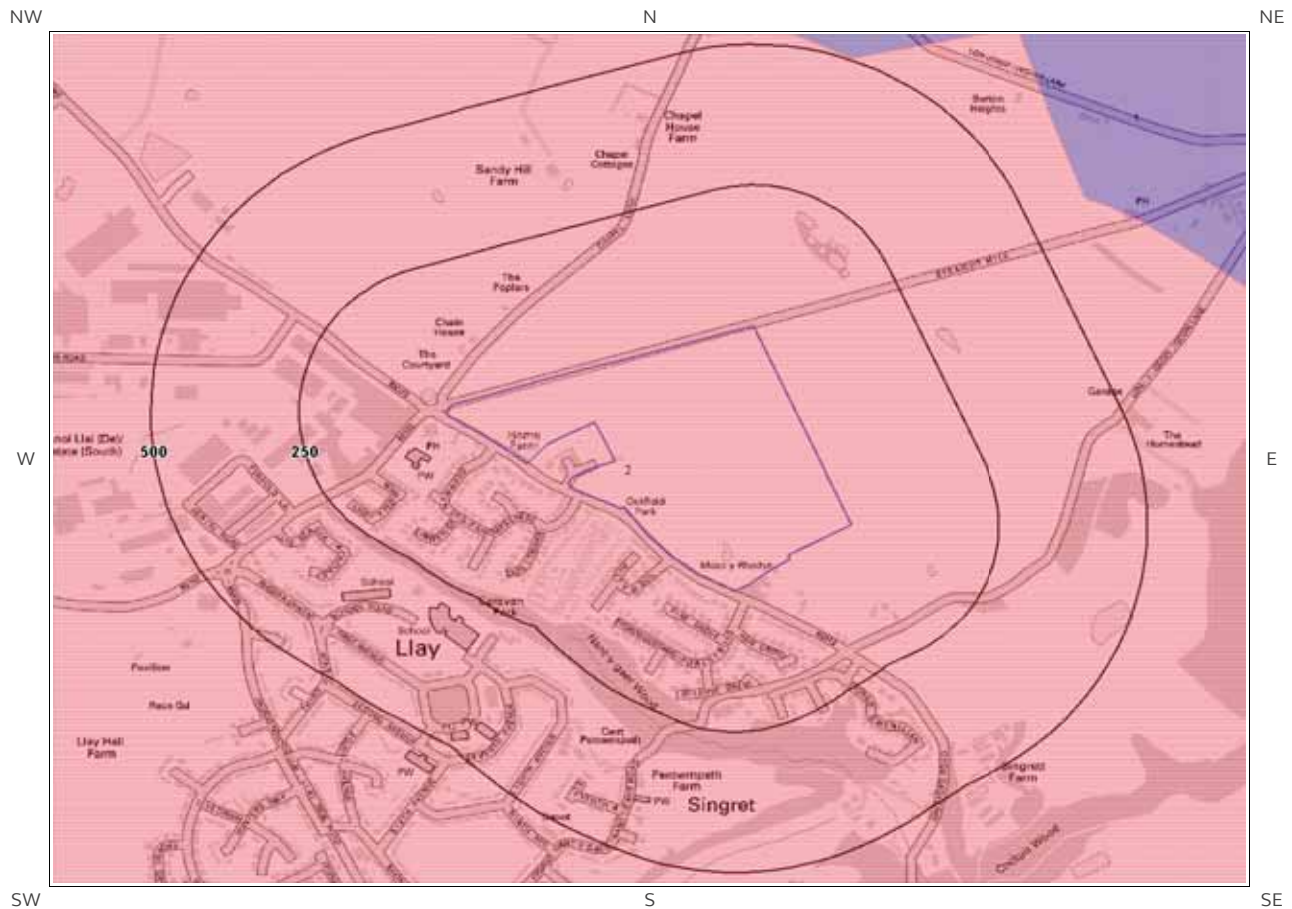
6a. Aquifer Within Superficial Geology



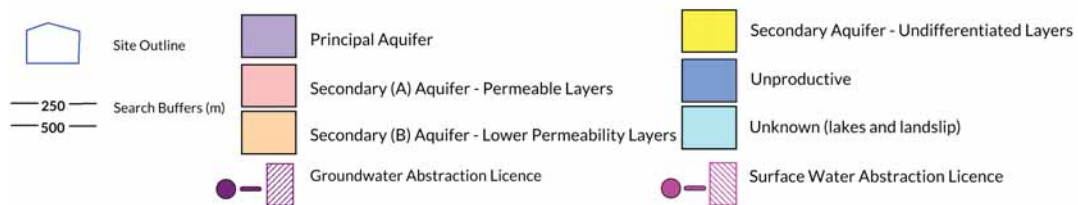
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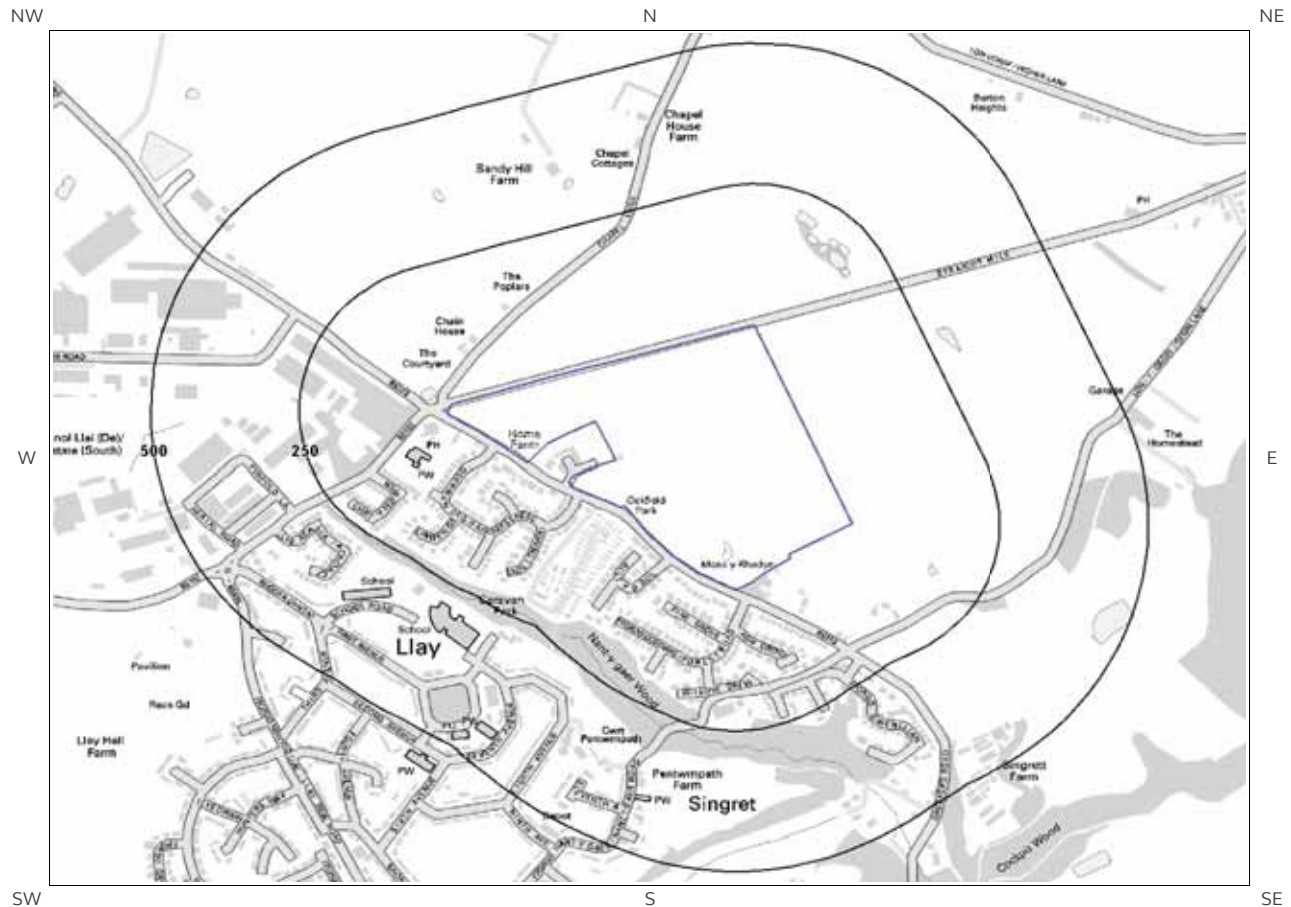
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



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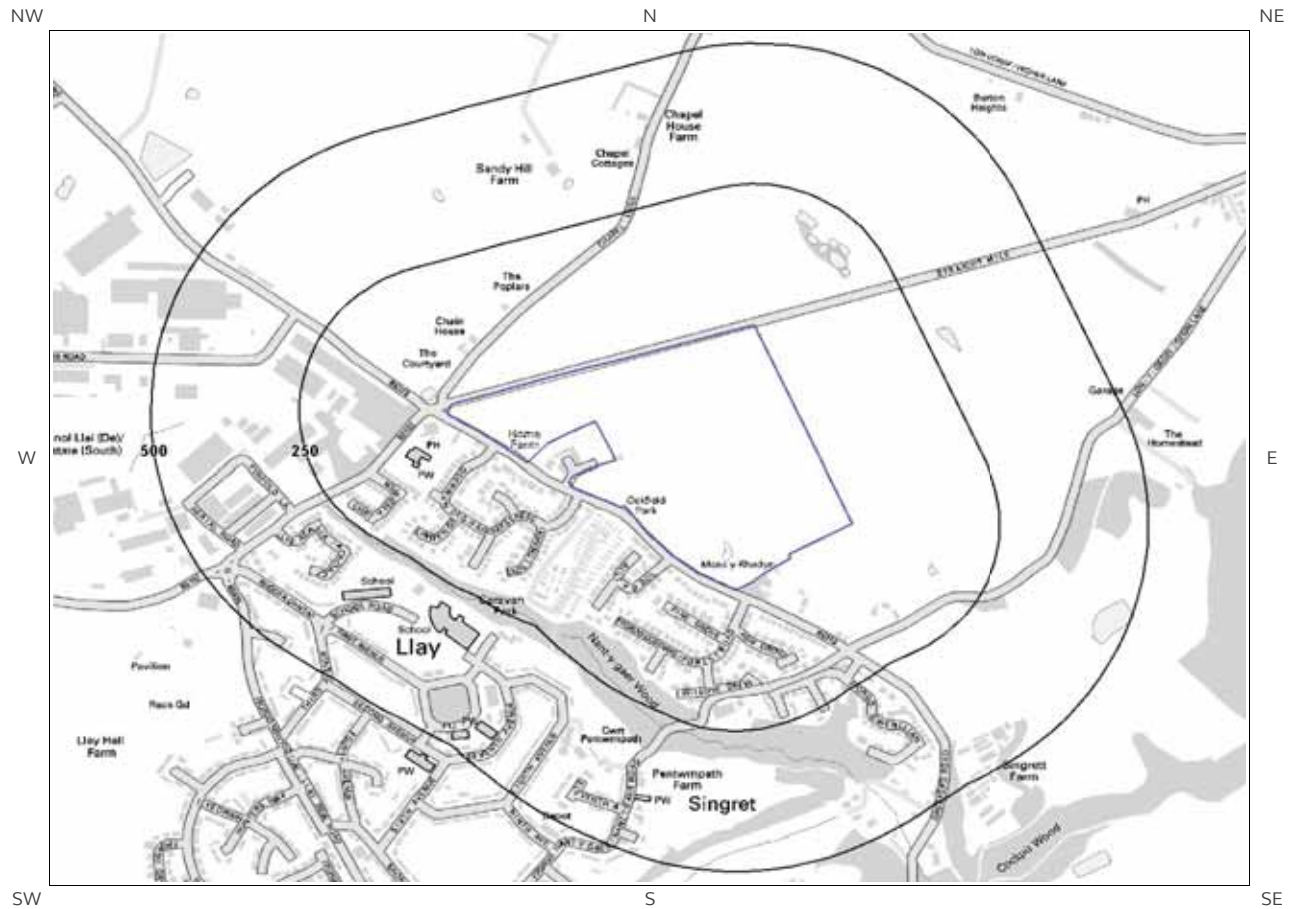


6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

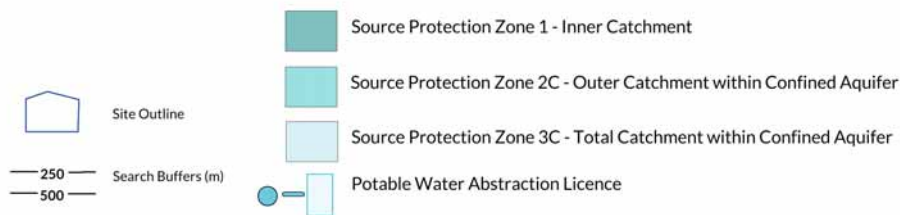


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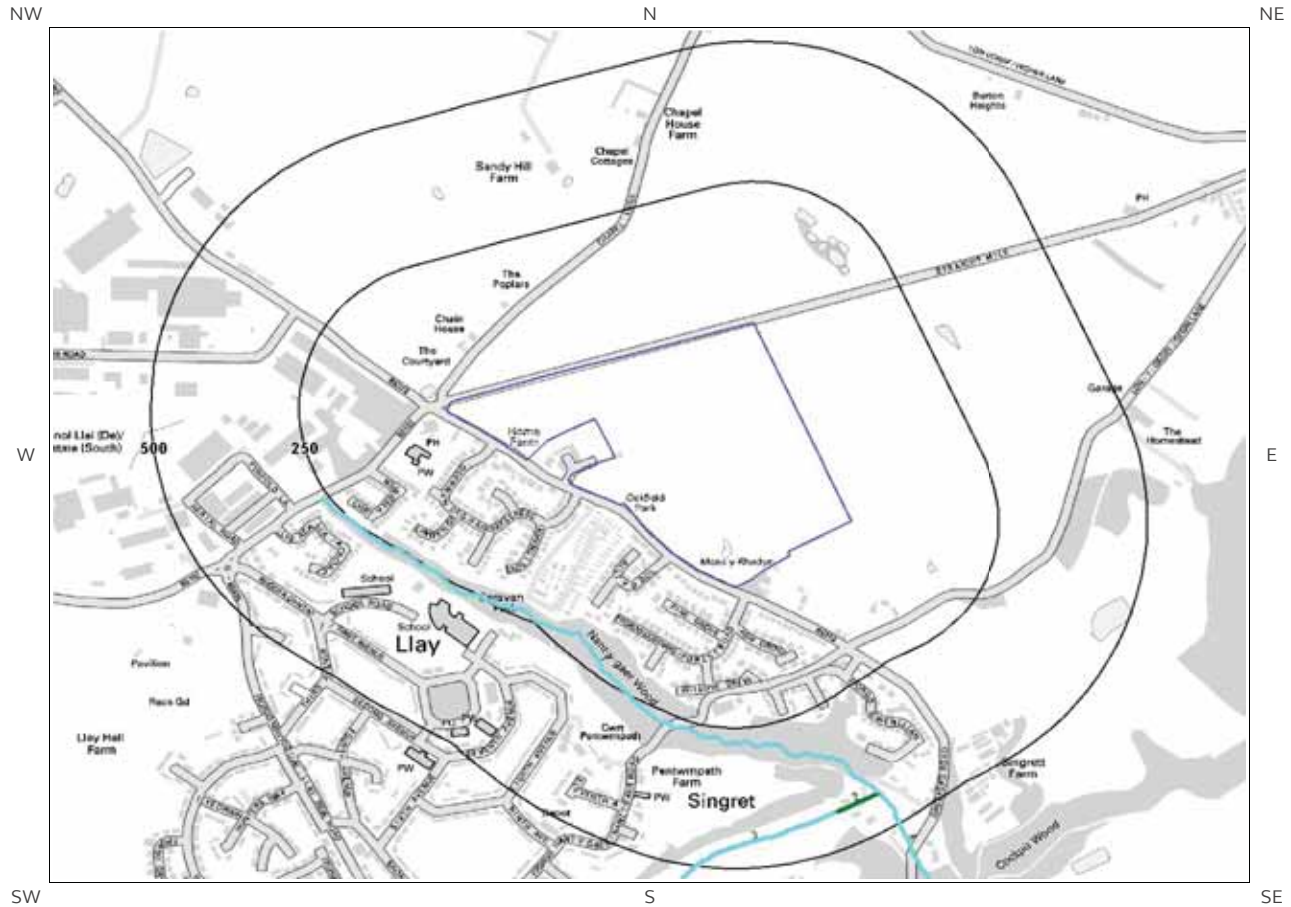
6d. Hydrogeology – Source Protection Zones within confined aquifer



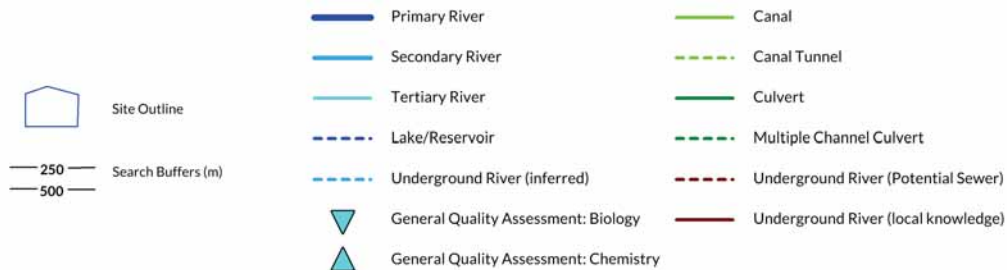
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6e. Hydrology – Detailed River Network and River Quality



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6. Hydrogeology and Hydrology

6.1 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/Natural Resources Wales'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 Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
1	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
3	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
4	238	SW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
5	273	S	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.2 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/Natural Resources Wales'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 Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
2	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

6.3 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 (6b):

ID	Distance (m)	Direction	NGR	Details
Not shown	1140	NE	334500 357380	Status: Historical Licence No: 24/67/9/0146 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Borehole Data Type: Point Name: Lister Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: N142 Original Start Date: 7/10/1974 Expiry Date: - Issue No: 100 Version Start Date: 7/10/1974 Version End Date:
Not shown	1436	NE	334520 357720	Status: Historical Licence No: 24/67/9/0065 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Borehole Data Type: Point Name: Walton Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 535 Original Start Date: 25/10/1966 Expiry Date: - Issue No: 100 Version Start Date: 25/10/1966 Version End Date:

6.4 Surface Water Abstraction Licences

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

Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details
Not shown	876	SE	334480 355400	Status: Historical Licence No: 24/67/8/0052 Details: Mineral Washing Direct Source: Eaw Surface Water Point: River Alyn Data Type: Point Name: Tarmac Limited Annual Volume (m³): 166929 Max Daily Volume (m³): 545.52 Application No: - Original Start Date: 14/6/1968 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2008 Version End Date:
Not shown	1016	E	334961 356380	Status: Active Licence No: WA/067/0008/007 Details: Mineral Washing Direct Source: Eaw Surface Water Point: Lagoon At Ballswood Quarry Data Type: Point Name: DP Williams Holdings Ltd Annual Volume (m³): 3800 Max Daily Volume (m³): 138 Application No: WPCC3082 Original Start Date: 26/6/2015 Expiry Date: 31/3/2017 Issue No: 1 Version Start Date: 26/6/2015 Version End Date:
Not shown	1059	E	335000 356400	Status: Historical Licence No: 24/67/8/0108 Details: Mineral Washing Direct Source: Eaw Surface Water Point: Lagoon At Ballswood Quarry Wrexham Data Type: Point Name: DP Williams Holdings Ltd Annual Volume (m³): 3800 Max Daily Volume (m³): 138 Application No: NPS/WR/011382 Original Start Date: 30/6/2006 Expiry Date: 31/3/2015 Issue No: 2 Version Start Date: 3/10/2012 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1349	E	335530 356760	Status: Active Licence No: 24/67/8/0086 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: River Alyn Data Type: Line Name: H E Jones And Son	Annual Volume (m³): 6164.37 Max Daily Volume (m³): 272.76 Application No: N206 Original Start Date: 16/6/1980 Expiry Date: - Issue No: 100 Version Start Date: 1/4/2007 Version End Date:

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency/Natural Resources Wales 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	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.
0	On Site	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
37	SW	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.
436	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.
446	N	Major 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.
446	N	Major Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

6.9 River Quality

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? Yes

6.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

The following Biological Quality records are shown on the Hydrology Map (6e):

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
Not shown	902	SE	334200 355200	River Name: Alyn / Alun Reach: Rosset Weir - Gresford Lodge End/Start of Stretch: Start of Stretch NGR	C	C	C	C	C
Not shown	902	SE	334200 355200	River Name: Alyn / Alun Reach: Gresford - Conf. Cegidog End/Start of Stretch: End of Stretch NGR	B	B	B	B	B

6.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAH). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

The following Chemical Quality records are shown on the Hydrology Map (6e):

ID	Distance (m)	Direction	NGR	River Quality Grade	Chemical Quality Grade				
					2005	2006	2007	2008	2009
Not shown	902	SE	334200 355200	River Name: Alyn Reach: Gresford - Conf. Cegidog End/Start of Stretch: End of Stretch NGR	A	A	B	B	-
Not shown	902	SE	334200 355200	River Name: Alyn Reach: Rosset Weir - Gresford Lodge End/Start of Stretch: Start of Stretch NGR	A	B	B	B	-

6.10 Detailed River Network

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

Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details
1	211	SW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
2	434	SE	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
3	434	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	436	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

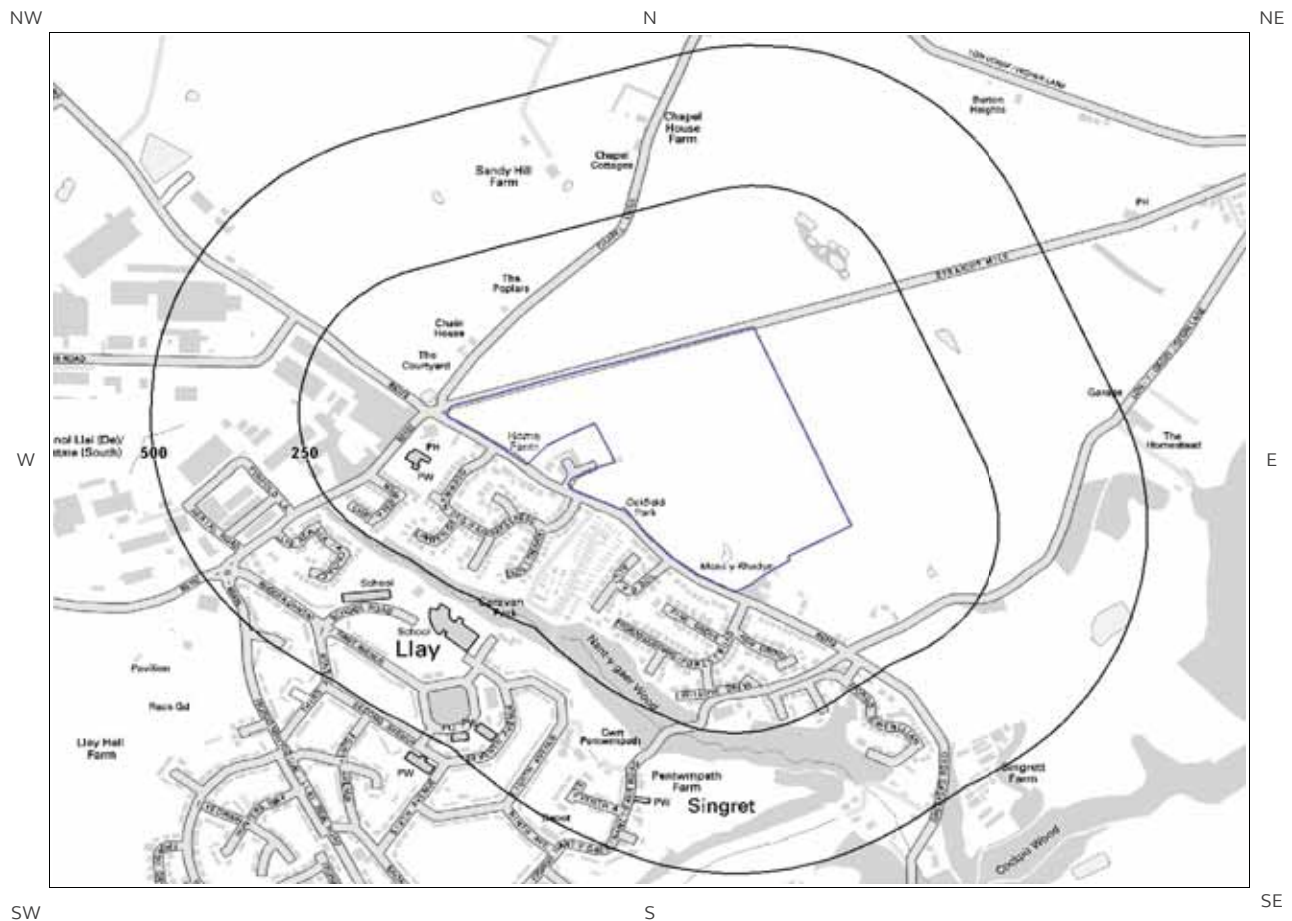
6.11 Surface Water Features

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

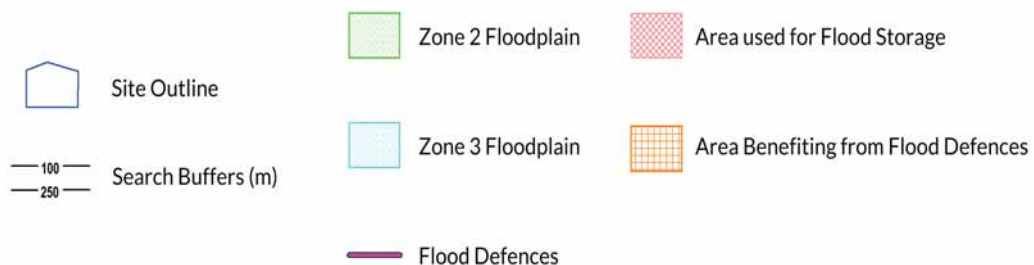
The following surface water records are not represented on mapping:

Distance (m)	Direction
170	NE
171	NE
175	NE
192	NE
196	NE
211	SW
236	SW

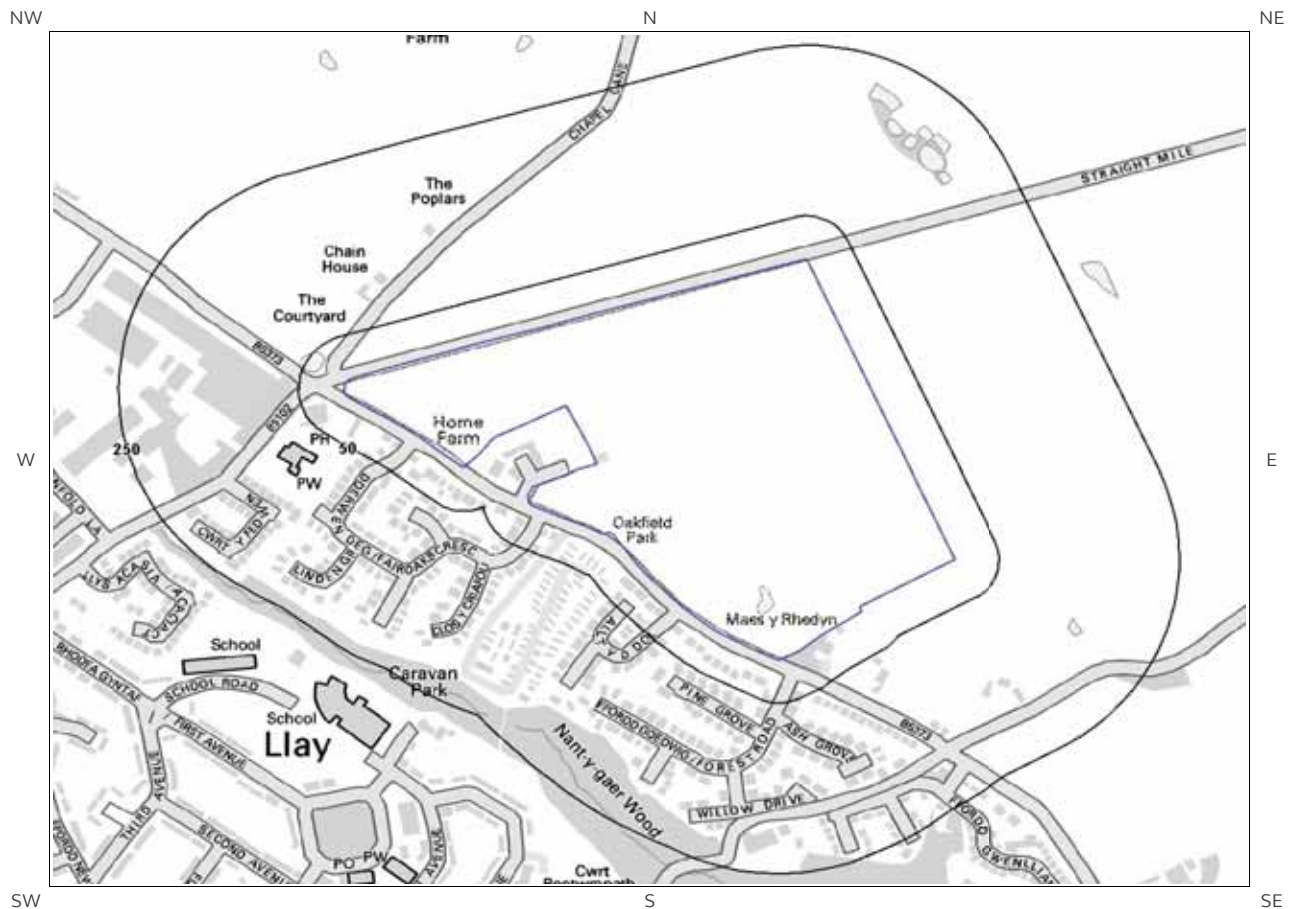
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



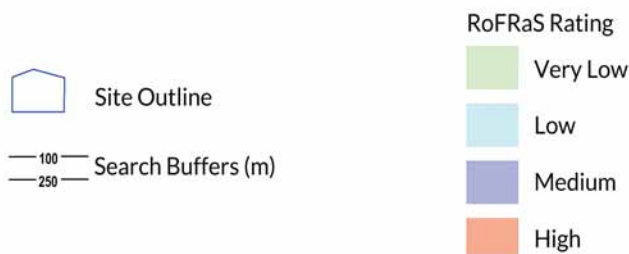
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? No

Environment Agency/Natural Resources Wales 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 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? No

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 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? Very Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

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

7.6 Areas benefiting from Flood Storage

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

No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 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).

7.7.2 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.

7.8 Groundwater Flooding Confidence Areas

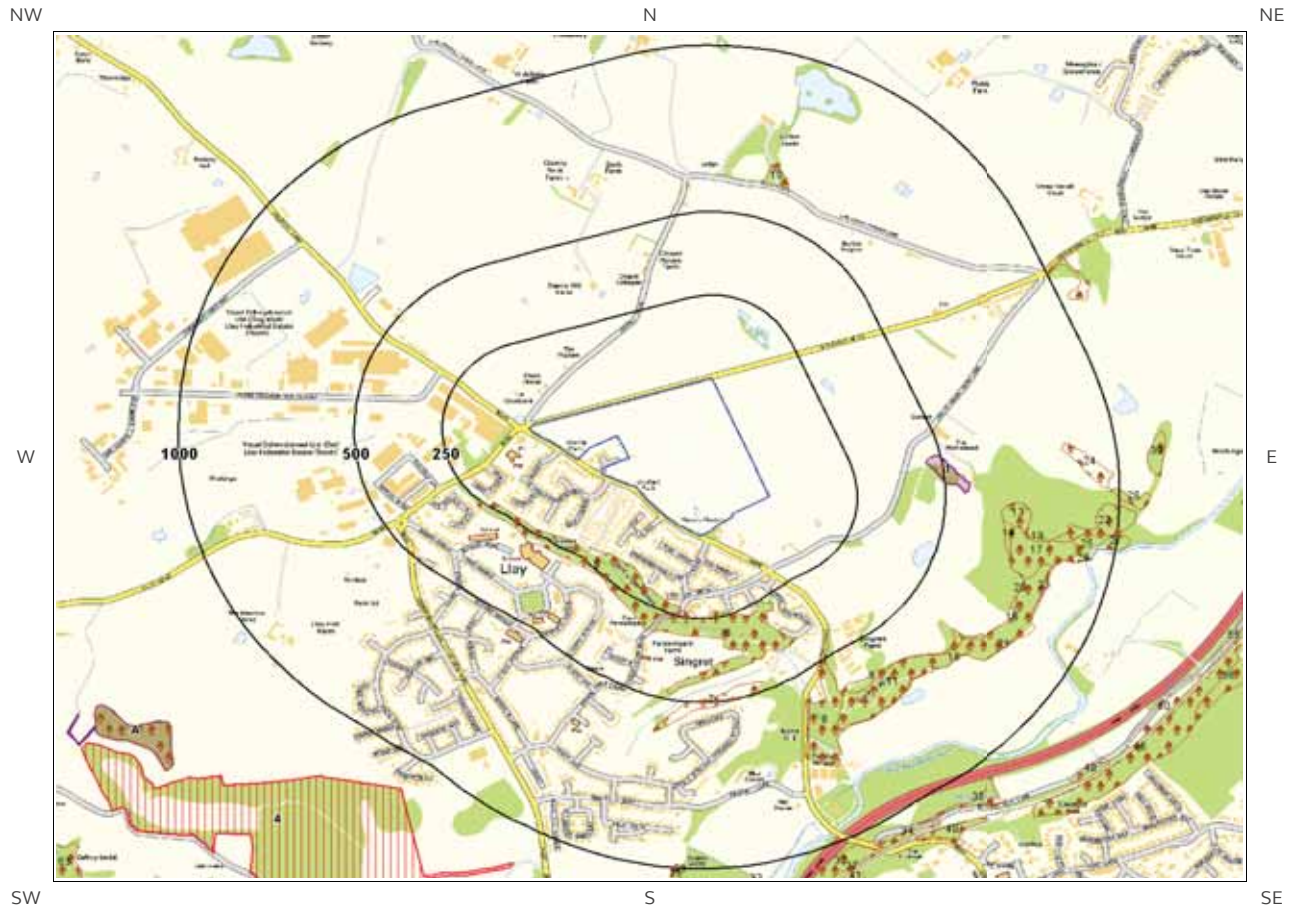
What is the British Geological Survey confidence rating in this result?

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.

8. Designated Environmentally Sensitive Sites Map



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8. Designated Environmentally Sensitive Sites

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

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

3

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

ID	Distance (m)	Direction	SSSI Name	Data Source
1	455	E	CHWAREL SINGRET	Natural Resources Wales
2A	1350	SW	LLAY BOG	Natural Resources Wales
Not shown	1492	E	MARFORD QUARRY	Natural Resources Wales

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

75

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
5	173	SW	Unknown	Ancient and Semi-Natural Woodland
6	226	S	Unknown	Ancient and Semi-Natural Woodland
7	461	S	Unknown	Ancient and Semi-Natural Woodland
8	488	SE	Unknown	Restored Ancient Woodland Site
9	598	SE	Unknown	Ancient and Semi-Natural Woodland
10	601	N	Unknown	Ancient and Semi-Natural Woodland
11	605	SE	Unknown	Restored Ancient Woodland Site
12	653	SE	Unknown	Restored Ancient Woodland Site
13	665	E	Unknown	Ancient Replanted Woodland
14	673	E	Unknown	Ancient and Semi-Natural Woodland
15	681	SE	Unknown	Ancient and Semi-Natural Woodland
16	695	SE	Unknown	Ancient and Semi-Natural Woodland
17	699	E	Unknown	Restored Ancient Woodland Site
18	715	SE	Unknown	Ancient and Semi-Natural Woodland
19	736	E	Unknown	Ancient and Semi-Natural Woodland
20	765	SE	Unknown	Ancient and Semi-Natural Woodland
21	784	SE	Unknown	Ancient and Semi-Natural Woodland
22	816	E	Unknown	Ancient and Semi-Natural Woodland
23	826	E	Unknown	Ancient and Semi-Natural Woodland
24	846	E	Unknown	Ancient and Semi-Natural Woodland
25	864	E	Unknown	Ancient and Semi-Natural Woodland
26	903	E	Unknown	Ancient and Semi-Natural Woodland
27	948	E	Unknown	Ancient and Semi-Natural Woodland
28	969	E	Unknown	Ancient and Semi-Natural Woodland
29	996	S	Unknown	Ancient and Semi-Natural Woodland
30	996	NE	Unknown	Ancient and Semi-Natural Woodland
31	998	S	Unknown	Restored Ancient Woodland Site

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
32	1023	SE	Unknown	Restored Ancient Woodland Site
33	1036	S	Unknown	Ancient and Semi-Natural Woodland
34	1037	SE	Unknown	Restored Ancient Woodland Site
35	1051	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1065	S	Unknown	Restored Ancient Woodland Site
37	1066	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1071	S	Unknown	Ancient and Semi-Natural Woodland
39	1082	E	Unknown	Ancient and Semi-Natural Woodland
40	1089	SE	Unknown	Restored Ancient Woodland Site
41	1100	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1109	S	Unknown	Restored Ancient Woodland Site
Not shown	1131	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1134	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1161	S	Unknown	Ancient and Semi-Natural Woodland
46	1196	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1200	N	Unknown	Restored Ancient Woodland Site
48	1209	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1237	S	Unknown	Ancient and Semi-Natural Woodland
50	1258	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1268	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1274	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1321	S	Unknown	Ancient and Semi-Natural Woodland
54A	1350	SW	Unknown	Ancient and Semi-Natural Woodland
55	1351	E	Unknown	Ancient and Semi-Natural Woodland
56	1374	SE	Unknown	Ancient Replanted Woodland
Not shown	1376	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1385	S	Unknown	Restored Ancient Woodland Site

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1434	E	Unknown	Restored Ancient Woodland Site
Not shown	1452	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1492	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1563	S	Unknown	Restored Ancient Woodland Site
63	1642	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1758	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1774	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1816	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1824	S	Unknown	Restored Ancient Woodland Site
Not shown	1829	E	Unknown	Restored Ancient Woodland Site
Not shown	1860	W	Unknown	Ancient and Semi-Natural Woodland
Not shown	1866	W	Unknown	Ancient and Semi-Natural Woodland
Not shown	1873	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1880	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1927	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1945	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1957	W	Unknown	Ancient and Semi-Natural Woodland
Not shown	1962	W	Unknown	Ancient and Semi-Natural Woodland
Not shown	1965	NW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1971	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1978	S	Unknown	Ancient and Semi-Natural Woodland

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

1

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
4	1104	SW	ALYN WATERS	Natural Resources Wales

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.

8.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 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 Geo Insight, available from our [website](#). The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell** 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
Ground conditions predominantly low plasticity. 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 due to potential problems with shrink-swell clays.

9.1.2 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.

9.1.3 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.

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

9.1.4 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.

9.1.5 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.

9.1.6 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.

9.2 Radon

9.2.1 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.

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

9.2.2 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.

10. Mining

10.1 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 (m)	Direction	Details
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.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary?

No

Database searched and no data found.

10.3 Brine Affected Areas

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

No

Guidance: No Guidance Required.

Contact Details

CENTREMAPS

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Groundsure@centremaps.co.uk

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Fax: 0115 936 3276.

Email:

Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries:

enquiries@bgs.ac.uk

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Ty Cambria

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Cardiff

CF24 0TP

Tel: 0300 065 3000

Email: enquiries@naturalresourceswales.gov.uk

Public Health England

Public information access office

Public Health England, Wellington House

133-155 Waterloo Road, London, SE1 8UG

www.gov.uk/phe

Email: enquiries@phe.gov.uk

Main switchboard: 020 7654 8000

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Tel: 0345 7626 848

DX 716176 Mansfield 5

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Phone: 01978 292 000

Web: <http://www.wrexham.gov.uk/>

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**British
Geological Survey**

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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, Natural England who retain the Copyright and Intellectual Property Rights for the data.

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<https://www.groundsure.com/terms-and-conditions-sept-2016>

APPENDIX B



CENTREMAPS

Open Space, Upper Interfields,
Worcester, WR14 1UT

Report Reference: CMAPS-CM-605307-30974-
070317GEO

Your Reference: 30974

Report Date 7 Mar 2017

Report Delivery Email - pdf
Method:

Groundsure Geo Insight

Address: 4 Gresford Road, Llay, LL12 0NW

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

Enc.
Groundsure Geoinsight



Groundsure Geo Insight

Address: 4 Gresford Road, Llay, LL12 0NW
Date: 7 Mar 2017
Reference: CMAPS-CM-605307-30974-070317GEO
Client: CENTREMAPS

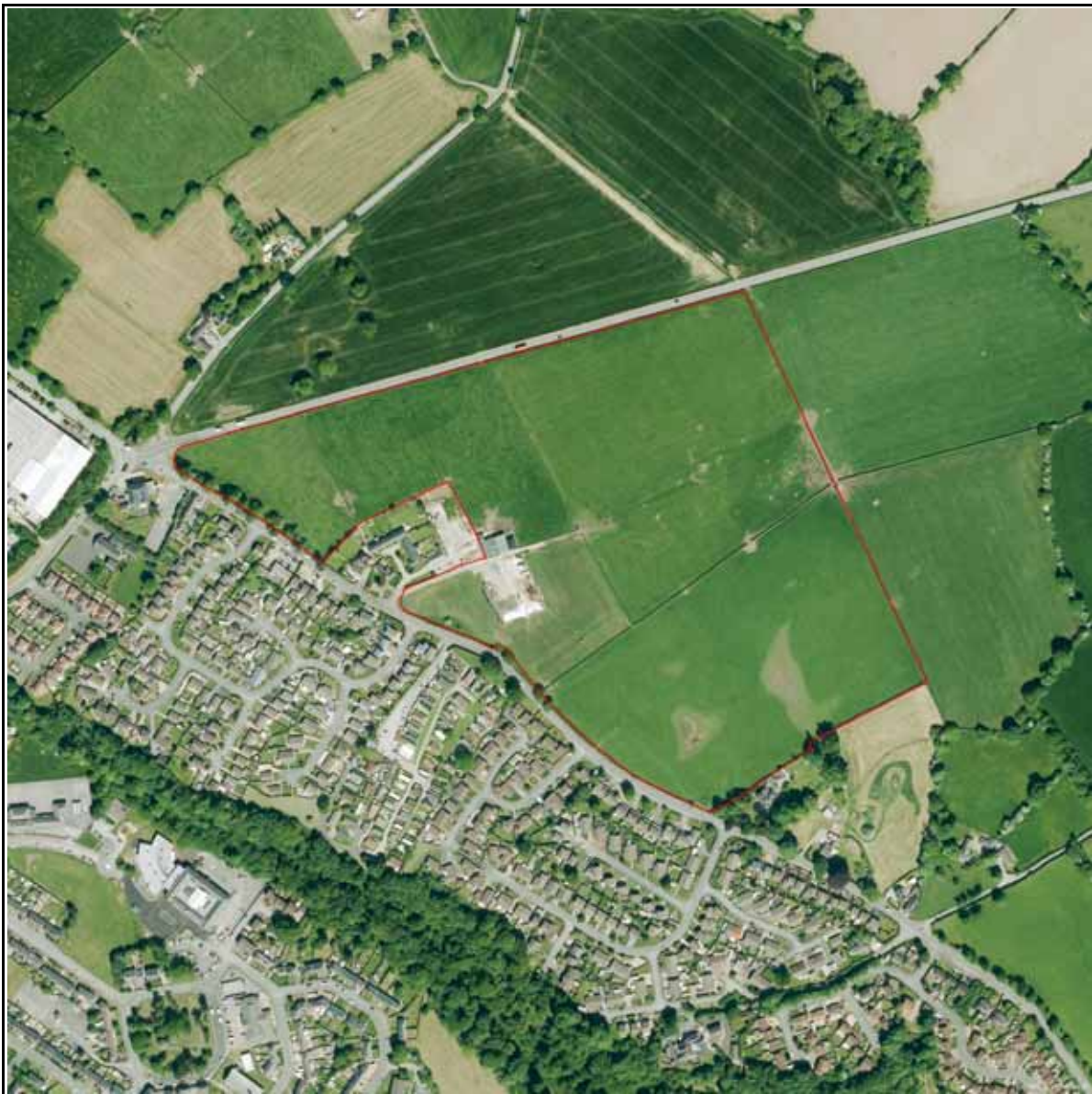
NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 09-Jun-2013
Grid Reference: 333640,356235
Site Size: 15.63ha

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Overview of Findings

The Groundsure Geo Insight 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

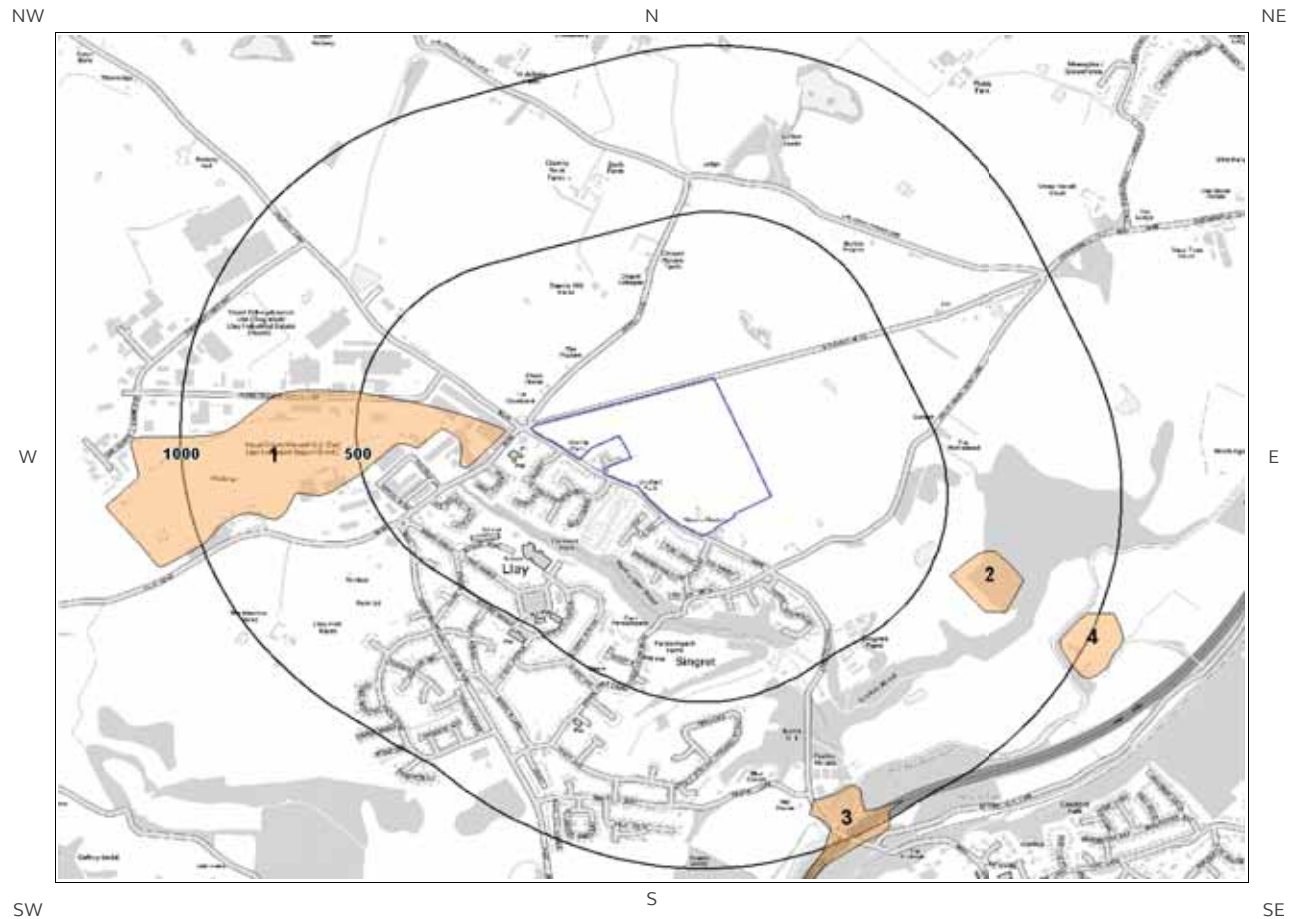
Section 2:Ground Workings	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	4	10	18	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	3	0	4
2.3 Current Ground Workings	0	0	1	1	10

Section 3: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.1 Historical Mining	0	0	3	0	4
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	1
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	Very Low				
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	0	0	4		
Section 6: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
6 Records of Background Soil Chemistry	5	2	14		
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	5	Not Searched	
7.3 Historical Railways	0	0	2	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

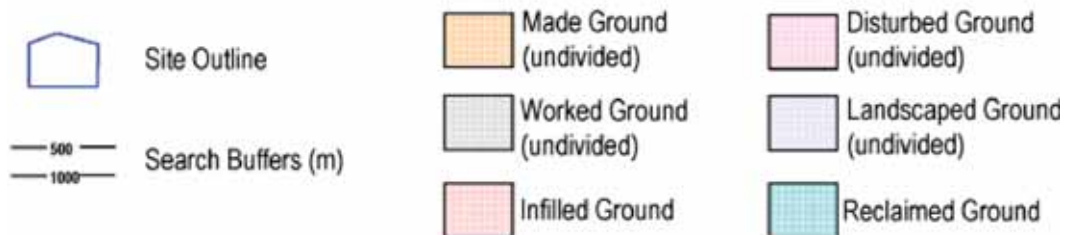
1 Geology

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:108

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

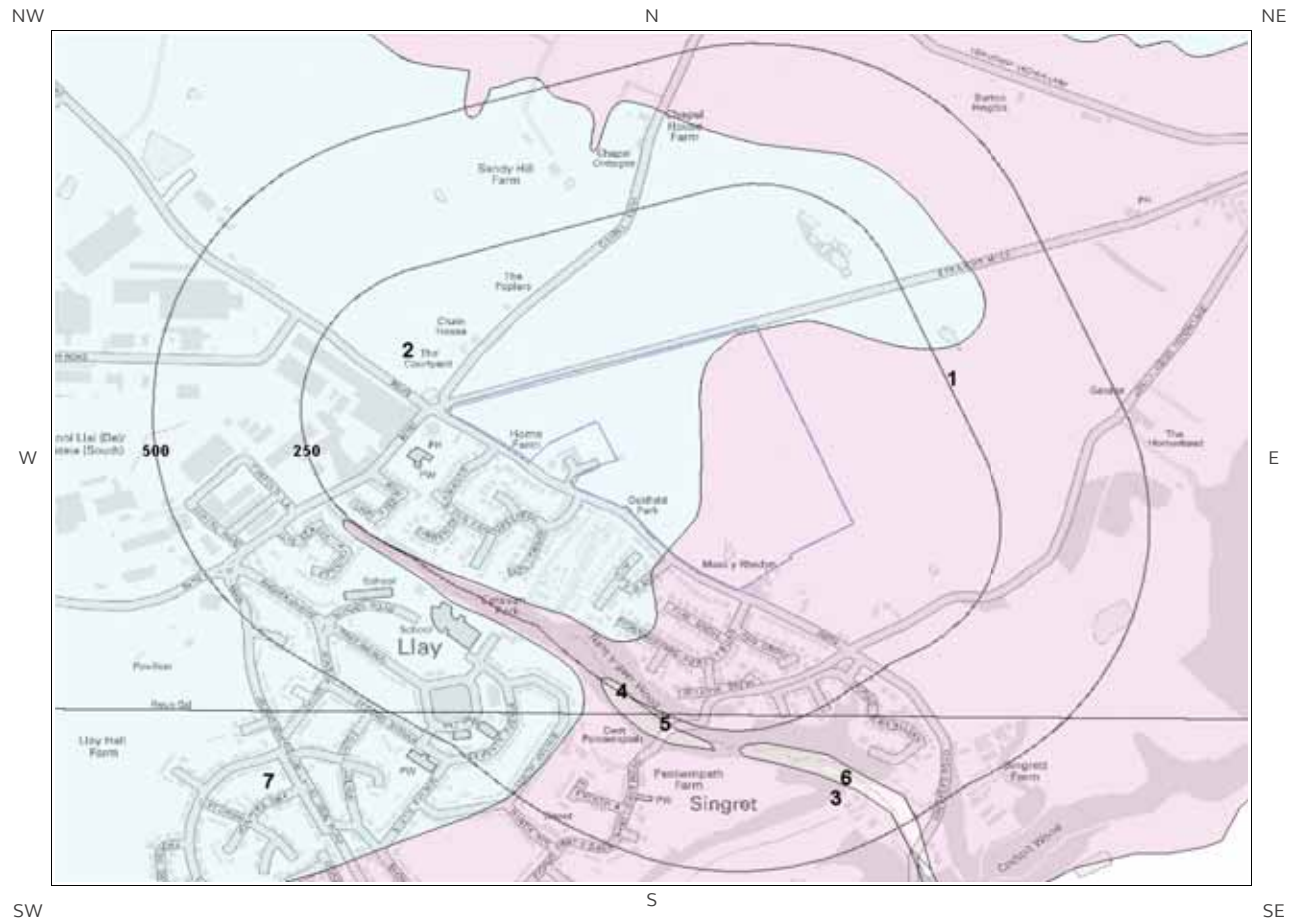
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	77.0	W	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

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	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
2	0.0	On Site	TILLD	TILL, DEVENSIAN	DIAMICTON
3	221.0	S	GFDUD	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
4	238.0	SW	GLLDD	GLACIOLACUSTRINE DEPOSITS, DEVENSIAN	CLAY AND SILT [UNLITHIFIED DEPOSITS CODING SCHEME]
5	259.0	SW	GLLDD	GLACIOLACUSTRINE DEPOSITS, DEVENSIAN	CLAY AND SILT [UNLITHIFIED DEPOSITS CODING SCHEME]
6	273.0	S	GLLDD	GLACIOLACUSTRINE DEPOSITS, DEVENSIAN	CLAY AND SILT [UNLITHIFIED DEPOSITS CODING SCHEME]
7	317.0	SW	TILLD	TILL, DEVENSIAN	DIAMICTON

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
0.0	On Site	Mixed	High	Low

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

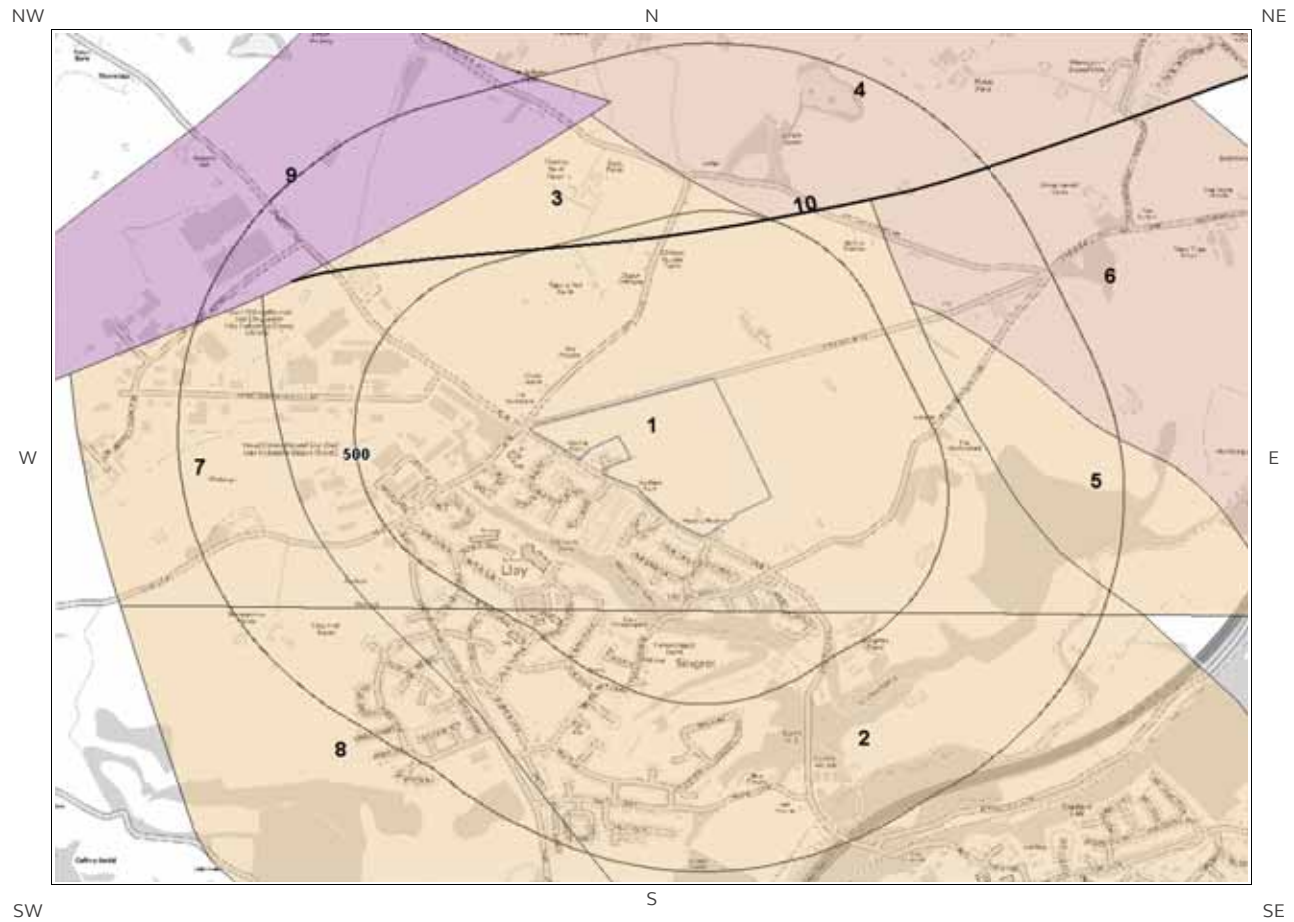
Are there any records relating to permeability of landslips within the study site** boundary?

No

Database searched and no data found.

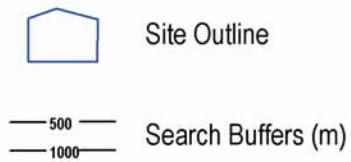
* This includes an automatically generated 50m buffer zone around the site

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:108

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	221.0	S	SAL-MDSC	Salop Formation - Mudstone, Sandstone And Conglomerate	/ Westphalian D
3	439.0	N	SAL-MDSC	Salop Formation - Mudstone, Sandstone And Conglomerate	/ Westphalian D

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
10	439.0	N	FAULT	Fault, inferred, displacement unknown

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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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	333528 356201	Pond	1900
2A	0.0	On Site	333530 356196	Ponds	1872
3A	0.0	On Site	333529 356197	Pond	1968
4A	0.0	On Site	333529 356197	Pond	1960
5	7.0	SW	333773 355991	Pond	1872
6B	13.0	SW	333583 356104	Ponds	1872
7B	13.0	SW	333583 356104	Ponds	1900
8B	14.0	SW	333594 356106	Ponds	1949
9C	26.0	SW	333417 356197	Pond	1968
10C	26.0	SW	333417 356197	Pond	1960
11D	30.0	NW	333267 356348	Pond	1979
12D	30.0	NW	333267 356348	Pond	1960
13D	30.0	NW	333267 356348	Pond	1968
14D	30.0	NW	333267 356348	Pond	1992
15	51.0	W	333022 356314	Refuse Heap	1949
16H	51.0	W	332577 356462	Colliery	1949
17E	59.0	SE	333939 356016	Sand Pit	1949
18E	61.0	SE	333944 356013	Sand Pit	1900
19	70.0	W	333147 356300	Unspecified Heap	1979
20	84.0	SE	333948 355972	Unspecified Pit	1872

ID	Distance (m)	Direction	NGR	Use	Date
21F	91.0	S	333402 356123	Ponds	1872
22F	91.0	S	333402 356123	Ponds	1900
23F	91.0	S	333400 356122	Ponds	1949
24G	171.0	NE	333922 356619	Ponds	1960
25G	171.0	NE	333922 356619	Ponds	1979
26G	171.0	NE	333922 356619	Ponds	1992
27G	171.0	NE	333922 356619	Ponds	1968
28G	172.0	NE	333908 356634	Ponds	1949
29G	173.0	NE	333918 356618	Water Body	1900
30G	173.0	NE	333918 356618	Ponds	1872
31	203.0	SE	334152 355988	Ponds	1872
32	214.0	S	333709 355795	Gravel Pit	1949

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? Yes

The following Historical Underground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
33H	51.0	W	332577 356462	Colliery	1949
34I	93.0	W	332841 356423	Unspecified Mine	1968
35I	93.0	W	332841 356423	Unspecified Mine	1960
Not shown	512.0	W	332807 356478	Unspecified Disused Shafts	1992
Not shown	519.0	W	332796 356480	Unspecified Disused Shafts	1979
Not shown	597.0	W	332714 356479	Unspecified Disused Shafts	1979
Not shown	602.0	W	332716 356479	Unspecified Disused Shafts	1992

2.3 Current Ground Workings

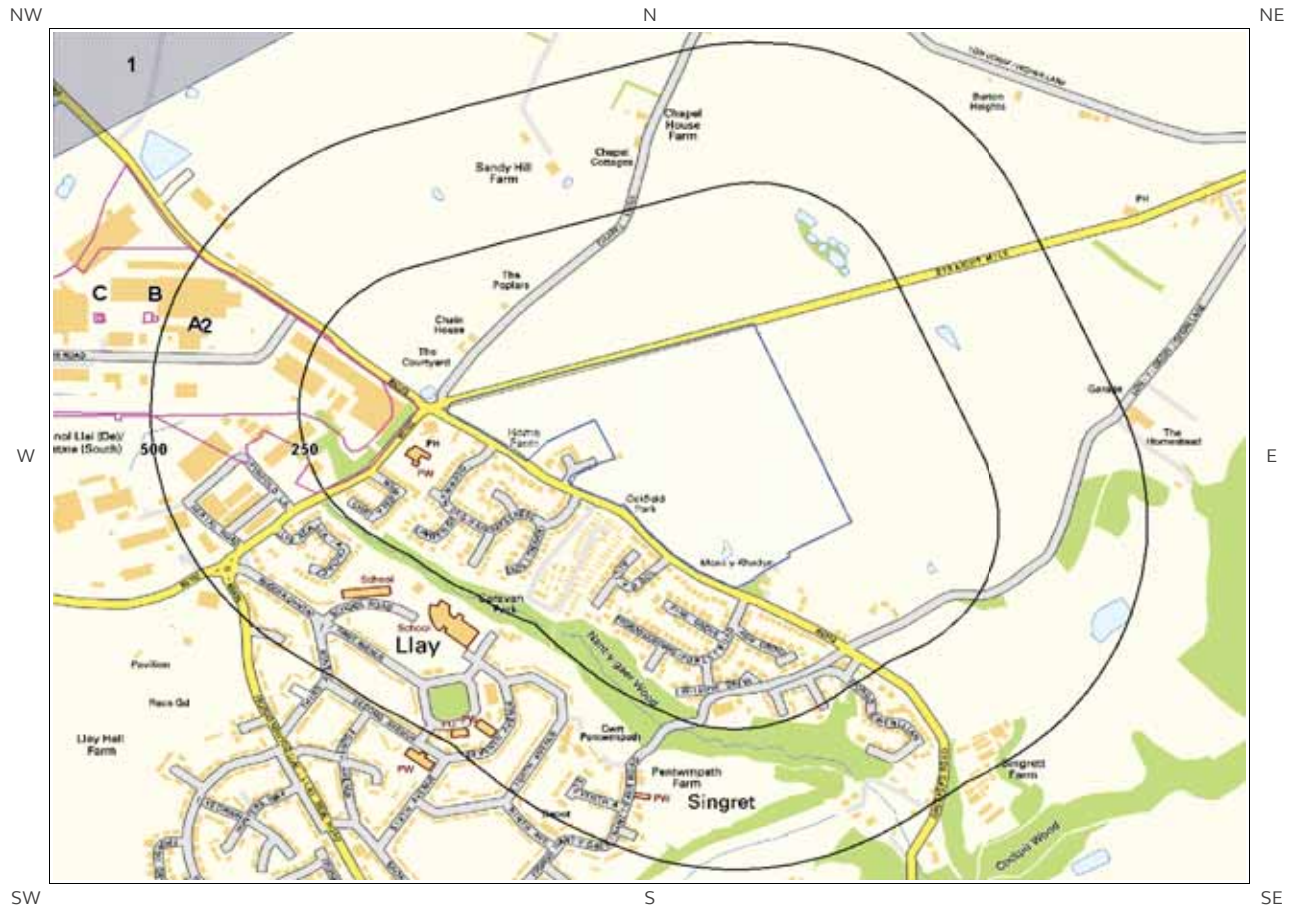
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? 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
40	89.0	SE	333966 356011	Sand	Oak Cottage	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	500.0	SE	334380 355820	Sand & Gravel	Singret Farm	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	535.0	W	332790 356479	Coal, Deep	Llay Main Colliery, No. 1 Shaft	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	611.0	W	332710 356479	Coal, Deep	Llay Main Colliery, No. 2 Shaft	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	635.0	S	333988 355399	Sand & Gravel	Bull's Hill	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	797.0	E	334775 356070	Sand & Gravel	Ball's Wood Gravel Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	807.0	N	333338 357176	Sand	Yr Ackery Sand Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	836.0	W	332480 356150	Clay & Shale	Llay Main Colliery Tip	Tip at a mine, quarry or other location from which mineral is being extracted. Working may be termed Slate Waste Tip, Shale Bing, Coal Tip or Coal Bing	Inactive
Not shown	852.0	E	334770 356435	Sand & Gravel	Ballswood	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Active
Not shown	876.0	N	333130 357190	Sand & Gravel	Bank Farm	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	922.0	E	334853 356411	Sand & Gravel	Ball's Wood	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	972.0	E	334940 356265	Sand & Gravel	Ball's Wood Gravel Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3 Mining, Extraction & Natural Cavities Map



Mining, Extraction and
Natural Cavities Legend

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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? Yes

The following Historical Mining information is provided by Groundsure:

ID	Distance (m)	Direction	NGR	Details	Date
2	51.0	W	332577 356462	Colliery	1949
3A	93.0	W	332841 356423	Unspecified Mine	1968
4A	93.0	W	332841 356423	Unspecified Mine	1960
5B	512.0	W	332807 356478	Unspecified Disused Shafts	1992
6B	519.0	W	332796 356480	Unspecified Disused Shafts	1979
7C	597.0	W	332714 356479	Unspecified Disused Shafts	1979
8C	602.0	W	332716 356479	Unspecified Disused Shafts	1992

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? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	708.0	NW	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

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 data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

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

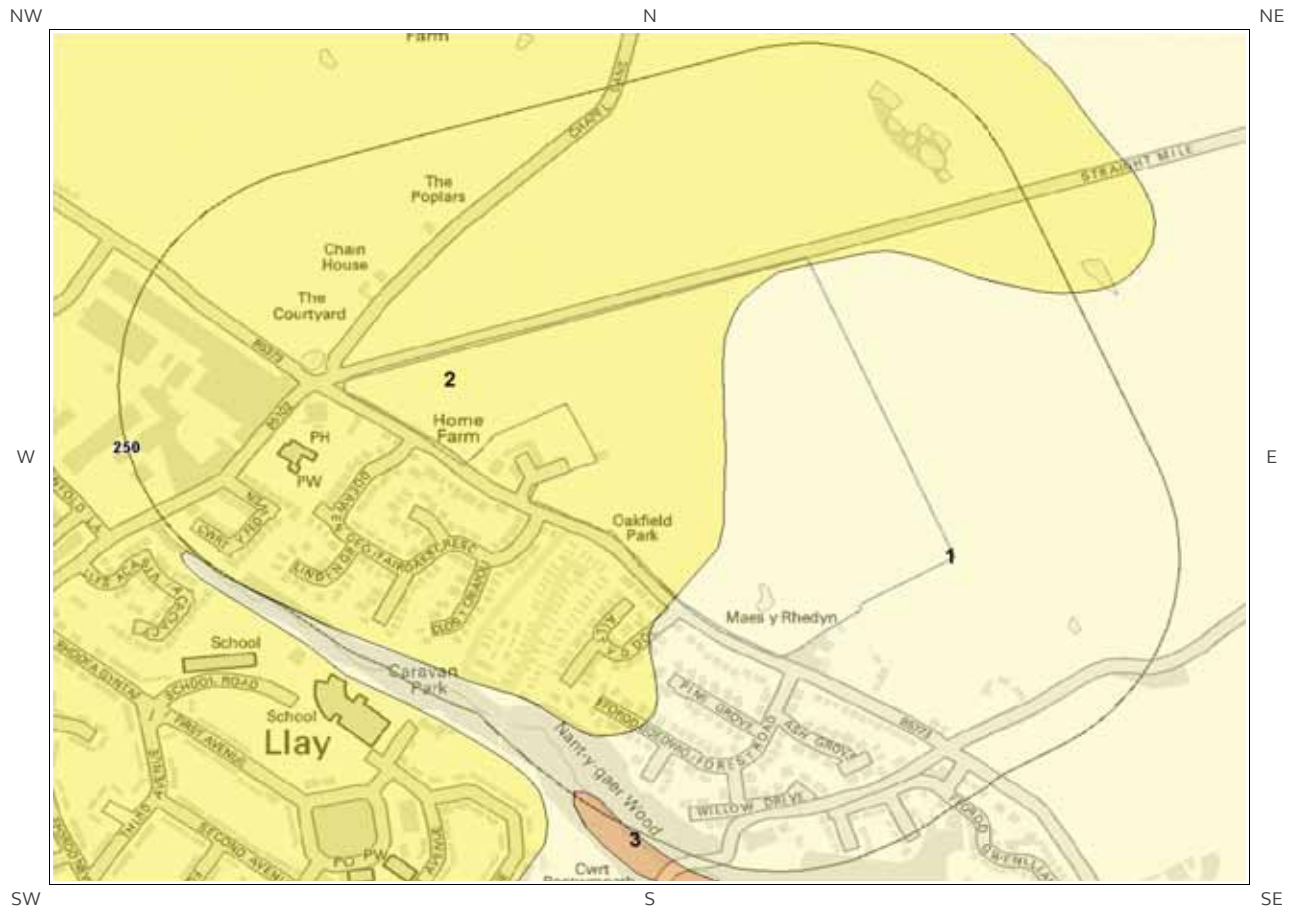
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

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

Database searched and no data found.

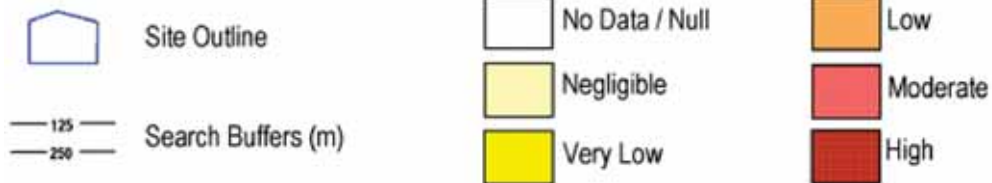
4 Natural Ground Subsidence

4.1 Shrink-Swell Clay Map



Shrink Swell Clay Legend

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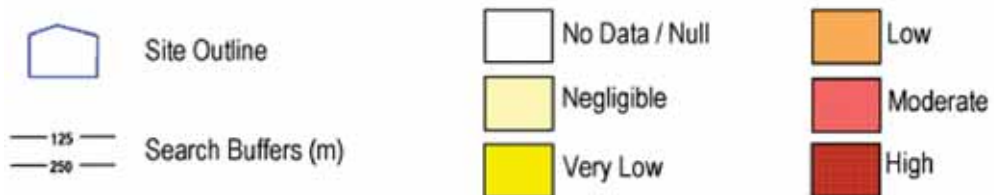


4.2 Landslides Map



Landslides Legend

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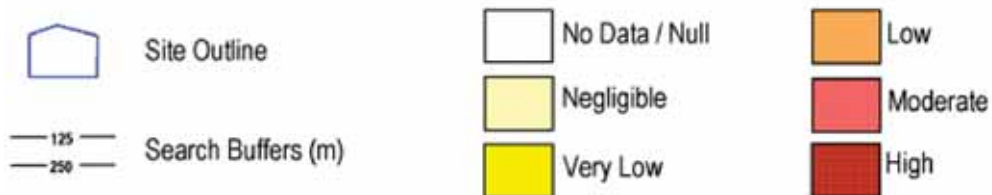


4.3 Ground Dissolution Soluble Rocks Map



**Ground Dissolution
Soluble Rocks Legend**

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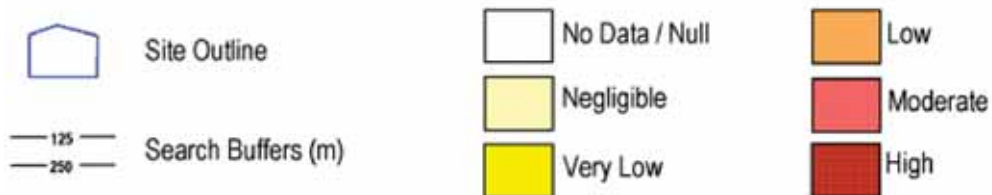


4.4 Compressible Deposits Map

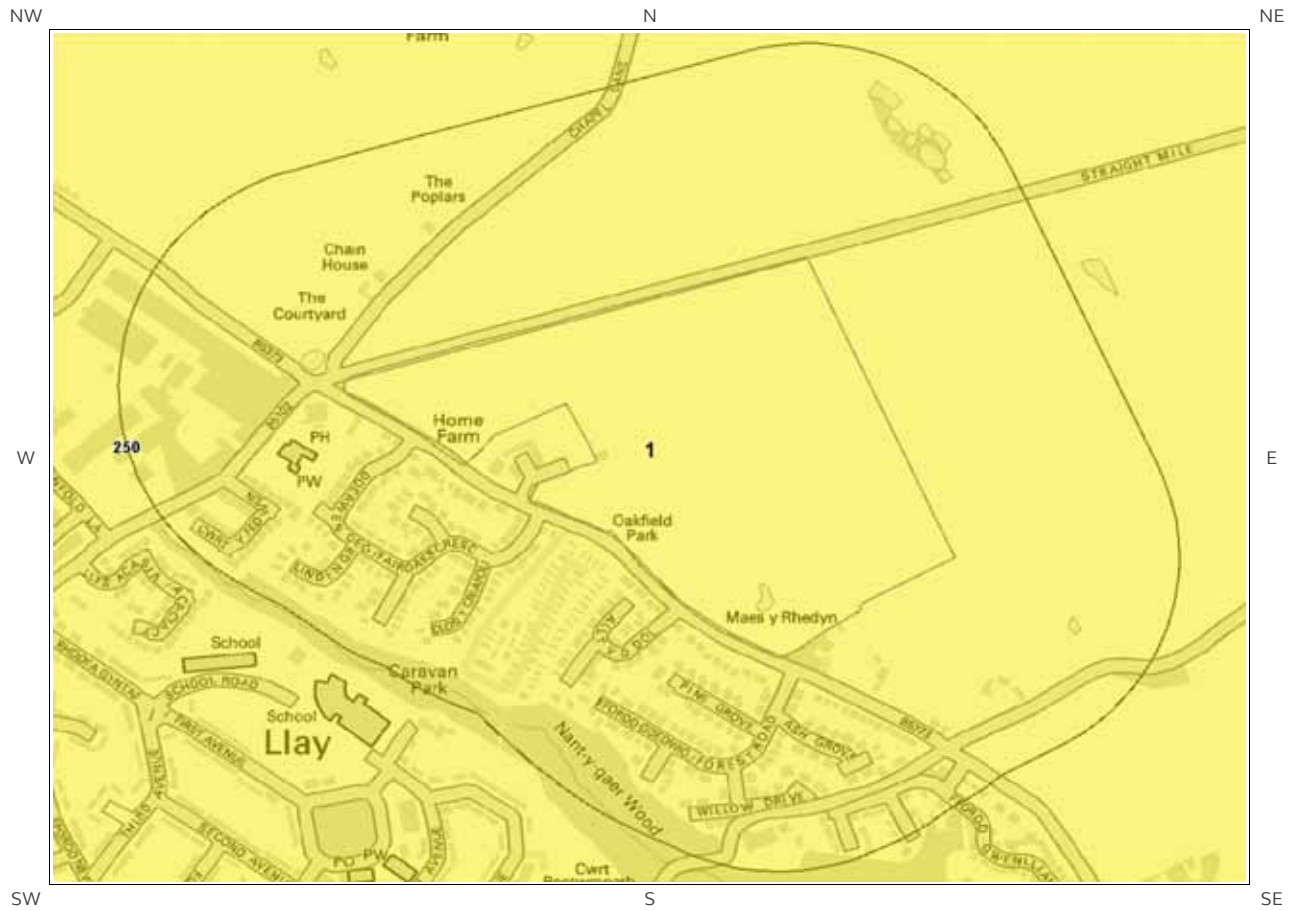


Compressible Deposits Legend

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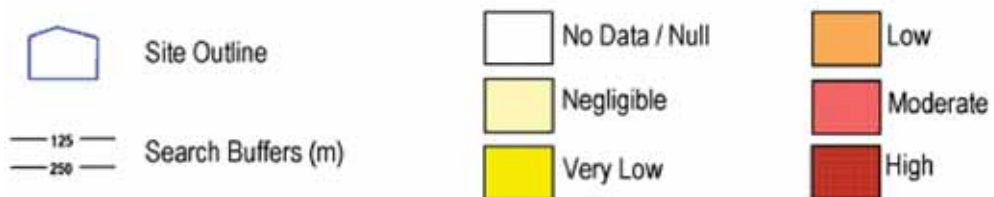


4.5 Collapsible Deposits Map



Collapsible Deposits Legend

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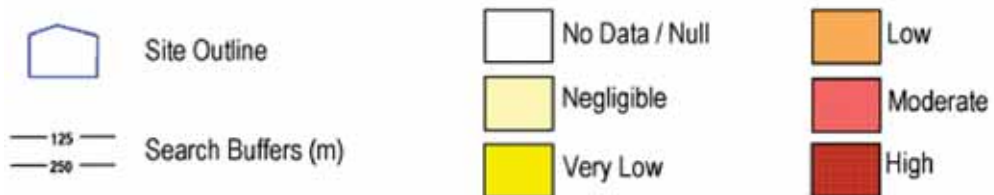


4.6 Running Sand Map



Running Sand Legend

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4 Natural Ground Subsidence

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

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

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

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 due to potential problems with shrink-swell clays.
2	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. 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 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 ground identified. No special actions required to avoid problems due to compressible ground. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible ground.

4.5 Collapsible Deposits

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

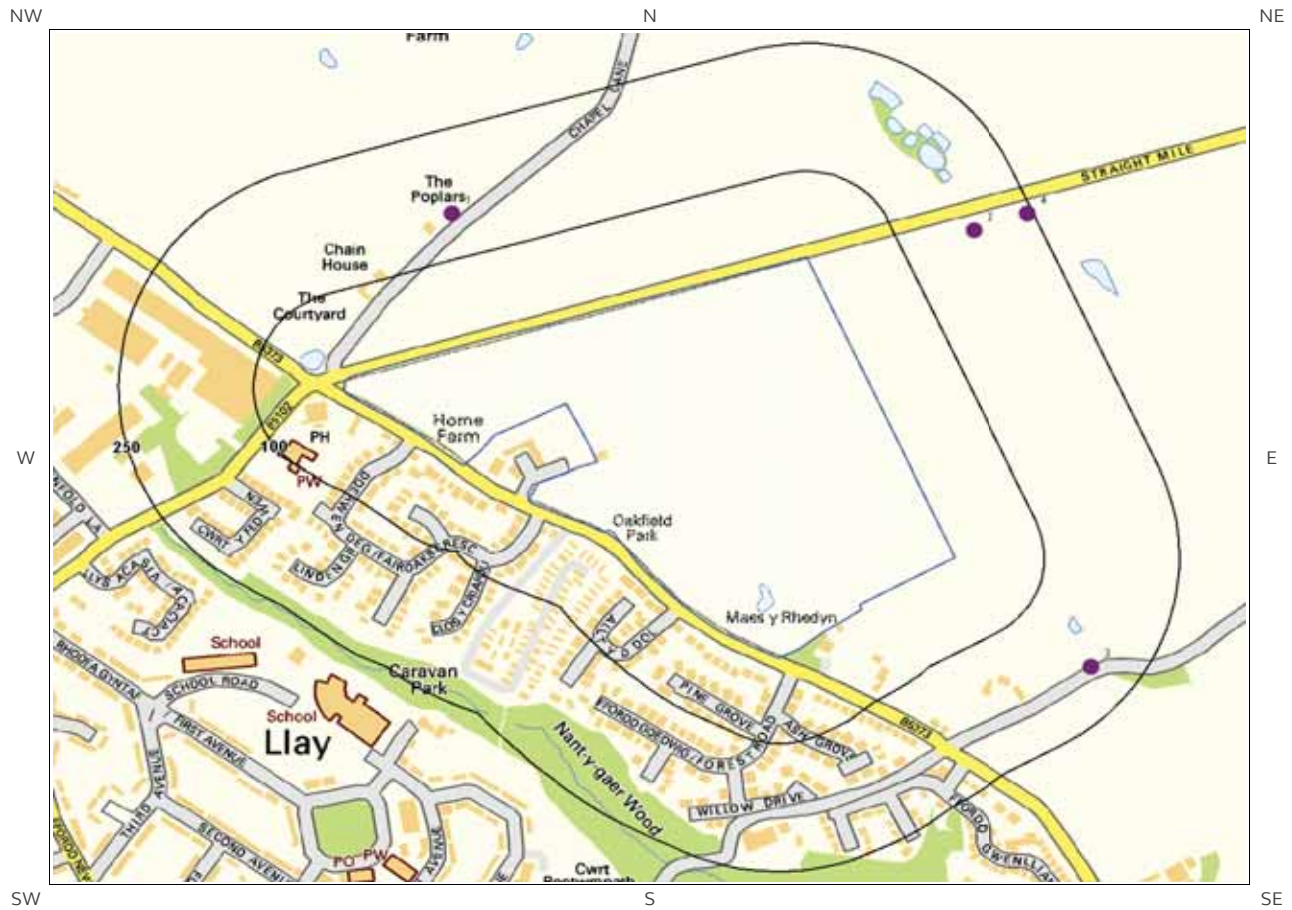
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible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

4

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	152.0	N	333420 356520	SJ35NW43	25.0	LLAY, CHAPEL LANE
2	181.0	NE	334000 356500	SJ35NW9	46.63	LLAY CAE MAWR FARM
3	198.0	SE	334130 355990	SJ35NW48	25.0	LLAY, NEAR THE VADOG
4	244.0	NE	334060 356520	SJ35NW4	256.03	LLAY 2

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

- #1: scans.bgs.ac.uk/sobi_scans/boreholes/154248
- #2: scans.bgs.ac.uk/sobi_scans/boreholes/154213
- #3: scans.bgs.ac.uk/sobi_scans/boreholes/154253
- #4: scans.bgs.ac.uk/sobi_scans/boreholes/154208

6 Estimated Background Soil Chemistry

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

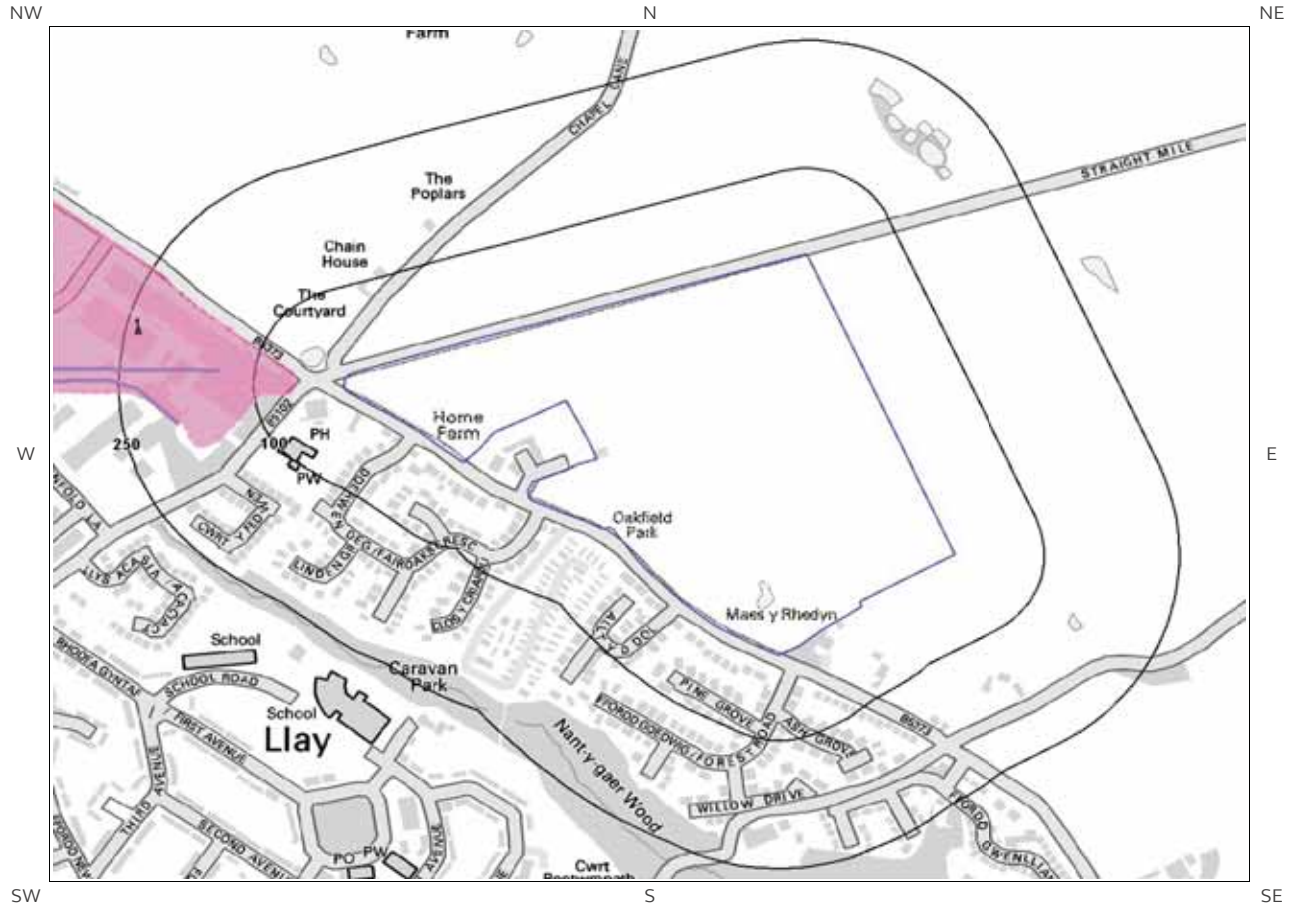
21

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight 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 mg/kg	<100 mg/kg
0.0	On Site	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	S	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
21.0	E	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
30.0	N	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
71.0	SW	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
71.0	SW	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
112.0	N	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
114.0	SE	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
114.0	SE	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
159.0	NE	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
169.0	SW	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
169.0	SW	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
181.0	NE	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
201.0	SW	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
221.0	S	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
224.0	SW	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
224.0	SW	RuSoilExAs	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
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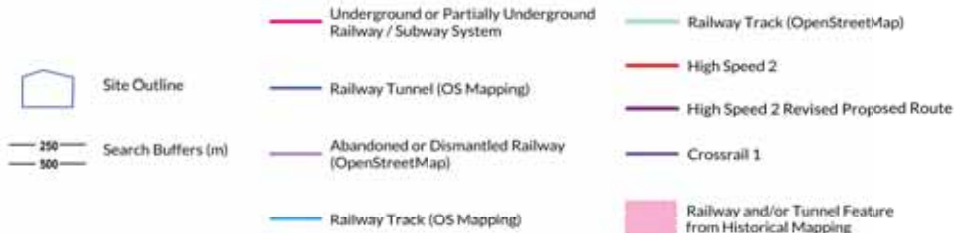
*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

7 Railways and Tunnels Map



Railways and Tunnels Legend

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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? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1	51	W	332792 356529	Railway Sidings	1949
2A	93	W	332543 356423	Railway Sidings	1968
3A	93	W	332543 356423	Railway Sidings	1960
4	97	W	332601 356445	Mineral Railway Sidings	1961
5	136	NW	333113 356378	Railway Sidings	1975

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? Yes

Distance (m)	Direction	Status
139	W	Abandoned
188	W	Abandoned

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 1 .

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 1 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 1 Report.

Crossrail route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

Contact Details



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Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries



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NATURAL ENVIRONMENT RESEARCH COUNCIL

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The Coal Authority

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Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk



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<https://www.gov.uk/government/organisations/public-health-england>
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APPENDIX C

These Ordnance Survey maps are not printed to scale and have been reduced to A4 size

A3 1/10,000 plans are available upon request

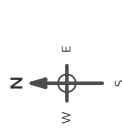


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4 Gresford Road, Llay, LL12
ONW

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Report Ref: CMAPS-CM-605307-30974-070317HIS
Grid Ref: 333640, 356235

Map Name: County Series



Map date: 1872

Scale: 1:10,560

Printed at: 1:10,560 s

Surveyed 1872	
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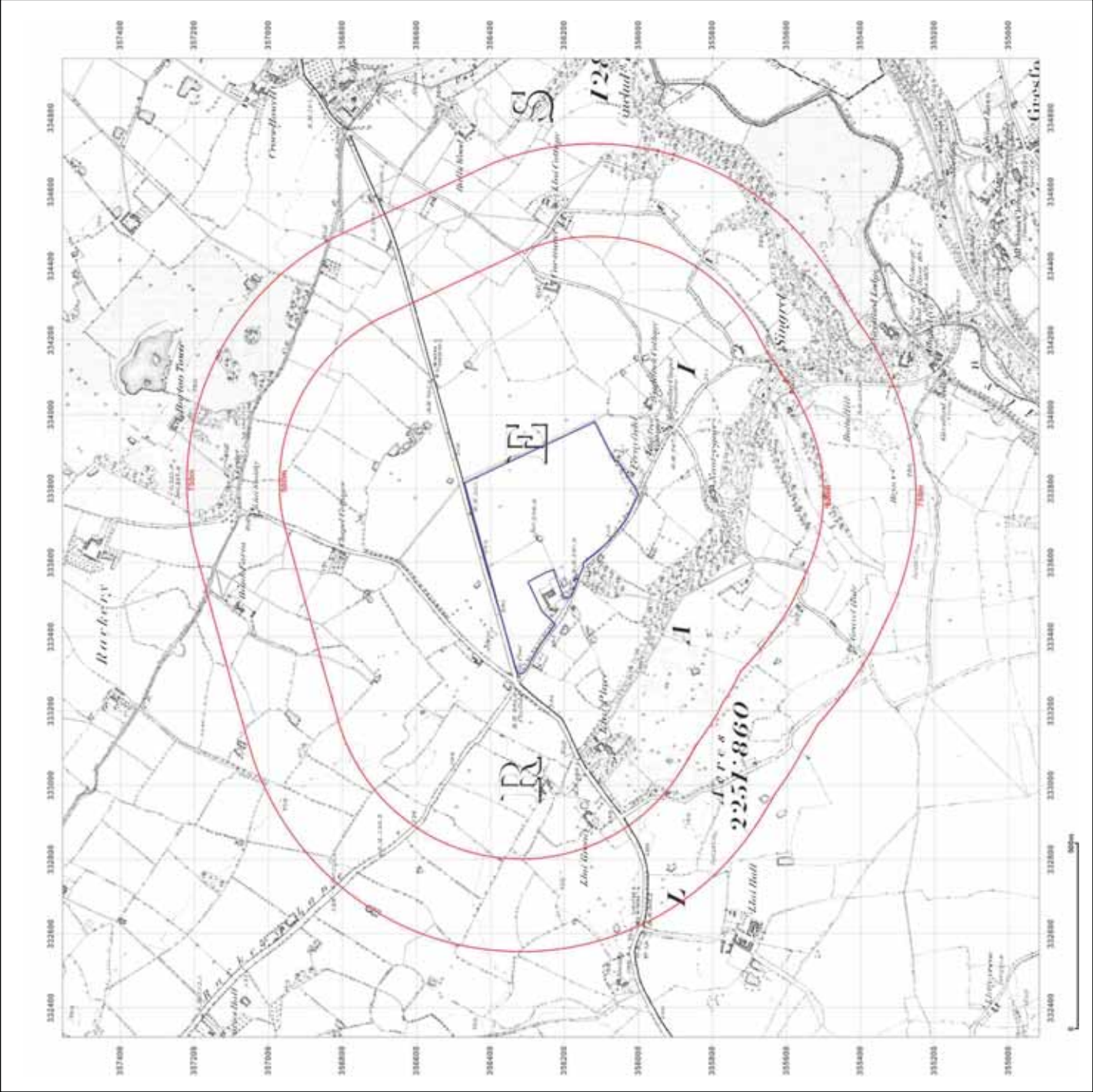
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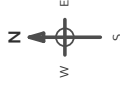
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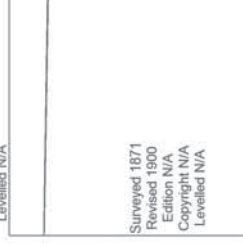
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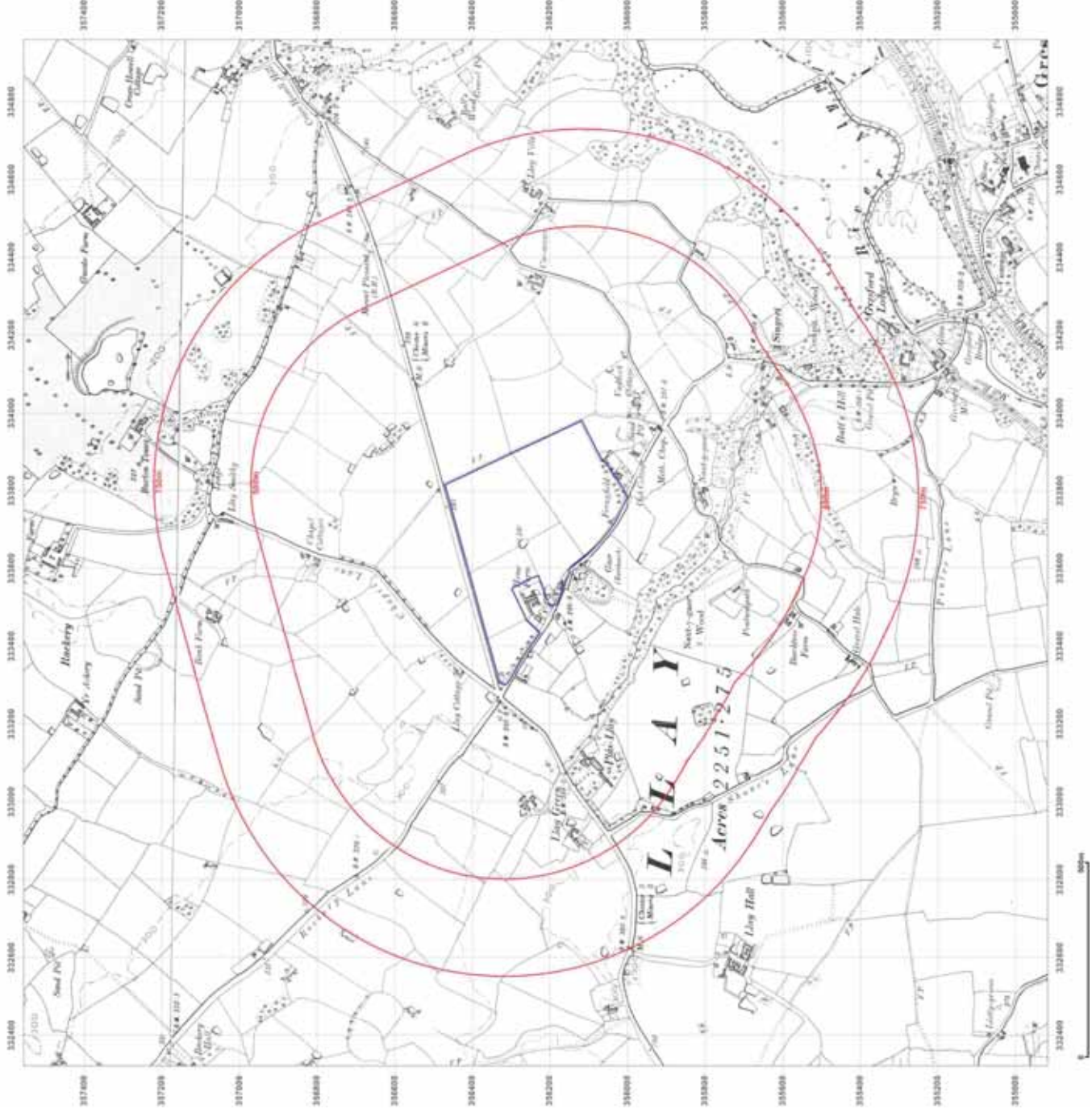


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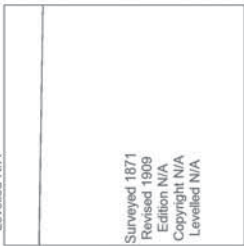
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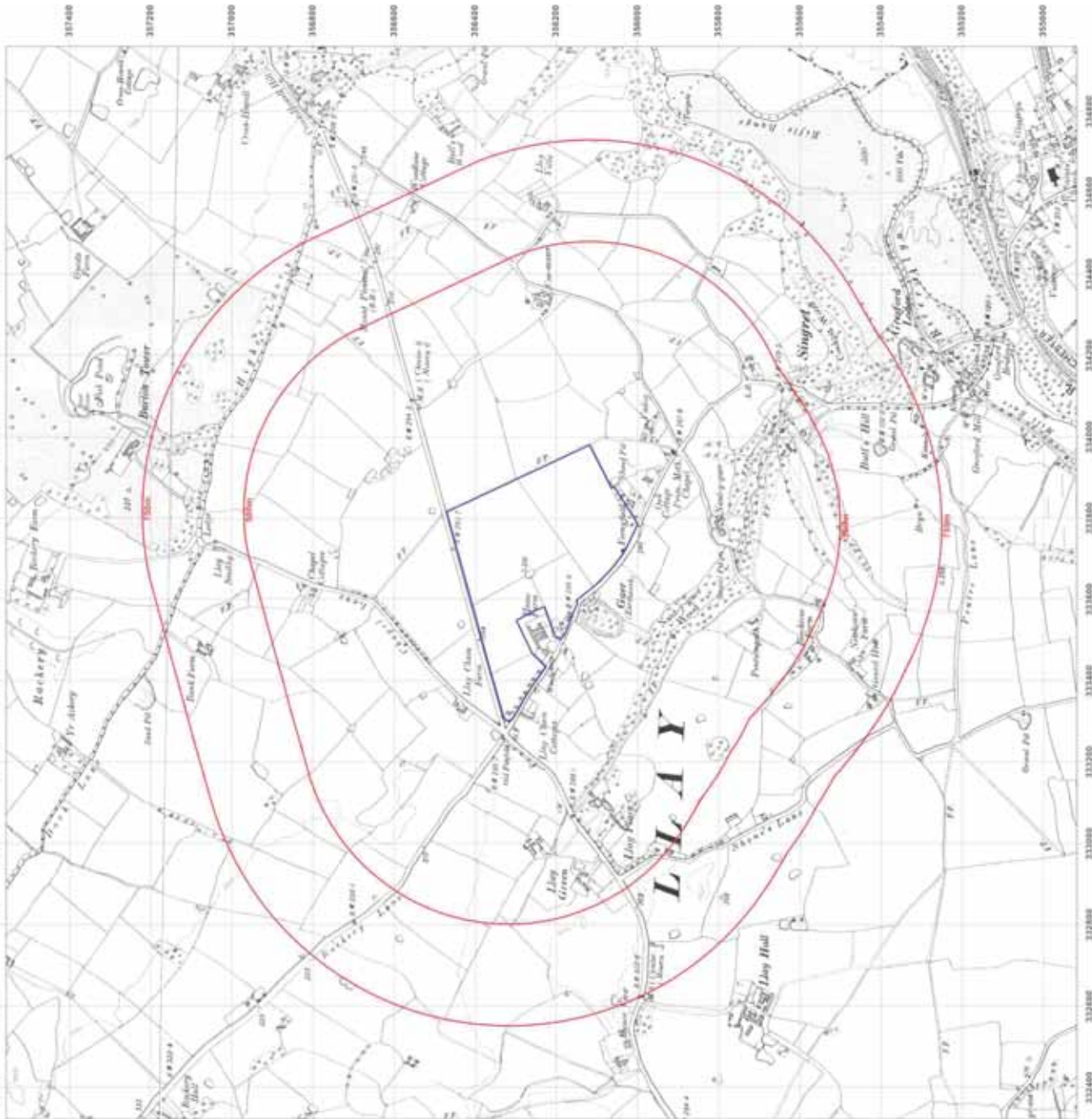


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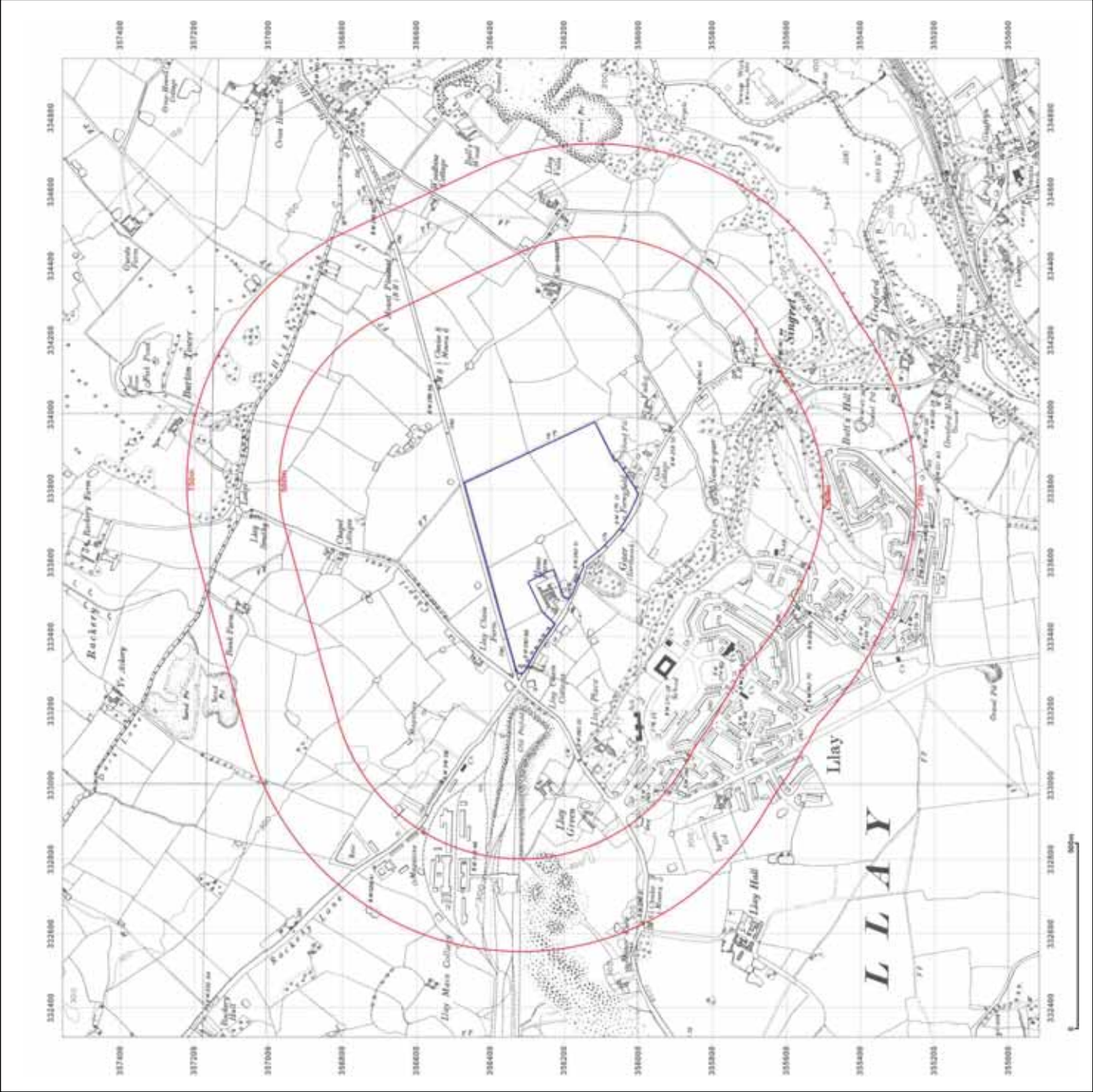


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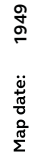
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Map Name: Provisional

Map date: 1960-1964

Scale: 1:10,560

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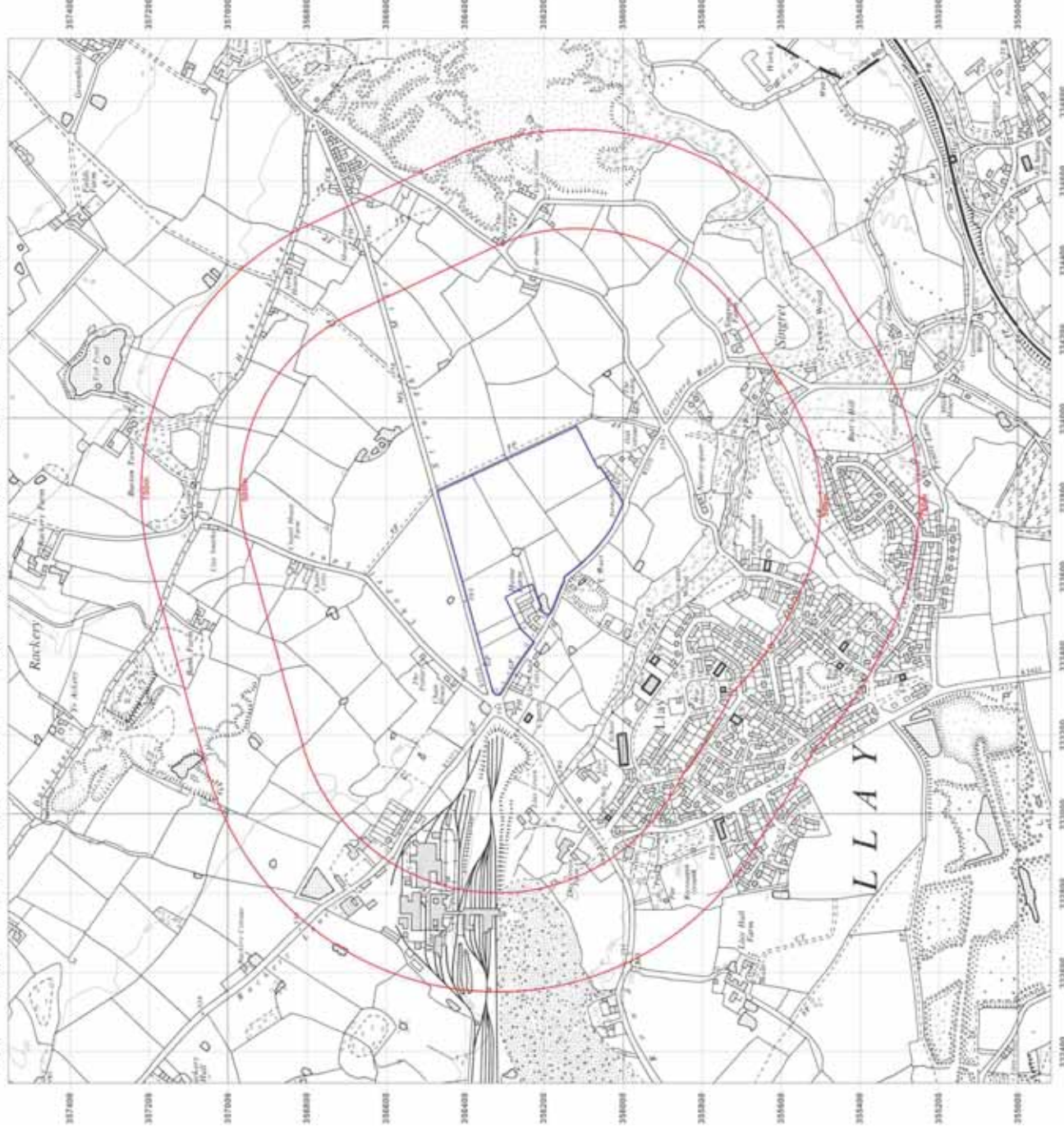


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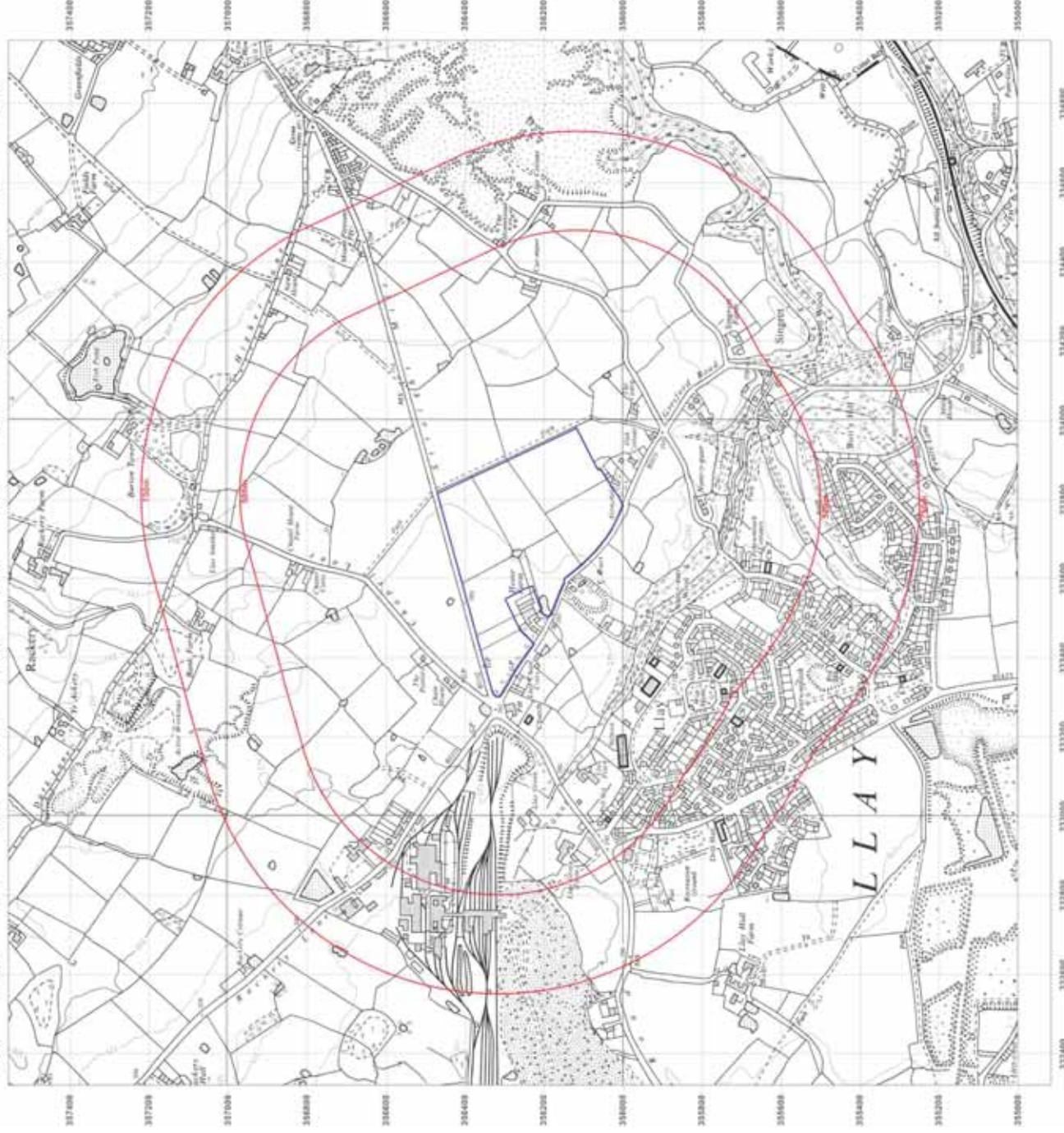


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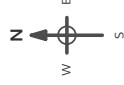
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Grid Ref: 333640, 356235

Map Name: National Grid

Map date: 1980-1981

Scale: 1:10,000

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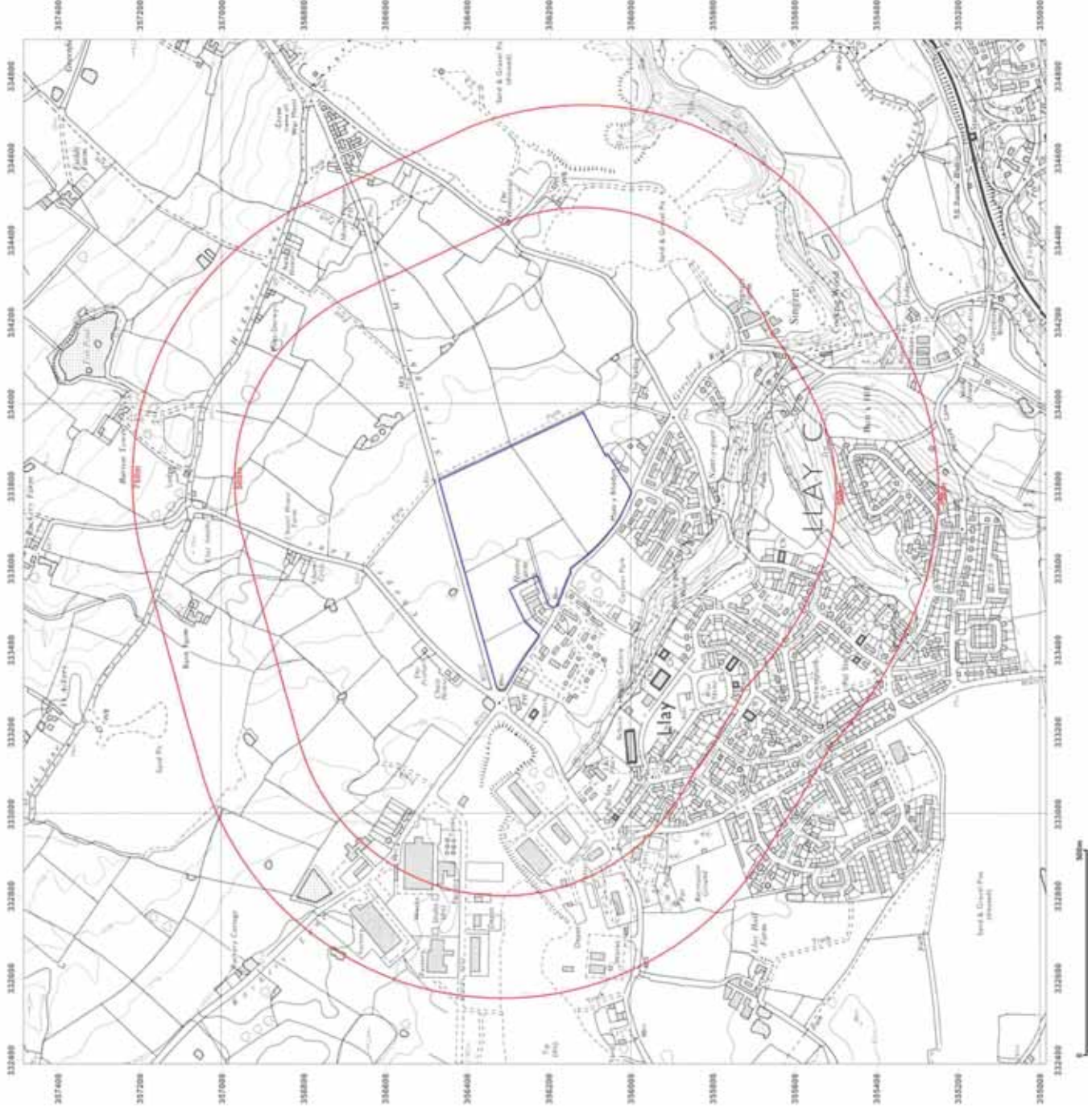


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Client Ref: 30974
Report Ref: CMAPS-CM-605307-30974-070317HIS
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Map Name: National Grid

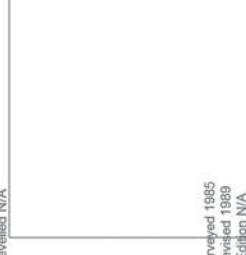
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Revised 1989
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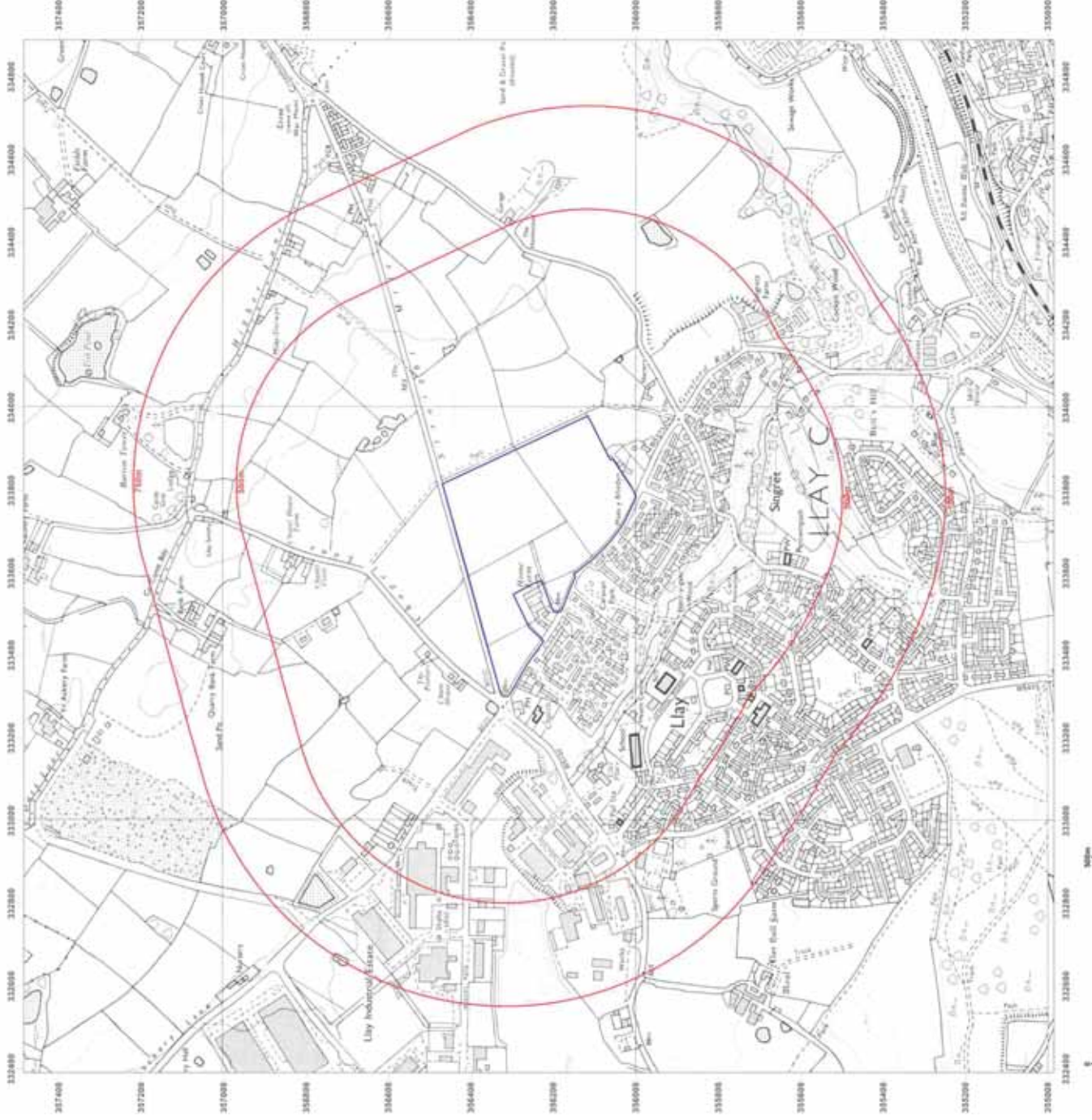


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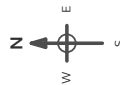
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Grid Ref: 333640, 356235

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2002



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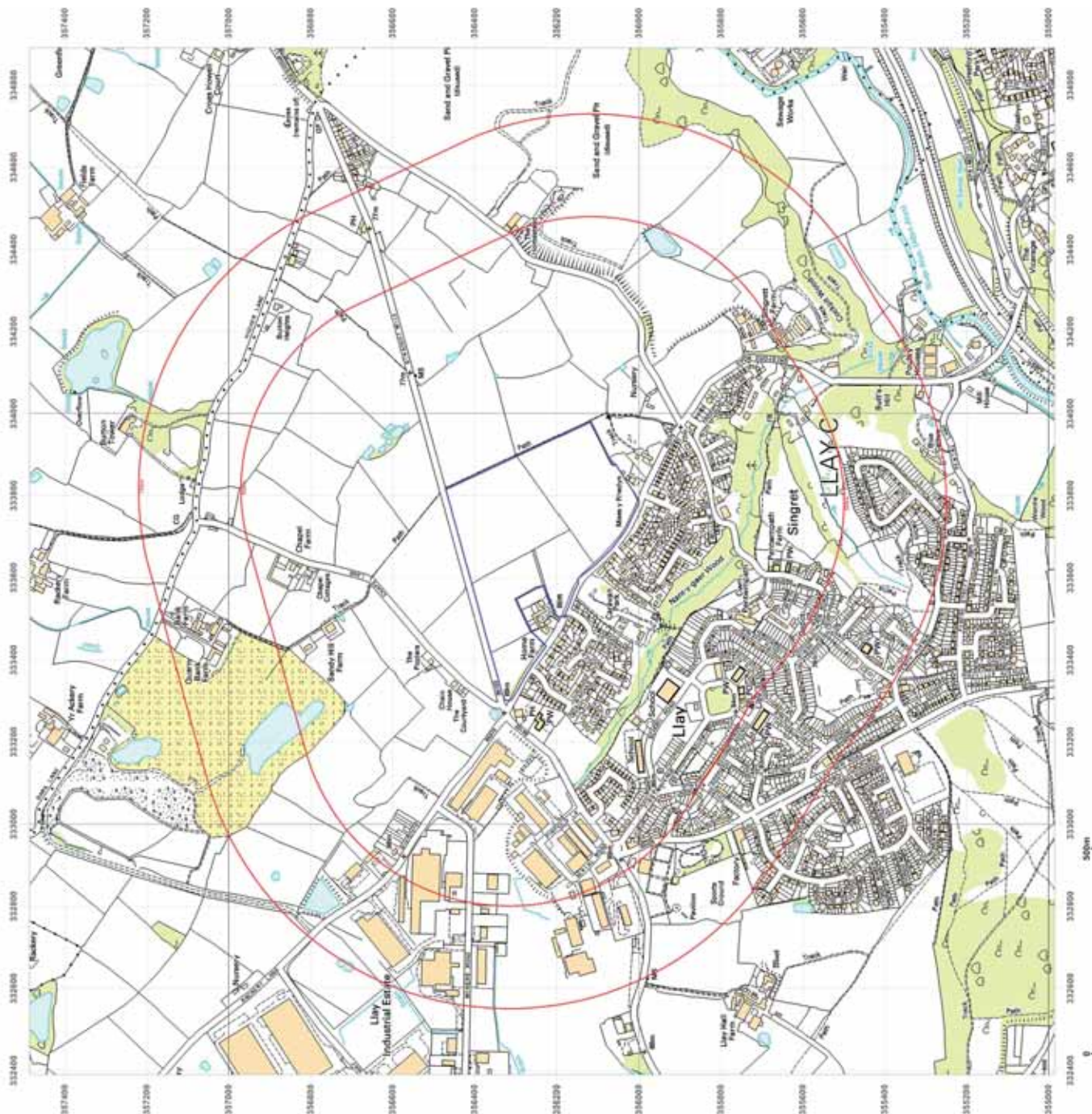


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Grid Ref: 333640, 356235

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

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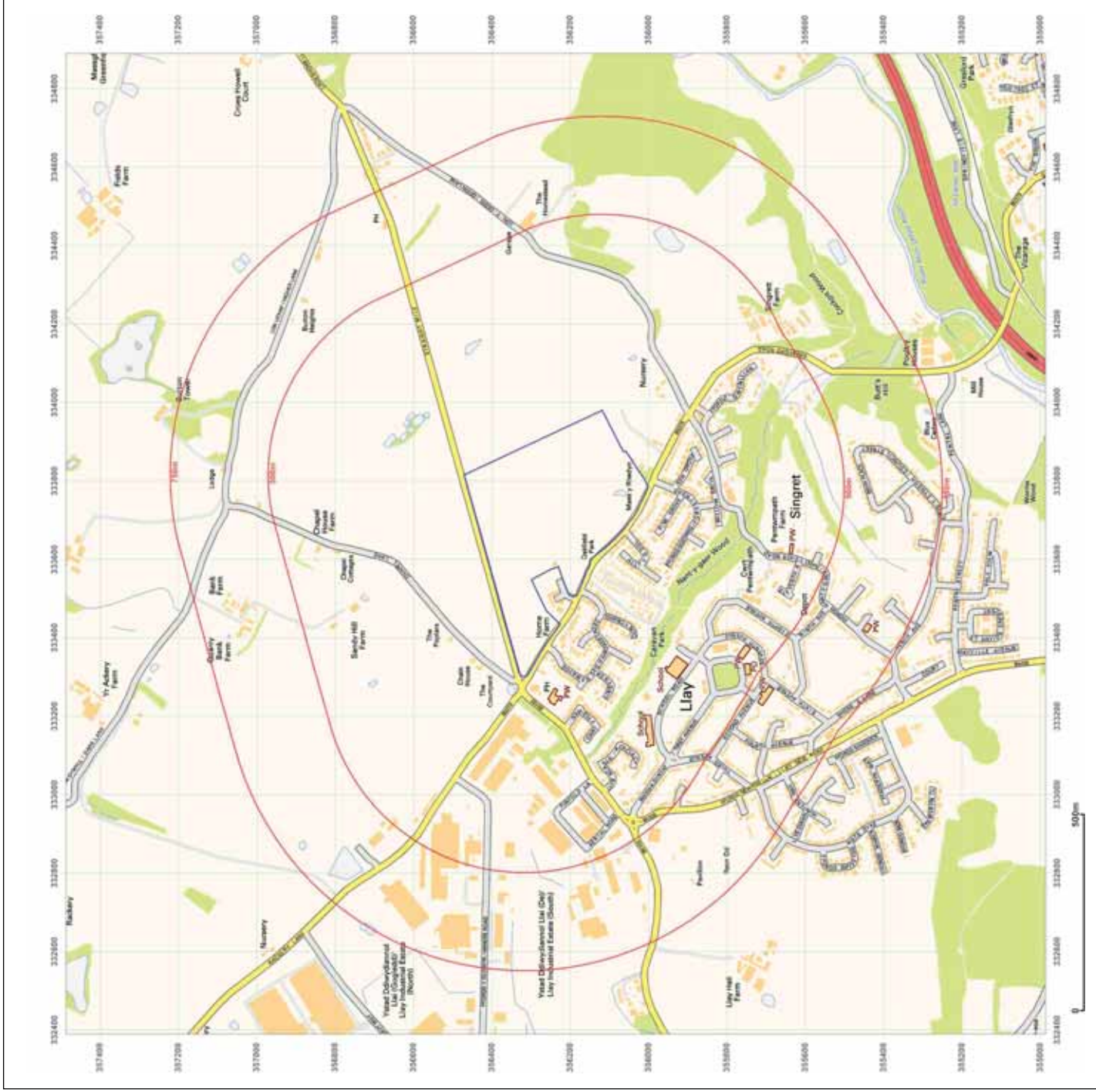


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ONW

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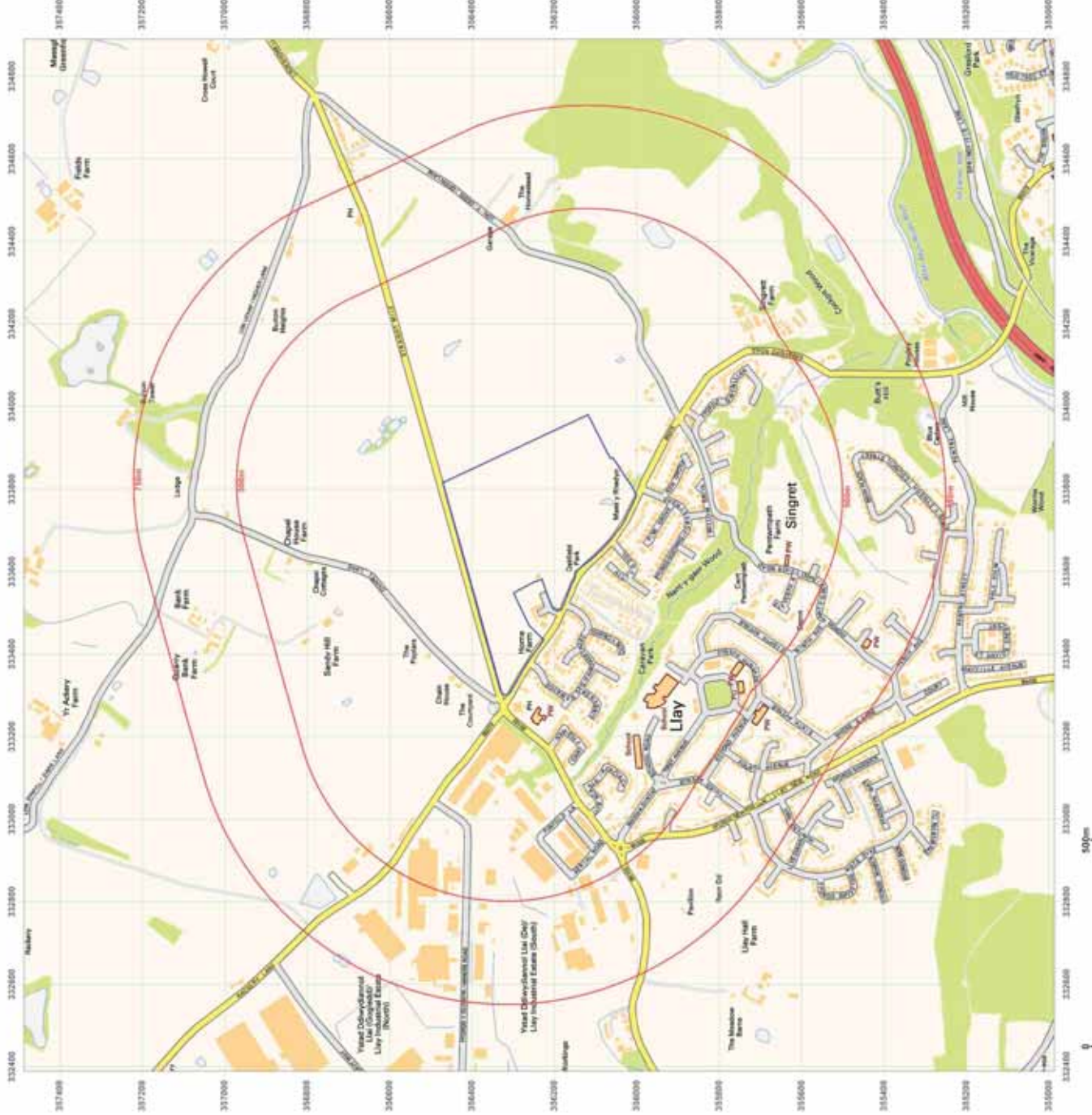


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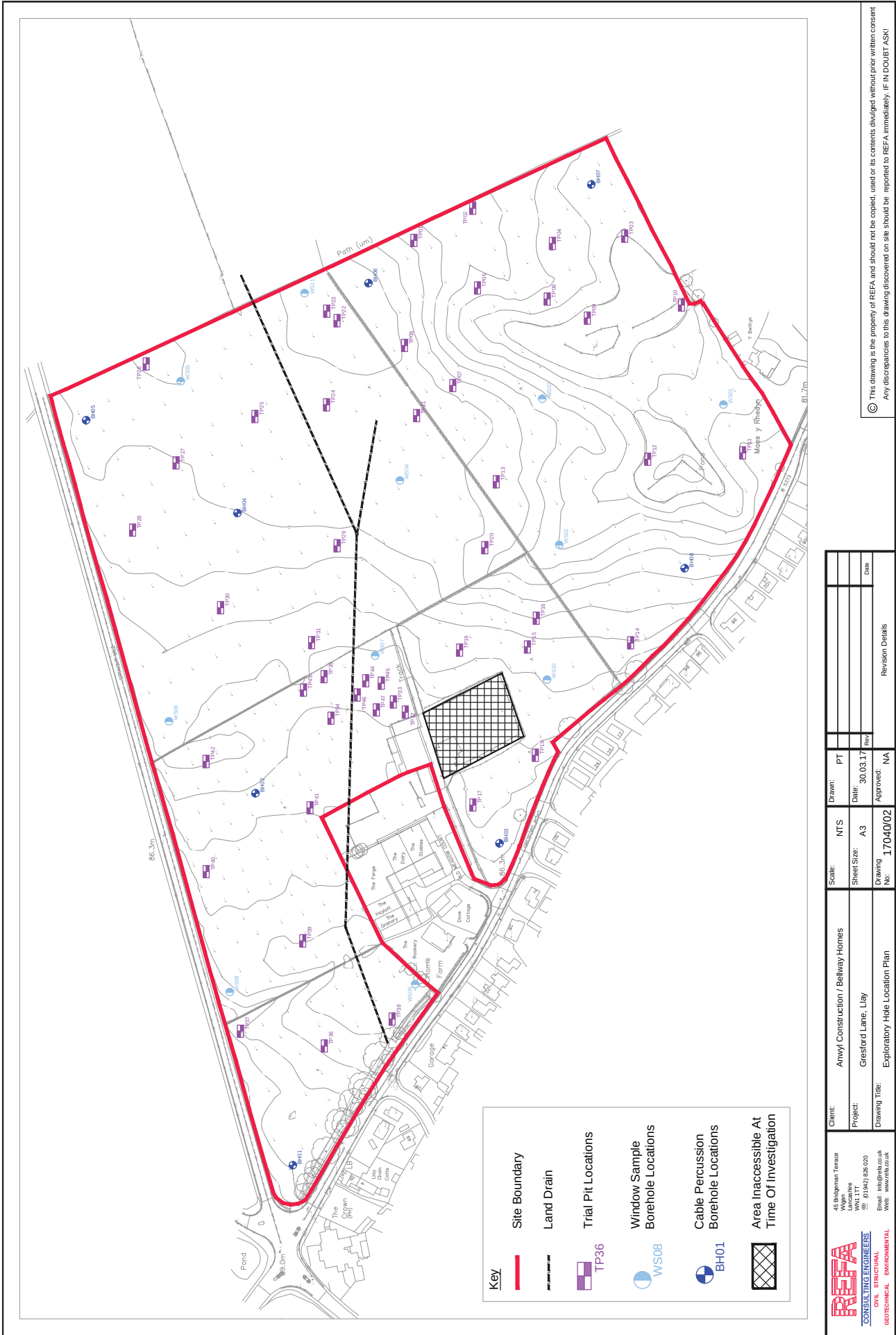
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APPENDIX D



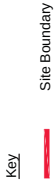
APPENDIX E



REFA CONSULTING ENGINEERS CIVIL & STRUCTURAL GEOTECHNICAL & ENVIRONMENTAL	45 Bridgman Terrace Wigan WV9 3TF		Drawn: PT	
	Tel: 01942 638 020		Date: 13.03.17	
	Email: info@refa.co.uk		Approved: NA	
	Web: www.refa.co.uk		Revision Details	
Client: Anyvi Construction / Bellway Homes Ltd		Scale: NTS	Drawing No: 17040/01	
Project: Gresford Lane, Llay		Sheet Size: A3	Revision	
Drawing Title: Walk Over Survey		Drawing No:	Date	

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APPENDIX F



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APPENDIX G

Site Walkover Photographs



Photo 1: General view north-east along Straight Mile Road from the junction of Gresford Rd and Straight Mile Road



Photo 2: General view south-east along Gresford Road from the junction of Gresford Road and Straight Mile Road

Area 1

Photo 3: General view north-west from the south eastern corner of area 1



Photo 4 – View of a drainage ditch along the southwestern boundary of the site in area 1



Photo 5 – General view north-west of area 1



Photo 6 – General view south-east of area 1

Area 2

Photo 7 – General view north of area 2



Photo 8 – General view east of area 2



Photo 9 – View of barn conversions which back onto area 2 from the east



Photo 10 – View of manhole in western end of area 2 and gate leading to area 1



Photo 11 – General view south of area 2 with barn conversions in the distance



Photo 12 – General view north east of area 2



Photo 13 – General view south west of area 2



Photo 14 – General view north west of area 2

Area 3

Photo 15 – General view north of area 3



Photo 16 – General view south of area 3



Photo 17 – General view south-west of area 3



Photo 18 – General view north-east of area 3 with a patch of water-logged ground in the foreground

Area 4

Photo 19 – View of gate leading from area 3 into area 4



Photo 20 – General view north of area 4



Photo 21 – General view west of area 4 showing a patch of water-logged ground in the foreground



Photo 22 – View of manhole in patch of waterlogged ground in area 4



Photo 23 – General view south of area 4



Photo 24 – General view west of area 4 showing a pond in the foreground



Photo 25 – View of manhole in pond in area 4



Photo 26 – General view east of area 4

Area 5

Photo 27 – General view north of area 5 showing area of concrete hardstanding for agricultural stores in the background



Photo 28 – General view east of area 5



Photo 29 – View of animal feeding trough in area 5



Photo 30 – View of tree lined bund which runs along the side of the area of agricultural storage yard



Photo 31 – General view west of area 5



Photo 32 – General view south-east of area 5



Photo 33 – View south of agricultural storage yard showing mounds of stockpiled manure



Photo 34 – View north east of agricultural storage yard showing stockpiled silage and farm machinery



Photo 35 – View north of stockpiled materials to the rear of silage bales



Photo 36 – View north of stockpiled wood and farm machinery in the agricultural storage yard



Photo 37 – View south of bund which runs along eastern edge of agricultural storage yard



Photo 38 – View north of cow shed on the norther edge of the agricultural storage yard



Photo 39 – View north-east of track which leads to area 3

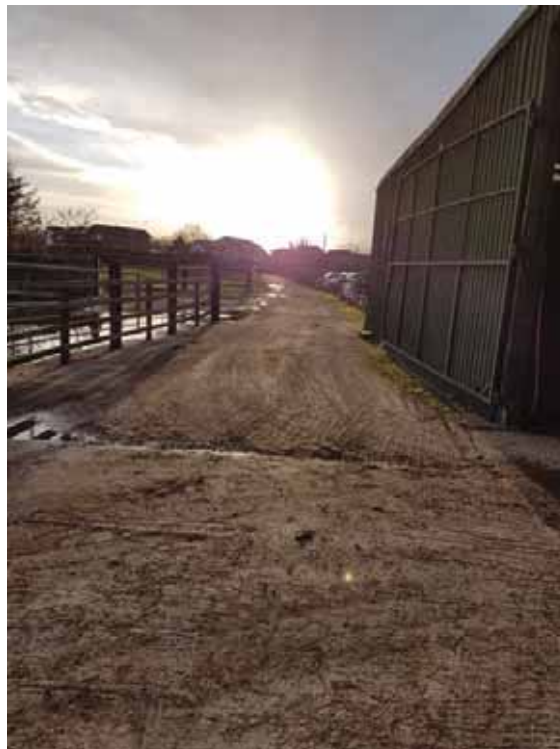


Photo 40 – View south-west of track which leads to Gresford Road



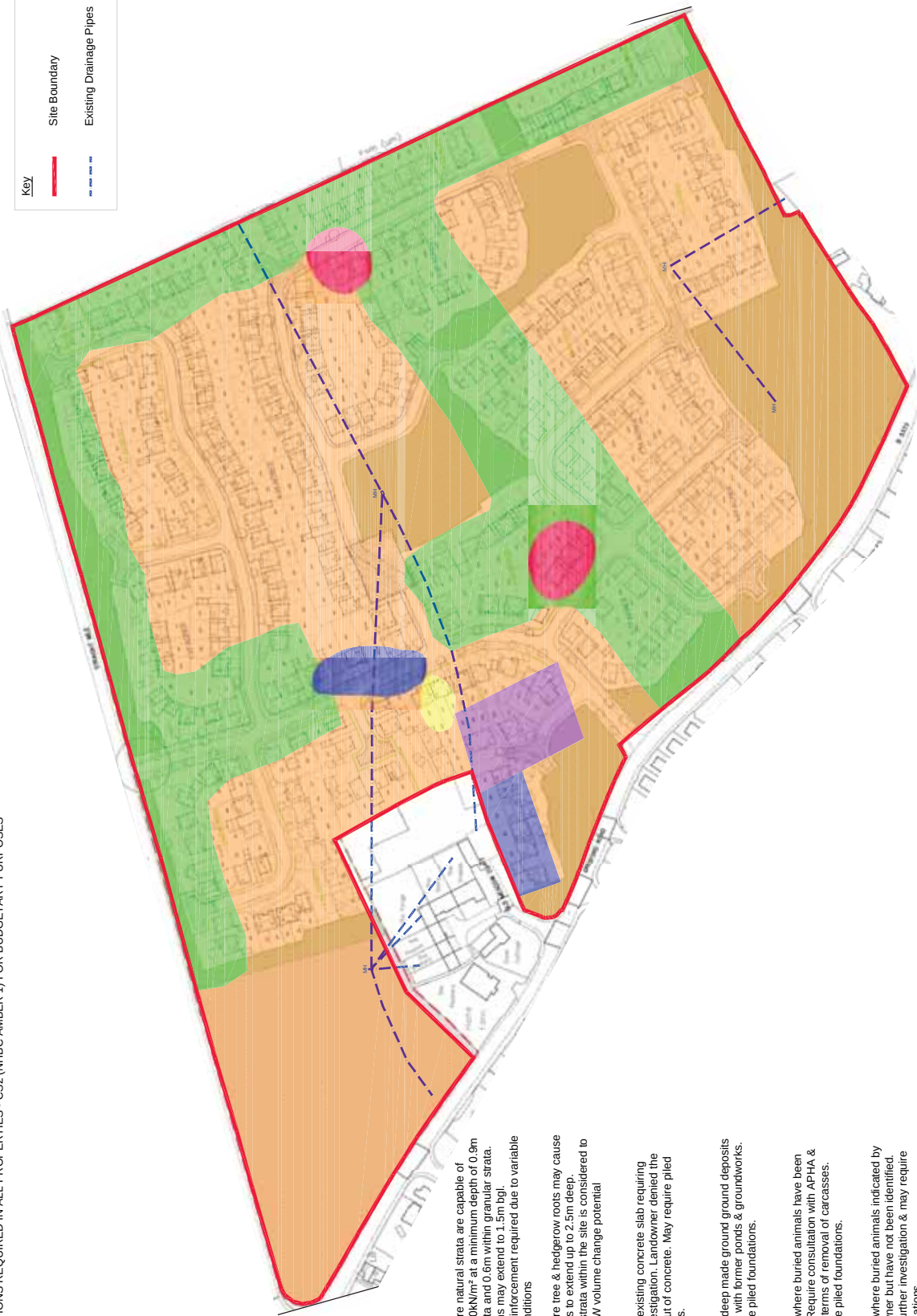
Photo 41 – View of former vehicle repair workshop on across Gresford Road from the southwestern site boundary

APPENDIX H

Key

Site Boundary

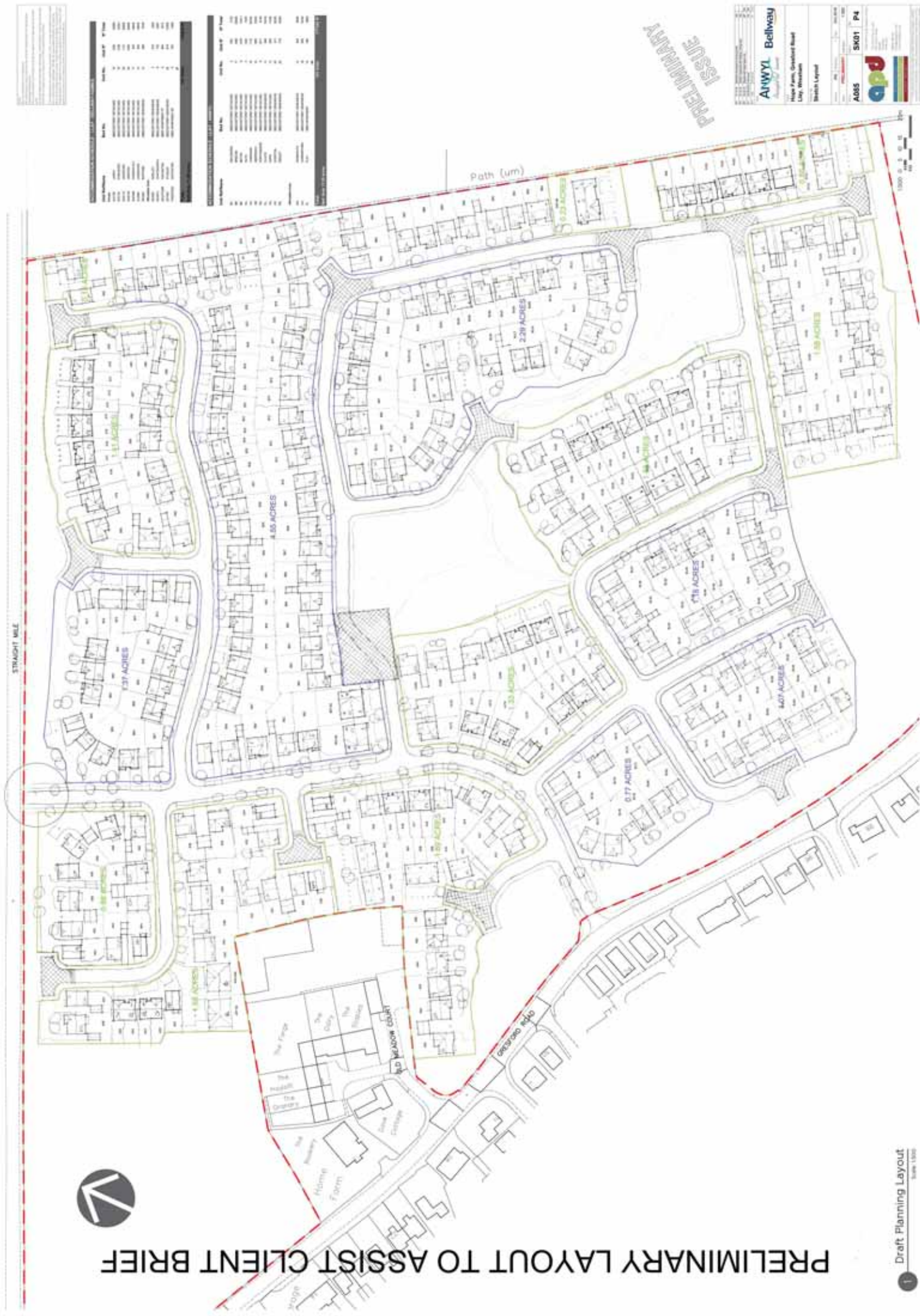
Existing Drainage Pipes



- Areas where natural strata are capable of offering 100kNm² at a minimum depth of 0.9m in clay strata and 0.6m within granular strata. Foundations may extend to 1.5m bgl. Nominal reinforcement required due to variable ground conditions
- Areas where tree & hedgerow roots may cause foundations to extend up to 2.5m deep. Cohesive strata within the site is considered to have a LOW volume change potential
- Locality of existing concrete slab requiring further investigation. Landowner denied the breaking out of concrete. May require piled foundations.
- Locality of deep made ground ground deposits associated with former ponds & groundworks. May require piled foundations.
- Locality of where buried animals have been identified. Require consultation with APHA & duty vet in terms of removal of carcasses. May require piled foundations.
- Locality of where buried animals indicated by the landowner but have not been identified. Requires further investigation & may require piled foundations

REFACONSULTING ENGINEERS CIVIL STRUCTURAL GEOTECHNICAL ENVIRONMENTAL 45 Bridgeman Terrace Wigan Lancashire WN1 1TF ☎ 01942 338 020 Email: info@refa.co.uk Web: www.refa.co.uk	Client: Anywl Construction / Bellway Homes Ltd		Scale: NTS	Drawn: PT		
	Project: Gresford Lane, Llay		Sheet Size: A3	Date: 30.03.17		
	Drawing Title: Development Constraints Plan					
			Drawing No: 17040/03	Approved: NA	Revision Details	
						Page

APPENDIX I



APPENDIX J



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Trial Pit Log

Trialpit No

TP01

Sheet 1 of 1

Project Name: Gresford Rd. LLay

Project No.
17040

Co-ords: 333914.18 - 356239.83
Level: 81.92

Date
13/03/2017

Location: Gresford Rd, LLay

Dimensions (m): 2.4

Scale

1:25

Client: Bellway/Anwyl Construction Ltd

Depth
2.00

0.7

Logged
NRBA

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES					TOPSOIL: Brown silty sandy clay and rootlets	
				0.30	81.62		Soft light brown slightly gravelly sandy CLAY with low cobble content. Cobbles are rounded.	
				0.70	81.22		Reddish brown clayey gravelly SAND. Sand is fine to medium. Gravel is fine to coarse and angular to rounded. Occasional angular cobbles of blackish brown mudstone.	1
				1.70	80.22		Orangish light brown clayey SAND. Sand is fine to medium with low cobble content. Cobbles are angular to subrounded and of mixed lithologies.	
				2.00	79.92		End of pit at 2.00 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

AGS



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Trial Pit Log

Trialpit No

TP02

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333934.64 - 356202.38 Level: 81.37	Date 13/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.2 Depth 2.30		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged NRBA

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.30	81.07		TOPSOIL: Brown silty slightly sandy clay and rootlets.	
	0.40	D	HVP=78	0.50	80.87		Firm to stiff yellowish light brown slightly gravelly sandy CLAY. Gravel is medium to coarse and is subrounded to rounded.	
	1.00	D	HVP=75	1.50	79.87		Firm to stiff reddish dark brown sandy gravelly CLAY. Sand is fine. Gravel is fine to medium, angular to rounded and includes small fragments of coal.	1
				2.00	79.37		Stiff and friable reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium and is angular fragments of coal. No HVP possible - too friable.	2
				2.30	79.07		Orangish brown slightly gravelly SAND. Sand is fine to coarse with occasional pockets of stiff clay. Gravel is fine to medium and angular fragments of coal.	3
							End of pit at 2.30 m	4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP03

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333916.85 - 356105.56 Level: 79.62	Date 13/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.6 Depth 1.80		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged NRBA

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.40	79.22		TOPSOIL: Dark brown silty clay and rootlets.	
				0.60	79.02		Light brown fine to medium SAND. Low cobbles content. Cobbles are rounded and of mixed lithologies.	
	0.80	D	HVP=116	1.10	78.52		Stiff grey and brown mottled slightly gravelly CLAY. Gravel is sub-angular to rounded.	1
	1.30	D	HVP=92	1.80	77.82		Stiff light brown slightly sandy gravelly CLAY. Gravel is angular to rounded.	2
							End of pit at 1.80 m	3
								4
								5

Remarks: No groundwater encountered. Land drain noted at 0.5m depth.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP04

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333912.23 - 356151.61 Level: 80.41	Date 13/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.4 Depth 2.30		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged NRBA

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
			HVP=97	0.40	80.01		TOPSOIL: Brown silty sandy clay and rootlets	
							Firm to stiff grey and brown gravelly sandy CLAY. Sand is fine to medium. Gravel is angular to subrounded with occasional rounded cobbles of mixed lithologies.	
			HVP=104	1.00	79.41		Stiff light brown and grey very sandy very gravelly CLAY with occasional pockets of fine orange sand. Gravel is medium to coarse and is very angular to rounded and includes fragments of black coal and brown mudstone.	1
				1.70	78.71		Grey and orange SAND. Sand is fine to medium. Occasional pockets of firm to stiff clay.	2
				2.30	78.11	End of pit at 2.30 m		3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP05

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333884.15 - 356198.94 Level: 80.68	Date 13/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): Depth 1.90		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
			HVP=89	0.40	80.28		TOPSOIL: Brown silty slightly sandy clay and rootlets.	
				0.60	80.08		Firm to stiff yellowish light brown very sandy very gravelly CLAY with occasional cobbles. Sand is fine to medium. Gravel is fine to coarse and angular to subrounded.	
				1.50	79.18		Stiff brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse and angular to subrounded. Low cobble content and are subangular to rounded.	1
				1.90	78.78		Reddish brown stiff and friable sandy very gravelly CLAY. Gravel is angular to rounded and includes fragments of black and brown mudstone.	
							End of pit at 1.90 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability:

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Trial Pit Log

Trialpit No

TP06

Sheet 1 of 1

Project Name: Gresford Rd, L Lay	Project No. 17040	Co-ords: 333847.27 - 356245.79 Level: 83.14	Date 13/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.8 Depth 1.60		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged NRBA

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES					TOPSOIL: Brown silty slightly sandy clay and rootlets.	
			HVP=81	0.35	82.79		Firm to stiff orangish light brown very sandy gravelly CLAY. Gravel is angular to subrounded and includes angular fragments of black coal.	
			HVP=107	0.70	82.44		Stiff to very stiff orangish red very sandy very gravelly CLAY. Sand is fine to medium. Gravel is sub-angular to well rounded. Medium cobble content. Cobbles are well rounded.	1
				1.60	81.54		End of pit at 1.60 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP07

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333834.64 - 356199.25 Level: 81.26	Date 13/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): Depth 2.90		Scale 1:25
Client: Bellway/Anwyl Construction Ltd	2.6 0.7		Logged NRBA

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	ES		0.30	80.96		TOPSOIL: Dark brown silty clay and rootlets.	1
							Fine orangish red SAND. Sand is fine to coarse.	
				1.50	79.76		Reddish brown gravelly clayey SAND. Sand is fine to coarse. Gravel is fine to coarse and angular to rounded.	2
				2.90	78.36		End of pit at 2.90 m	3
								4
								5

Remarks: Groundwater strike at 1.3m depth. Slow rate of infiltration.

Stability: Pit collapse 0.4 -1.2m depth

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Trial Pit Log

Trialpit No

TP08

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333868.96 - 356152.38 Level: 79.72	Date 13/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.4 Depth 3.20		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged NRBA

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.60	D	HVP=120	0.40	79.32		TOPSOIL: Light brown silty sandy clay and rootlets	
				0.80	78.92		Stiff grey sandy gravelly CLAY with medium cobble content. Gravel is fine to coarse and sub-angular to well rounded and includes fragments of black coal and brown and grey mudstone.	
	1.00	D	HVP=101				Stiff greyish brown gravelly CLAY with pockets of whitish grey fine to medium SAND. Medium content of large angular cobbles.	1
				1.90	77.82		Fine red SAND.	2
				2.10	77.62		Fine brown SAND.	
				3.20	76.52	End of pit at 3.20 m		3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP09

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333856.19 - 356138.22 Level: 79.21	Date 13/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.3 Depth 1.90		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged NRBA

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼	0.20	ES	HVP=47				TOPSOIL: Dark brown silty clay and rootlets.	
				0.60	78.60		Firm grey sandy CLAY. Sand is fine to medium.	1
				1.80	77.40		Fine brown SAND.	
				1.90	77.31		End of pit at 1.90 m	2
								3
								4
								5

Remarks: Groundwater strike at 0.9m depth. Slow rate of infiltration.

Stability: Pit collapse 0.1 - 1.8m depth.

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Trial Pit Log

Trialpit No

TP10

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333873.01 - 356069.45 Level: 79.53	Date 13/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.4 Depth 1.80		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged NRBA

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.50	79.03		TOPSOIL: Light brown silty clay and rootlets.	
	1.00	D	HVP=109				Stiff grey gravelly CLAY. Gravel is very angular to subrounded. Low cobble content. Cobbles are rounded.	1
	1.40	D	HVP=99	1.20	78.33		Stiff brownish grey slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is sub-angular to rounded with low cobble content. Cobbles are angular to rounded.	
				1.80	77.73		End of pit at 1.80 m	2
								3
								4
								5

Remarks: No groundwater encountered. Land drain noted at 0.4m depth.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP11

Sheet 1 of 1

Project Name: Gresford Rd. L Lay

Project No.
17040

Co-ords: 333778.87 - 356030.50
Level: 81.29

Date
14/03/2017

Location: Gresford Rd, L Lay

Dimensions (m): 2.2

Scale
1:25

Client: Bellway/Anwyl Construction Ltd

Depth
1.70

0.7

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.30	80.99		TOPSOIL: Dark brown very clayey fine sand with rootlets	
							Stiff brown sandy CLAY. Sand is fine.	
	1.00	D	HVP=95					1
			HVP=127					
				1.70	79.59		End of pit at 1.70 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

AGS



Trialpit No

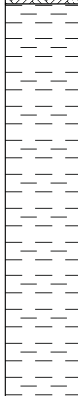
Sheet 1 of 1

Date
14/03/2017

Scale

MO

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	1.00	D	HVP=144	0.50	79.57		TOPSOIL: Dark brown very clayey fine sand with rootlets	1
			HVP=175				Firm to very stiff brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse angular to sub rounded and of mixed lithologies.	
			HVP=187	1.90	78.17		End of pit at 1.90 m	
								3
								4
								5

Remarks:	No groundwater encountered.
----------	-----------------------------

Stability: Pit Stable





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Trial Pit Log

Trialpit No

TP13

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333749.00 - 356181.94 Level: 82.50	Date 14/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.2 Depth 2.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.40	82.10		TOPSOIL: Dark brown very clayey fine sand with rootlets	
			HVP=95				Firm to very stiff brown slightly gravelly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	1
			HVP=144					
			HVP=144					2
	2.50	D	HVP=162	2.50	80.00		End of pit at 2.50 m	3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP14

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333657.86 - 356101.76 Level: 83.71	Date 14/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.2 Depth 2.20		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30	83.41		TOPSOIL: Dark brown very clayey fine sand with rootlets	
			HVP=92				Firm to stiff brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	1
	2.00	D	HVP=120					
			HVP=70	2.20	81.51			2
							End of pit at 2.20 m	
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP15

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333655.28 - 356167.54 Level: 83.87	Date 14/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.4 Depth 2.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES					TOPSOIL: Dark brown very clayey fine sand with rootlets	
				0.30	83.57		Firm to stiff brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	
			HVP=104					1
			HVP=110					
			HVP=123					2
			HVP=126	2.50	81.37		End of pit at 2.50 m	3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP16

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333673.58 - 356161.85 Level: 83.14	Date 14/03/2017
Location: Gresford Rd, LLay		Dimensions (m): 2.2 Depth 3.70	Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.50	82.64		TOPSOIL: Dark brown very clayey fine sand with rootlets	
			HVP=70				Firm to stiff brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	1
			HVP=83					
			HVP=135					2
			HVP=129					
				3.70	79.44		End of pit at 3.70 m	3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP17

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333554.58 - 356202.26 Level: 85.00	Date 14/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.2 Depth 1.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	ES		0.20	84.80		TOPSOIL: Brown silty sandy clay and rootlets	
							MADE GROUND: Dark greyish black clayey sand with angular gravel of mudstone and occasional fragments of pottery and brick.	
			HVP=90	1.00	84.00		Stiff brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	1
			HVP=91	1.50	83.50		End of pit at 1.50 m	
								2
								3
								4
								5

Remarks: Groundwater strike at 0.5m depth. Fast rate of ingress.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP18

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333586.28 - 356162.47 Level: 84.78	Date 14/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.3 Depth 2.20		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.30	84.48		TOPSOIL: Brown silty sandy clay and rootlets	
			HVP=104				Firm to stiff brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	1
	1.50	D						
			HVP=110					
			HVP=126	2.20	82.58			2
							End of pit at 2.20 m	
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP19

Sheet 1 of 1

Project Name: Gresford Rd, LLay

Project No.
17040

Co-ords: 333653.33 - 356210.75
Level: 84.00

Date
14/03/2017

Location: Gresford Rd, LLay

Dimensions (m): 2.3

Scale

1:25

Client: Bellway/Anwyl Construction Ltd

Depth
2.00

0.7

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.30	83.70		TOPSOIL: Brown silty sandy clay and rootlets	
	1.00	D	HVP=89 HVP=123 HVP=126	2.00	82.00		Firm to stiff brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	1
							End of pit at 2.00 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP20

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333723.18 - 356200.79 Level: 82.54	Date 14/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.2 Depth 1.60		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES					TOPSOIL: Brown silty sandy clay and rootlets	
				0.50	82.04		Stiff to very stiff brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	
	1.00	D	HVP=138					1
			HVP=169					
				1.60	80.94		End of pit at 1.60 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP21

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333802.56 - 356238.08 Level: 82.96	Date 14/03/2017
Location: Gresford Rd, LLay	Dimensions (m): Depth 2.10		Scale 1:25
Client: Bellway/Anwyl Construction Ltd	2.1		Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30	82.66		TOPSOIL: Brown silty sandy clay and rootlets	
			HVP=112				Firm to stiff brown mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	1
			HVP=98					
	2.00	D	HVP=113	2.10	80.86		End of pit at 2.10 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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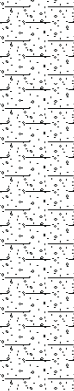
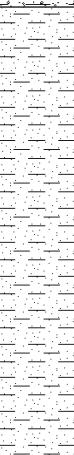
Trial Pit Log

Trialpit No

TP22

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333863.03 - 356288.75 Level: 83.55	Date 14/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.6 Depth 3.30		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES					TOPSOIL: Brown silty sandy clay and rootlets	
				0.30	83.25		Reddish brown slightly gravelly clayey fine to coarse SAND. Gravel is fine to medium, subangular to rounded and of various lithologies.	1
				1.70	81.85		Firm to stiff brown slightly sandy CLAY. Gravel is fine to coarse, sub angular to rounded and of mixed lithologies.	2
			HVP=104	3.30	80.25		End of pit at 3.30 m	3
								4
								5

Remarks: Groundwater strike at 1.7m depth. Fast rate of ingress.

Stability: Pit Collapse 0.3m - 1.5m depth.

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Trial Pit Log

Trialpit No

TP23

Sheet 1 of 1

Project Name: Gresford Rd, LLay

Project No.
17040

Co-ords: 333869.11 - 356295.33
Level: 83.49

Date
14/03/2017

Location: Gresford Rd, LLay

Dimensions (m): 2.6

Scale
1:25

Client: Bellway/Anwyl Construction Ltd

Depth
3.70

0.7

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30	83.19		TOPSOIL: Brown silty sandy clay and rootlets	
							Firm brown very sandy CLAY.	
			HVP=70					1
			HVP=80					
			HVP=64					2
	2.50	D						3
				3.70	79.79		End of pit at 3.70 m	4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP24

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333809.46 - 356295.50 Level: 82.44	Date 14/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.2 Depth 1.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼	0.30	ES	HVP=181	0.50	81.94		TOPSOIL: Brown silty sandy clay and rootlets	1
				1.10	81.34		Stiff to very stiff brown very sandy CLAY.	
				1.30	81.14		Light brown slightly clayey slightly gravelly fine SAND.	
				1.50	80.94		Stiff brown CLAY.	
							End of pit at 1.50 m	
								2
								3
								4
								5

Remarks: Water ingress from land drain encountered at 1.0m depth.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP25

Sheet 1 of 1

Project Name: Gresford Rd. L Lay

Project No.
17040

Co-ords: 333802.05 - 356341.12
Level: 82.74

Date
14/03/2017

Location: Gresford Rd, L Lay

Dimensions (m): 2.2

Scale

1:25

Client: Bellway/Anwyl Construction Ltd

Depth
1.50

0.7

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30	82.44		TOPSOIL: Brown silty sandy clay and rootlets	
							Firm to stiff brown mottled grey sandy CLAY	
	1.00	D	HVP=113					1
			HVP=129	1.50	81.24			2
							End of pit at 1.50 m	3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP26

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333835.49 - 356410.34 Level: 82.44	Date 14/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.4 Depth 2.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.30	82.14		TOPSOIL: Brown silty sandy clay and rootlets	
			HVP=84				Firm to stiff brown mottled grey sandy CLAY	1
	1.50	D		1.60	80.84		Brown very clayey gravelly fine to coarse SAND. Gravel is fine to coarse, subangular to rounded and of various lithologies.	2
			HVP=95	2.50	79.94		End of pit at 2.50 m	3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP27

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333772.46 - 356391.32 Level: 83.06	Date 14/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.2 Depth 1.70		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	1.00	D		0.60	82.46		TOPSOIL: Brown silty sandy clay and rootlets	1
				0.80	82.26		Light brown very clayey fine to coarse SAND.	
							Dark brown very clayey fine to coarse SAND with pockets of clay (<70mm).	
				1.70	81.36		End of pit at 1.70 m	2
								3
								4
								5

Remarks: Groundwater strike at 1.3m depth. Slow rate of ingress.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP28

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333729.68 - 356419.01 Level: 83.16	Date 14/03/2017
Location: Gresford Rd, LLay		Dimensions (m): 2.1 Depth 1.70	Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES					TOPSOIL: Brown silty sandy clay and rootlets	
				0.50	82.66		Brown silty slightly gravelly fine to coarse SAND. Gravel is fine to coarse subrounded to rounded of various lithologies.	1
				1.70	81.46		End of pit at 1.70 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP29

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333719.67 - 356288.74 Level: 83.54	Date 15/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.3 Depth 1.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.30	83.24		TOPSOIL: Brown silty sandy clay and rootlets	
							Stiff to very stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium, subangular to rounded and of various lithologies.	
	1.00	D	HVP=107					1
			HVP=175	1.50	82.04		End of pit at 1.50 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP30

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333680.28 - 356362.97 Level: 83.94	Date 15/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.3 Depth 1.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.30	83.64		TOPSOIL: Brown silty sandy clay and rootlets	
	1.00	D	HVP=138				Stiff to very stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium, subangular to rounded and of various lithologies.	1
▼			HVP=156	1.50	82.44		End of pit at 1.50 m	2
								3
								4
								5

Remarks: Groundwater strike at 1.5m depth. Fast rate of ingress.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP31

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333658.02 - 356304.96 Level: 84.54	Date 15/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.2 Depth 2.00		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.30	84.24		TOPSOIL: Brown silty sandy clay and rootlets	
			HVP=86				Stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium, subangular to rounded and of various lithologies.	1
	1.50	D						
			HVP=98					
			HVP=104	2.00	82.54		End of pit at 2.00 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

AGS



Trialpit No

TP32

Sheet 1 of 1

Project Name: Gresford Rd. L Lay

Project No.
17040

Co-ords:	333614.95 - 356249.36
Level:	84.86

Date
15/03/2017

Location: Gresford Rd, L Lay

Dimensions (m): 2.3

Scale

1.23
Logged

Client: Bellway/Anwyl Construction Ltd

Depth
1.50

0.7

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							TOPSOIL: Brown silty sandy clay and rootlets
				0.30	84.56		MADE GROUND: Very soft dark brown mottled black sandy clay with animal remains identified at 1.4m depth. Strong organic odour.
				1.50	83.36		End of pit at 1.50 m

Remarks:	Damp from 0.3m depth. Backfilled upon identification of buried animal remains.
----------	--

Stability: Pit collapse from 0.3 - 1.5m

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Trial Pit Log

Trialpit No

TP33

Sheet 1 of 1

Project Name: Gresford Rd. L Lay

Project No.
17040

Co-ords: 333622.45 - 356247.84
Level: 84.80

Date
15/03/2017

Location: Gresford Rd, L Lay

Dimensions (m): 2.4

Scale

1:25

Client: Bellway/Anwyl Construction Ltd

Depth
2.00

0.7

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼				0.30	84.50		TOPSOIL: Brown silty sandy clay and rootlets	
							MADE GROUND: Firm to stiff brown sandy clay	
				0.80	84.00		MADE GROUND: Very soft sandy clay. Strong organic odour. Animal bone identified at 1.4m depth.	1
				2.00	82.80		End of pit at 2.00 m	2
								3
								4
								5

Remarks: Groundwater ingress at 1.0m. Trial pit into edge of burial pit. Approximately half of pit is made ground the other being natural strata. Animal remains in northern section of pit.

Stability: Pit Collapse from 1.0m depth.

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Trial Pit Log

Trialpit No

TP34

Sheet 1 of 1

Project Name: Gresford Rd, L Lay

Project No.
17040

Co-ords: 333614.59 - 356286.80
Level: 85.13

Date
15/03/2017

Location: Gresford Rd, L Lay

Dimensions (m): 2.4

Scale

1:25

Client: Bellway/Anwyl Construction Ltd

Depth
1.50

0.7

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.40	ES		0.50	84.63		TOPSOIL: Brown silty sandy clay and rootlets	
	1.00	D	HVP=98				Firm to stiff brown mottled grey CLAY	1
			HVP=110	1.50	83.63		End of pit at 1.50 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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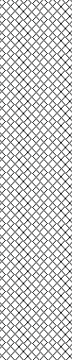
Trial Pit Log

Trialpit No

TP35

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333638.39 - 356290.97 Level: 84.78	Date 15/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.7 Depth 1.70		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50	ES		0.20	84.58		TOPSOIL: Brown silty sandy clay and rootlets	1
							MADE GROUND: Dark brown clayey gravelly fine to coarse SAND with medium cobble and boulder content. Gravel is fine to coarse angular and is of brick and concrete. Large concrete obstruction noted at 1.2m depth.	
				1.50	83.28		Firm to stiff brown mottled grey CLAY	2
				1.70	83.08		End of pit at 1.70 m	
								3
								4
								5

Remarks: Groundwater strike at 1.3m depth. Fast rate of ingress.

Stability: Pit Collapse 1.3 - 1.7m depth.

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Trial Pit Log

Trialpit No

TP36

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333401.12 - 356296.85 Level: 86.54	Date 15/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.2 Depth 2.10		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES					TOPSOIL: Brown silty sandy clay and rootlets	
				0.40	86.14		Stiff to very stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to rounded and of various lithologies. Low cobble content.	
	1.00	D	HVP=135					1
			HVP=159					
			HVP=169					
				2.10	84.44		End of pit at 2.10 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP37

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333410.59 - 356350.31 Level: 87.12	Date 15/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.3 Depth 2.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	ES		0.40	86.72		TOPSOIL: Brown silty sandy clay and rootlets	
	1.50	D	HVP=153				Stiff to very stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to rounded and of various lithologies. Low cobble content.	1
			HVP=159					
			HVP=153					2
			HVP=187	2.50	84.62		End of pit at 2.50 m	3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP38

Sheet 1 of 1

Project Name: Gresford Rd. L Lay

Project No.
17040

Co-ords: 333418.31 - 356253.72
Level: 85.81

Date
15/03/2017

Location: Gresford Rd, L Lay

Dimensions (m): 2.2

Scale

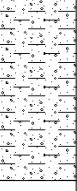
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Client: Bellway/Anwyl Construction Ltd

Depth
1.10

0.7

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
			HVP=156	0.40	85.41		TOPSOIL: Brown silty sandy clay and rootlets	
				1.10	84.71		Stiff to very stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to rounded and of various lithologies. Low cobble content.	
							End of pit at 1.10 m	
								1
								2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP39

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333468.09 - 356310.59 Level: 86.19	Date 15/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.3 Depth 1.60		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.40	ES		0.60	85.59		TOPSOIL: Brown silty sandy clay and rootlets	
			HVP=141				Stiff to very stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to rounded and of various lithologies. Low cobble content.	1
	1.50	D		1.60	84.59		End of pit at 1.60 m	2
			HVP=150					3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP40

Sheet 1 of 1

Project Name: Gresford Rd. L Lay

Project No.
17040

Co-ords: 333512.19 - 356372.10
Level: 86.00

Date
15/03/2017

Location: Gresford Rd, L Lay

Dimensions (m): 2.2
Depth 1.70

Scale
1:25

Client: Bellway/Anwyl Construction Ltd

Logged
MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.30	85.70		TOPSOIL: Brown silty sandy clay and rootlets	
							Stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to rounded and of various lithologies. Low cobble content.	
	1.00	D	HVP=172 HVP=82	1.70	84.30		End of pit at 1.70 m	
								1
								2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

AGS



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Trial Pit Log

Trialpit No

TP41

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333552.80 - 356306.00 Level: 85.61	Date 15/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.1 Depth 1.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	1.00	D	HVP=135	0.40	85.21		TOPSOIL: Brown silty sandy clay and rootlets	1
			HVP=187	1.50	84.11		Stiff to very stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to rounded and of various lithologies. Low cobble content.	2
							End of pit at 1.50 m	3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP42

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333582.31 - 356372.18 Level: 84.66	Date 15/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): Depth 2.00		Scale 1:25
Client: Bellway/Anwyl Construction Ltd	2.1 0.7		Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	ES		0.40	84.26		TOPSOIL: Brown silty sandy clay and rootlets	
			HVP=92				Stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to rounded and of various lithologies. Low cobble content. Occasional sand lenses at 1.2 - 1.4m depth.	1
			HVP=120					
	2.00	D		2.00	82.66		End of pit at 2.00 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP43

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333627.82 - 356310.13 Level: 84.87	Date 15/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): Depth 1.00		Scale 1:25
Client: Bellway/Anwyl Construction Ltd	2.3		Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.40	84.47		TOPSOIL: Brown silty sandy clay and rootlets	
				1.00	83.87		Firm to stiff greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to rounded and of various lithologies. Low cobble content. Occasional sand lenses at 1.2 - 1.4m depth.	
							End of pit at 1.00 m	1
								2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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Trial Pit Log

Trialpit No

TP44

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333640.44 - 356281.66 Level: 84.71	Date 15/03/2017
Location: Gresford Rd, LLay	Dimensions (m): 2.2 Depth 2.50		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼	0.40	ES		0.10	84.61		TOPSOIL: Brown silty sandy clay and rootlets MADE GROUND: Black ashy silty gravelly fine to coarse sand with bottle fragments. Gravel is fine to coarse angular and of brick glass and concrete.	1
			HVP=31	1.80	82.91		Soft to firm grey sandy CLAY becoming firm to stiff from 2.2m depth.	2
			HVP=97	2.50	82.21		End of pit at 2.50 m	3
								4
								5

Remarks: Groundwater strike at 1.8m depth. Moderate rate of ingress.

Stability: Pit Stable

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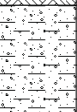
Trial Pit Log

Trialpit No

TP45

Sheet 1 of 1

Project Name: Gresford Rd. LLay	Project No. 17040	Co-ords: 333628.35 - 356263.58 Level: 84.88	Date 15/03/2017
Location: Gresford Rd, LLay	Dimensions (m): Depth 1.20		Scale 1:25
Client: Bellway/Anwyl Construction Ltd	0.7 		Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.40	ES					TOPSOIL: Brown silty sandy clay with brick, wood and pottery	
				0.80	84.08		Firm to stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium, subangular to rounded and of various lithologies.	1
				1.20	83.68		End of pit at 1.20 m	
								2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Collapse 1.0 - 2.0m depth.

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Trial Pit Log

Trialpit No

TP46

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333632.17 - 356270.42 Level: 84.73	Date 15/03/2017
Location: Gresford Rd, L Lay	Dimensions (m): 2.2 Depth 1.20		Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES					TOPSOIL: Brown silty sandy clay with brick, wood and pottery	
				0.70	84.03		Firm to stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium, subangular to rounded and of various lithologies.	1
				1.20	83.53		End of pit at 1.20 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

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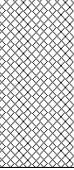
Trial Pit Log

Trialpit No

TP47

Sheet 1 of 1

Project Name: Gresford Rd. L Lay	Project No. 17040	Co-ords: 333615.18 - 356263.77 Level: 85.12	Date 15/03/2017
Location: Gresford Rd, L Lay		Dimensions (m): 2.1 Depth 0.90	Scale 1:25
Client: Bellway/Anwyl Construction Ltd			Logged MD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES	HVP=104				TOPSOIL: Brown silty sandy clay and rootlets	
				0.60	84.52		Firm to stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium, subangular to rounded and of various lithologies.	
				0.90	84.22		End of pit at 0.90 m	
								1
								2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Pit Stable

AGS

APPENDIX K

Trial Pit Photographs – Gresford Road, Llay, Wrexham



Photo 1 – Trial Pit 01



Photo 2 – Arising's from Trial Pit 01



Photo 3 – Trial Pit 02



Photo 4 – Arising's Trial Pit 02



Photo 5 – Trial Pit 03



Photo 6 – Arising's from Trial Pit 03



Photo 7 – Trial Pit 04



Photo 8 – Arising's from Trial Pit 04



Photo 9 – Trial Pit 05



Photo 10 – Arising's from Trial Pit 05



Photo 11 – Trial Pit 06



Photo 12 – Arising's from Trial Pit 06



Photo 13 – Trial Pit 07



Photo 14 – Arising's from Trial Pit 07



Photo 15 – Trial Pit 08



Photo 16 – Arising's from Trial Pit 08



Photo 17 – Trial Pit 09



Photo 18 – Arising's from Trial Pit 09



Photo 19 – Trial Pit 10



Photo 20 – Arising's from Trial Pit 10



Photo 21 – Trial Pit 11



Photo 22 – Arising's from Trial Pit 11



Photo 23 – Trial Pit 12



Photo 24 – Arising's from Trial Pit 12



Photo 25 – Trial Pit 13



Photo 26 – Arising's from Trial Pit 13



Photo 27 – Trial Pit 14



Photo 28 – Arising's from Trial Pit 14



Photo 29 – Trial Pit 15



Photo 30 – Arising's from Trial Pit 15



Photo 31 – Trial Pit 16



Photo 32 – Arising's from Trial Pit 16



Photo 33 – Trial Pit 17



Photo 34 – Arising's from Trial Pit 17



Photo 35 – Trial Pit 18



Photo 36 – Arising's from Trial Pit 18



Photo 37 – Trial Pit 19



Photo 38 – Arising's from Trial Pit 19



Photo 39 – Trial Pit 20



Photo 40 – Arising's from Trial Pit 20



Photo 41 – Trial Pit 21



Photo 42 – Arising's from Trial Pit 21



Photo 43 – Trial Pit 22



Photo 44 – Arising's from Trial Pit 22



Photo 45 – Trial Pit 23



Photo 46 – Arising's from Trial Pit 23



Photo 47 – Trial Pit 24



Photo 48 – Arising's from Trial Pit 24



Photo 49 – Trial Pit 25



Photo 50 – Arising's from Trial Pit 25



Photo 51 – Trial Pit 26



Photo 52 – Arising's from Trial Pit 26



Photo 53 – Trial Pit 27



Photo 54 – Arising's from Trial Pit 27



Photo 55 – Trial Pit 28



Photo 56 – Arising's from Trial Pit 28



Photo 57 – Trial Pit 29



Photo 58 – Arising's from Trial Pit 29



Photo 59 – Trial Pit 30



Photo 60 – Arising's from Trial Pit 30



Photo 61 – Trial Pit 31



Photo 62 – Arising's from Trial Pit 31



Photo 63 – Trial Pit 32



Photo 64 – Arising's from Trial Pit 32



Photo 65 – View of animal bone uncovered during the excavation of TP 32



Photo 66 – Trial Pit 33



Photo 67 – Arising's from Trial Pit 33



Photo 68 – View of animal bones uncovered during the excavation of TP 33



Photo 69 – Trial Pit 33



Photo 70 – Arising's from Trial Pit 34



Photo 71 – Trial Pit 35



Photo 72 – Arising's from Trial Pit 35



Photo 73 – Trial Pit 36



Photo 74 – Arising's from Trial Pit 36



Photo 75 – Trial Pit 37



Photo 76 – Arising's from Trial Pit 37



Photo 77 – Trial Pit 38



Photo 78 – Arising's from Trial Pit 38



Photo 79 – Trial Pit 39



Photo 80 – Arising's from Trial Pit 39



Photo 81 – Trial Pit 40



Photo 82 – Arising's from Trial Pit 40



Photo 83 – Trial Pit 41



Photo 84 – Arising's Trial Pit 41



Photo 85 – Trial Pit 42



Photo 86 – Arising's from Trial Pit 42



Photo 87 – Trial Pit 43



Photo 88 – Arising's from Trial Pit 43



Photo 89 – Trial Pit 44



Photo 90 – Arising's from Trial Pit 44



Photo 91 – Trial Pit 45



Photo 92 – Arising's from Trial Pit 45



Photo 93 – Trial Pit 46



Photo 94 – Arising's from Trial Pit 46



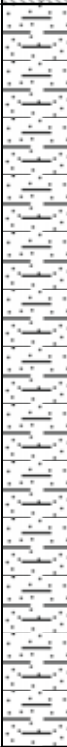
Photo 95 – Trial Pit 47

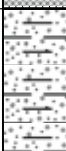
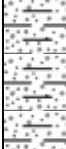
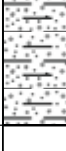


Photo 96 – Arising's from Trial Pit 47

APPENDIX L

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>						Site Home Farm. Gresford Road, Llay, Wrexham		Borehole Number BH01	
Boring Method Cable Percussion		Casing Diameter 150mm cased to 6.00m		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 16/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Instr
0.20	D					(0.50)	Brown sandy TOPSOIL with rootlets		
0.50	D					0.50	Firm brown CLAY		
1.20-1.65	SPT(C) N=13 D			2,3/3,3,4,3		1.20	Stiff brown sandy CLAY		
2.00-2.45	SPT(C) N=16 D			2,3/4,3,4,5					
3.00-3.45	SPT(C) N=24 D			4,4/5,6,6,7		(3.80)			
4.00-4.45	SPT(C) N=25 D			4,5/6,6,6,7					
5.00-5.45	SPT(C) N=21 D			3,4/4,5,6,6		5.00	Firm / stiff grey brown sandy gravelly CLAY		
6.00-6.45	SPT(C) N=22 D			4,4/5,5,5,7		(1.45)			
						6.45	Complete at 6.45m		
Remarks Services pit excavated by hand to 1.20m Water added to borehole to assist drilling								Scale (approx) 1:50	Logged By Dr J Crook
								Figure No. 17-1536.BH01	

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>						Site Home Farm. Gresford Road, Llay, Wrexham		Borehole Number BH02	
Boring Method Cable Percussion		Casing Diameter 150mm cased to 5.00m		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 15/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D					(0.50)	Brown sandy TOPSOIL with rootlets		
0.50	D					0.50	Stiff / very stiff brown sandy / very sandy CLAY		
1.20-1.65 1.20-1.65	SPT(C) N=10 D			2,2/2,3,2,3					
2.00-2.45 2.00-2.45	SPT(C) N=13 D			2,2/3,3,3,4					
3.00-3.45 3.00-3.45	SPT(C) N=15 D			2,3/3,4,4,4		(5.20)			
4.00-4.45 4.00-4.45	SPT(C) N=28 D			4,6/6,7,7,8					
5.00-5.45 5.00-5.45	SPT(C) N=32 D			4,5/7,7,9,9		5.70			
							Complete at 5.70m		
Remarks Water added to borehole to assist drilling Services pit excavated by hand to 1.20m							Scale (approx) 1:50	Logged By Dr J Crook	Figure No. 17-1536.BH02

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>						Site Home Farm. Gresford Road, Llay, Wrexham		Borehole Number BH03		
Boring Method Cable Percussion		Casing Diameter 150mm cased to 6.00m		Ground Level (mOD)		Client		Job Number 17-1536		
		Location		Dates 17/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.20	D			Seepage(1) at 0.50m.		(0.40) 0.40	Brown sandy TOPSOIL with rootlets			
1.20-1.65 1.20-1.65 1.50	SPT(C) N=11 D D			2,2/3,2,3,3		(1.10) 1.50	MADE GROUND : brown clay, sand, soil, gravel, ash and clinker fill		X1	
2.00-2.45 2.00-2.45	SPT(C) N=12 D			1,2/3,3,3,3			Firm / stiff brown sandy gravelly CLAY			
3.00-3.45 3.00-3.45	SPT(C) N=15 D			2,3/4,4,3,4		(3.50)				
4.00-4.45 4.00 4.00-4.45	SPT(C) N=21 D D			3,4/5,5,5,6						
5.00-5.45 5.00-5.45	SPT(C) N=23 D			4,5/5,6,5,7		5.00	Stiff brown sandy gravelly CLAY			
6.00-6.45 6.00-6.45	SPT(C) N=28 D			4,6/6,7,7,8		(1.45) 6.45				
							Complete at 6.45m			
Remarks Water added to borehole to assist drilling Services pit excavated by hand to 1.20m								Scale (approx)	Logged By	
								1:50	Dr J Crook	
								Figure No. 17-1536.BH03		

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>						Site Home Farm. Gresford Road, Llay, Wrexham		Borehole Number BH04	
Boring Method Cable Percussion		Casing Diameter 150mm cased to 6.00m		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 14/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D					(0.40)	Brown sandy TOPSOIL with rootlets		
0.50	D					0.40	Firm brown CLAY		
						(0.60)			
						1.00	Stiff brown sandy CLAY		
1.20-1.65	SPT(C) N=16			2,3/3,4,4,5					
1.20-1.65	D								
2.00-2.45	SPT(C) N=17			2,3/3,4,5,5		(2.00)			
2.00-2.45	D								
3.00-3.07	SPT(C) 50*/70			50/		3.00	Stiff brown sandy gravelly CLAY with sandstone cobbles and boulders		
3.00-3.45	D								
				Seepage(1) at 3.50m.		(1.50)			
4.00-4.45	SPT(C) N=18			3,4/3,5,5,5		4.50	Medium dense brown clayey fine SAND		
4.00-4.45	D								
5.00-5.45	SPT(C) N=17			3,3/3,4,5,5		(1.95)			
5.00-5.45	D								
6.00-6.45	SPT(C) N=23			3,4/5,6,6,6		6.45	Complete at 6.45m		
6.00-6.45	D								

Remarks
 Water added to borehole to assist drilling
 Services pit excavated by hand to 1.20m
 Chiselling from 3.00m to 3.40m for 0.75 hours.

Scale (approx)
 1:50

Logged By
 Dr J Crook

Figure No.
 17-1536.BH04

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>							Site Home Farm. Gresford Road, Llay, Wrexham		Borehole Number BH05		
Boring Method Cable Percussion		Casing Diameter 150mm cased to 6.00m			Ground Level (mOD)		Client			Job Number 17-1536	
		Location			Dates 15/03/2017		Engineer Robert E Fry & Associates Limited			Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water		
0.20	D					(0.60)	Brown sandy TOPSOIL with rootlets				
0.60	D					0.60	Loose brown fine SAND				
1.20-1.65 1.20-1.65	SPT(C) N=7 D			1,1/2,1,2,2		(2.00)					
2.00-2.45 2.00-2.45	SPT(C) N=8 D			2,2/2,2,2,2							
2.60	D					2.60	Firm / stiff brown sandy CLAY				
3.00-3.45 3.00-3.45	SPT(C) N=15 D			2,2/3,4,4,4		(0.90)					
3.50	D					3.50	Medium dense / dense brown coarse SAND and fine / medium sub-rounded GRAVEL				
4.00-4.45 4.00-4.45	SPT(C) N=29 D			6,5/6,6,8,9							
5.00-5.45 5.00-5.45	SPT(C) N=31 D			4,5/7,7,8,9		(2.95)					
6.00-6.45 6.00-6.45	SPT(C) N=30 D			4,5/6,8,7,9		6.45	Complete at 6.45m				
Remarks Water added to borehole to assist drilling Services pit excavated by hand to 1.20m								Scale (approx) 1:50	Logged By Dr J Crook		
								Figure No. 17-1536.BH01			

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>							Site Home Farm. Gresford Road, Llay, Wrexham		Borehole Number BH06		
Boring Method Cable Percussion		Casing Diameter 150mm cased to 7.00m			Ground Level (mOD)		Client			Job Number 17-1536	
		Location			Dates 13/03/2017		Engineer Robert E Fry & Associates Limited			Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water		
0.20	D					(0.60)	Brown TOPSOIL with rootlets				
0.60	D					0.60	Medium dense brown slightly clayey fine / medium SAND with occasional fine sub-rounded gravel				
1.20-1.65 1.20-1.65	SPT(C) N=13 D			2,2/3,3,4,3		(2.00)					
2.00-2.45 2.00-2.45	SPT(C) N=12 D			1,2/3,3,3,3							
2.60	D					2.60	Stiff brown sandy CLAY				
3.00-3.45 3.00-3.45	SPT(C) N=26 D			3,4/5,7,6,8		(2.20)					
4.00-4.45 4.00-4.45	SPT(C) N=27 D			3,5/5,7,7,8							
4.60	D					4.80	Medium dense brown claybound gravelly fine / medium SAND				
5.00-5.45 5.00-5.45	SPT(C) N=28 D			4,5/6,7,7,8		(1.30)					
6.00-6.45 6.00-6.45	SPT(C) N=23 D			5,6/6,6,5,6		6.10	Medium dense / dense brown fine SAND				
7.00-7.45 7.00-7.45	SPT(C) N=32 D			5,6/7,7,8,10		(1.35)					
						7.45	Complete at 7.45m				
Remarks Services pit excavated by hand to 1.20m Water added to borehole to assist drilling								Scale (approx)	Logged By		
								1:50	Dr J Crook		
								Figure No. 17-1536.BH06			

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>							Site Home Farm. Gresford Road, Llay, Wrexham		Borehole Number BH07		
Boring Method Cable Percussion		Casing Diameter 150mm cased to 7.00m			Ground Level (mOD)		Client			Job Number 17-1536	
		Location			Dates 13/03/2017		Engineer Robert E Fry & Associates Limited			Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.20	D					(0.60)	Brown sandy TOPSOIL with rootlets				
0.60	D					0.60	Firm / stiff grey / brown sandy CLAY / very sandy CLAY				
1.20-1.65 1.20-1.65	SPT(C) N=21 D			3,4/4,5,6,6		(1.40)					
2.00-2.45 2.00-2.45	SPT(C) N=14 D			2,3/3,4,3,4		2.00	Medium dense grey / brown slightly silty fine SAND				
						(1.00)					
3.00-3.45 3.00-3.45	SPT(C) N=15 D			2,2/2,3,5,5		3.00	Medium dense brown medium SAND				
4.00-4.45 4.00-4.45	SPT(C) N=14 D			1,1/2,4,4,4		(3.50)					
5.00-5.45 5.00-5.45	SPT(C) N=19 D			2,3/3,4,6,6							
6.00-6.45 6.00-6.45	SPT(C) N=26 D			3,4/4,6,7,9							
6.50	D					6.50	Medium dense brown coarse SAND and fine / medium sub-rounded GRAVEL				
						(0.95)					
7.00-7.45 7.00-7.45	SPT(C) N=30 D			4,5/5,7,9,9							
						7.45	Complete at 7.45m				
Remarks Water added to borehole to assist drilling Services pit excavated by hand to 1.20m								Scale (approx)	Logged By		
								1:50	Dr J Crook		
								Figure No. 17-1536.BH07			

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>						Site Home Farm. Gresford Road, Llay, Wrexham		Borehole Number BH08	
Boring Method Cable Percussion		Casing Diameter 150mm cased to 6.00m		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 14/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D					(0.50)	Brown sandy TOPSOIL with rootlets		
0.60	D					0.50 (0.40) 0.90	Firm brown very sandy CLAY		
1.20-1.65 1.20-1.65	SPT(C) N=11 D			2,2/3,2,3,3			Stiff brown sandy CLAY (gravel noted by driller)		
2.00-2.45 2.00-2.45	SPT(C) N=14 D			2,2/3,3,4,4		(3.10)			
3.00-3.45 3.00-3.45	D SPT(C) N=24			Slow(1) at 3.00m, rose to 2.70m in 20 mins. 1,1/3,4,7,10					
4.00-4.45 4.00-4.45	SPT(C) N=32 D			4,6/6,6,9,11		4.00	Stiff brown sandy CLAY		
5.00-5.45 5.00-5.45	SPT(C) N=32 D			3,6/7,7,9,9		(2.45)			
6.00-6.45 6.00-6.45	SPT(C) N=33 D			4,5/7,8,8,10		6.45	Complete at 6.45m		
Remarks Water added to borehole to assist drilling Services pit excavated by hand to 1.20m							Scale (approx) 1:50	Logged By Dr J Crook	
							Figure No. 17-1536.BH08		

APPENDIX M

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS01		
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 13/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10	D				(0.20)	Brown clayey TOPSOIL with rootlets			
0.40	D				(0.50)	Firm brown / orange sandy CLAY			
1.00-1.45	SPT(C) N=12		2,3/3,3,3,3		0.70	Stiff brown CLAY with occasional fine sub-rounded gravel			
1.00	D								
2.00-2.45	SPT(C) N=23		2,3/4,5,6,8		(2.10)				
2.00	D								
2.60	D				2.80	Brown clayey SILT			
3.00-3.45	SPT(C) N=15		3,3/3,3,4,5		(0.30)	Medium dense brown fine SAND			
3.00	D				3.10				
3.20	D								
4.00-4.45	SPT(C) N=19		3,4/4,4,5,6		(1.35)				
4.00	D				4.45	Complete at 4.45m			
Remarks							Scale (approx)	Logged By	
							1:50	Dr J Crook	
							Figure No. 17-1536.WS01		

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS02		
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 13/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.10	D				(0.20)	Brown clayey TOPSOIL with rootlets			
0.50	D				(0.40)	Firm brown slightly sandy CLAY			
1.00-1.45 1.00	SPT(C) N=9 D		2,2/2,2,2,3		0.60	Stiff brown slightly sandy CLAY with occasional fine sub-rounded gravel			
2.00-2.45 2.00	SPT(C) N=16 D		3,3/4,4,4,4		(1.90)				
2.60	D				2.50	Brown medium SAND with occasional fine / medium sub-rounded gravel			
3.00-3.45 3.00	SPT(C) N=21 D		4,4/5,5,5,6		(0.70)				
4.00-4.45 4.00	SPT(C) N=24 D		4,3/5,5,6,8		3.20	Stiff brown sandy CLAY with occasional fine sub-rounded gravel			
					(1.25)				
					4.45	Complete at 4.45m			
Remarks								Scale (approx)	Logged By
								1:50	Dr J Crook
								Figure No. 17-1536.WS02	

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS03		
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 13/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.10	D				(0.20) 0.20	Brown sandy TOPSOIL with rootlets			
0.50	D					Medium dense brown medium SAND			
1.00-1.45 1.00	SPT(C) N=13 D		2,2/2,3,4,4						
2.00-2.45 2.00	SPT(C) N=14 D		2,3/3,3,4,4		(4.25)				
3.00-3.45 3.00	SPT(C) N=17 D		3,3/3,4,5,5						
4.00-4.45 4.00	SPT(C) N=20 D		4,4/4,5,5,6		4.45	Complete at 4.45m			
Remarks						Scale (approx)		Logged By	
						1:50		Dr J Crook	
						Figure No. 17-1536.WS03			

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS04		
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 14/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.10	D				(0.20)	Brown clayey sandy TOPSOIL with rootlets			
0.40	D				(0.50)	Firm / stiff brown slightly sandy CLAY with occasional fine sub-rounded gravel			
					0.70	Stiff brown CLAY with occasional fine sub-rounded gravel			
1.00-1.45 1.00	SPT(C) N=17 D		2,3/4,4,4,5		(0.80)				
					1.50	Brown slightly sandy SILT			
1.80	D				(0.40)				
2.00-2.45 2.00	SPT(C) N=15 D		2,2/2,4,4,5		1.90	Medium dense brown fine / medium SAND			
					(1.30)				
3.00-3.45 3.00	SPT(C) N=14 D		3,3/3,3,4,4		3.20	Medium dense brown medium / coarse SAND with occasional fine sub-rounded gravel (wet)			
3.50	D				(1.25)				
4.00-4.45 4.00	SPT(C) N=21 D		3,4/4,5,6,6		4.45	Complete at 4.45m			
Remarks						Scale (approx)		Logged By	
						1:50		Dr J Crook	
						Figure No. 17-1536.WS04			

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS05		
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 13/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.10	D				(0.20) 0.20	Brown clayey sandy TOPSOIL with rootlets			
0.40	D					Brown fine / medium SAND			
1.00-1.45 1.00	SPT(C) N=10 D		2,2/2,2,3,3		(1.10)				
1.50	D				1.30	Stiff brown slightly sandy CLAY with occasional fine sub-rounded gravel			
2.00-2.45 2.00	SPT(C) N=14 D		3,2/3,3,4,4		(1.30)				
2.50	D				2.60	Medium dense brown medium SAND with very occasional fine / medium sub-rounded gravel			
2.70	D								
3.00-3.45 3.00	SPT(C) N=17 D		3,3/4,4,4,5		(1.85)				
4.00-4.45 4.00	SPT(C) N=19 D		4,4/4,4,5,6		4.45	Complete at 4.45m			
Remarks									
								Scale (approx) 1:50	Logged By Dr J Crook
								Figure No. 17-1536.WS05	

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS06		
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 13/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.10	D				(0.20) 0.20	Brown clayey TOPSOIL with rootlets			
0.40	D					Firm / stiff grey / brown slightly sandy CLAY with occasional fine sub-rounded gravel			
1.00-1.45 1.00	SPT(C) N=15 D		2,2/3,4,4,4		(1.60)				
2.00-2.45 2.00	SPT(C) N=21 D		4,4/4,5,6,6		1.80 (0.30) 2.10	Claybound sandy fine to coarse sub-rounded GRAVEL			
2.50	D					Stiff brown slightly sandy CLAY with occasional fine sub-rounded gravel			
3.00-3.45 3.00	SPT(C) N=18 D		3,3/4,4,4,6		(2.35)				
4.00-4.45 4.00	SPT(C) N=20 D		4,4/4,5,5,6		4.45	Complete at 4.45m			
Remarks						Scale (approx)		Logged By	
						1:50		Dr J Crook	
						Figure No. 17-1536.WS06			

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>						Site Home Farm. Gresford Road, Llay, Wrexham		Number WS07	
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 14/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10	D				(0.40)	MADE GROUND : brown / black soil, gravel fill with occasional pieces of black shale			
					0.40	MADE GROUND : frm brown clay / sand fill			
0.60	D				(0.40)				
0.90	D				0.80	MADE GROUND : black ash and broken brick fill with coarse sub-rounded gravel			
1.00-1.45	SPT(C) N=10		2,4/3,2,2,3		1.00				
1.10	D				(0.30)	Black relic TOPSOIL			
					1.30	Firm grey / brown sandy CLAY with occasional fine sub-rounded gravel			
					(0.70)				
2.00-2.45	SPT(C) N=13		2,2/2,3,3,5		2.00	No recovery			
2.00	D				(1.00)				
3.00-3.45	SPT(C) N=11		3,3/3,3,2,3		3.00	Brown clayey fine / medium SAND			
3.10	D				3.10	Stiff brown sandy CLAY with occasional fine sub-rounded gravel			
3.50	D				(1.35)				
4.00-4.45	SPT(C) N=21		3,4/5,5,5,6		4.45	Complete at 4.45m			
4.00	D								
Remarks							Scale (approx) 1:50	Logged By Dr J Crook	Figure No. 17-1536.WS07

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS08	
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536
		Location		Dates 14/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.20)	Brown sandy TOPSOIL with rootlets		
0.40	D				(0.50)	Firm grey / brown CLAY with occasional fine sub-rounded gravel		
1.00-1.45	SPT(C) N=20		2,3/4,4,6,6		0.70	Stiff brown CLAY with occasional fine sub-rounded gravel		
1.00	D				(1.10)			
2.00-2.45	SPT(C) N=13		2,2/3,3,3,4		1.80	Brown clayey slightly sandy SILT		
2.00	D				(0.30)	Stiff brown slightly sandy CLAY with occasional fine sub-rounded gravel		
2.50	D				2.10			
3.00-3.45	SPT(C) N=23		3,3/4,6,6,7		(2.35)			
3.00	D							
4.00-4.45	SPT(C) N=25		5,5/6,6,6,7		4.45	Complete at 4.45m		
4.00	D							
Remarks							Scale (approx) 1:50	Logged By Dr J Crook
							Figure No. 17-1536.WS08	

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS09		
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 14/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.10	D				(0.30)	Brown clayey TOPSOIL with rootlets			
0.50	D				0.30	Firm grey / brown CLAY			
1.00-1.45	SPT(C) N=16		3,3/3,4,4,5		(1.00)				
1.00	D				1.30	Firm / stiff grey / brown CLAY with occasional fine sub-rounded gravel			
1.50	D								
2.00-2.45	SPT(C) N=19		2,3/4,4,5,6						
2.00	D								
3.00-3.45	SPT(C) N=20		3,4/4,4,6,6		(3.15)				
3.00	D								
4.00-4.45	SPT(C) N=24		3,4/5,5,7,7						
4.00	D				4.45	Complete at 4.45m			
Remarks								Scale (approx)	Logged By
								1:50	Dr J Crook
								Figure No. 17-1536.WS09	

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS10		
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 14/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.10	D				(0.20) 0.20	Brown clayey TOPSOIL with rootlets			
0.50	D				(1.00)	Firm / stiff grey / brown CLAY			
1.00-1.45 1.00	SPT(C) N=15 D		2,3/3,4,4,4		1.20	Stiff brown sandy CLAY with occasional fine sub-rounded gravel			
1.50	D								
2.00-2.45 2.00	SPT(C) N=16 D		3,4/4,4,4,4						
					(3.25)				
3.00-3.45 3.00	SPT(C) N=15 D		3,3/4,4,3,4						
4.00-4.45 4.00	SPT(C) N=20 D		4,4/5,4,5,6		4.45	Complete at 4.45m			
Remarks Scale (approx) 1:50 Logged By Dr J Crook Figure No. 17-1536.WS10									

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham		Number WS11		
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 17-1536	
		Location		Dates 14/03/2017		Engineer Robert E Fry & Associates Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.10	D				(0.20) 0.20	Brown sandy TOPSOIL with rootlets			
0.40	D					Brown fine SAND			
1.00-1.45 1.00	SPT(C) N=19 D		2,3/4,4,5,6		(1.00)				
1.40	D				1.20	Medium dense brown silty fine SAND			
2.00-2.45 2.00	SPT(C) N=20 D		3,4/4,4,6,6						
3.00-3.45 3.00	SPT(C) N=24 D		3,3/6,6,6,6		(3.25)				
4.00-4.45 4.00	SPT(C) N=24 D		3,4/4,7,7,6		4.45	Complete at 4.45m			
Remarks Scale (approx) 1:50 Logged By Dr J Crook Figure No. 17-1536.WS11									

Geo-Ventures (UK) Limited

Geotechnical and Environmental Services

Standard Penetration Test Results

Site : Home Farm. Gresford Road, Llay, Wrexham

Job Number
17-1536

Client :

Sheet
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Engineer : Robert E Fry & Associates Limited

Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
BH01	1.20	1.35	1.65	CPT	2	3	3	3	4	3	N=13	
BH01	2.00	2.15	2.45	CPT	2	3	4	3	4	5	N=16	
BH01	3.00	3.15	3.45	CPT	4	4	5	6	6	7	N=24	
BH01	4.00	4.15	4.45	CPT	4	5	6	6	6	7	N=25	
BH01	5.00	5.15	5.45	CPT	3	4	4	5	6	6	N=21	
BH01	6.00	6.15	6.45	CPT	4	4	5	5	5	7	N=22	
BH02	1.20	1.35	1.65	CPT	2	2	2	3	2	3	N=10	
BH02	2.00	2.15	2.45	CPT	2	2	3	3	3	4	N=13	
BH02	3.00	3.15	3.45	CPT	2	3	3	4	4	4	N=15	
BH02	4.00	4.15	4.45	CPT	4	6	6	7	7	8	N=28	
BH02	5.00	5.15	5.45	CPT	4	5	7	7	9	9	N=32	
BH03	1.20	1.35	1.65	CPT	2	2	3	2	3	3	N=11	
BH03	2.00	2.15	2.45	CPT	1	2	3	3	3	3	N=12	
BH03	3.00	3.15	3.45	CPT	2	3	4	4	3	4	N=15	
BH03	4.00	4.15	4.45	CPT	3	4	5	5	5	6	N=21	
BH03	5.00	5.15	5.45	CPT	4	5	5	6	5	7	N=23	
BH03	6.00	6.15	6.45	CPT	4	6	6	7	7	8	N=28	
BH04	1.20	1.35	1.65	CPT	2	3	3	4	4	5	N=16	
BH04	2.00	2.15	2.45	CPT	2	3	3	4	5	5	N=17	
BH04	3.00	3.07	3.07	CPT	50						50*/70mm	Refusal
BH04	4.00	4.15	4.45	CPT	3	4	3	5	5	5	N=18	
BH04	5.00	5.15	5.45	CPT	3	3	3	4	5	5	N=17	
BH04	6.00	6.15	6.45	CPT	3	4	5	6	6	6	N=23	
BH05	1.20	1.35	1.65	CPT	1	1	2	1	2	2	N=7	
BH05	2.00	2.15	2.45	CPT	2	2	2	2	2	2	N=8	
BH05	3.00	3.15	3.45	CPT	2	2	3	4	4	4	N=15	
BH05	4.00	4.15	4.45	CPT	6	5	6	6	8	9	N=29	
BH05	5.00	5.15	5.45	CPT	4	5	7	7	8	9	N=31	
BH05	6.00	6.15	6.45	CPT	4	5	6	8	7	9	N=30	
BH06	1.20	1.35	1.65	CPT	2	2	3	3	4	3	N=13	
BH06	2.00	2.15	2.45	CPT	1	2	3	3	3	3	N=12	
BH06	3.00	3.15	3.45	CPT	3	4	5	7	6	8	N=26	
BH06	4.00	4.15	4.45	CPT	3	5	5	7	7	8	N=27	
BH06	5.00	5.15	5.45	CPT	4	5	6	7	7	8	N=28	
BH06	6.00	6.15	6.45	CPT	5	6	6	6	5	6	N=23	
BH06	7.00	7.15	7.45	CPT	5	6	7	7	8	10	N=32	
BH07	1.20	1.35	1.65	CPT	3	4	4	5	6	6	N=21	
BH07	2.00	2.15	2.45	CPT	2	3	3	4	3	4	N=14	
BH07	3.00	3.15	3.45	CPT	2	2	2	3	5	5	N=15	
BH07	4.00	4.15	4.45	CPT	1	1	2	4	4	4	N=14	
BH07	5.00	5.15	5.45	CPT	2	3	3	4	6	6	N=19	

Geo-Ventures (UK) Limited

Geotechnical and Environmental Services

Standard Penetration Test Results

Site : Home Farm. Gresford Road, Llay, Wrexham

Job Number
17-1536

Client :

Sheet
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Engineer : Robert E Fry & Associates Limited

Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
BH07	6.00	6.15	6.45	CPT	3	4	4	6	7	9	N=26	
BH07	7.00	7.15	7.45	CPT	4	5	5	7	9	9	N=30	
BH08	1.20	1.35	1.65	CPT	2	2	3	2	3	3	N=11	
BH08	2.00	2.15	2.45	CPT	2	2	3	3	4	4	N=14	
BH08	3.00	3.15	3.45	CPT	1	1	3	4	7	10	N=24	
BH08	4.00	4.15	4.45	CPT	4	6	6	6	9	11	N=32	
BH08	5.00	5.15	5.45	CPT	3	6	7	7	9	9	N=32	
BH08	6.00	6.15	6.45	CPT	4	5	7	8	8	10	N=33	
WS01	1.00	1.15	1.45	CPT	2	3	3	3	3	3	N=12	
WS01	2.00	2.15	2.45	CPT	2	3	4	5	6	8	N=23	
WS01	3.00	3.15	3.45	CPT	3	3	3	3	4	5	N=15	
WS01	4.00	4.15	4.45	CPT	3	4	4	4	5	6	N=19	
WS02	1.00	1.15	1.45	CPT	2	2	2	2	2	3	N=9	
WS02	2.00	2.15	2.45	CPT	3	3	4	4	4	4	N=16	
WS02	3.00	3.15	3.45	CPT	4	4	5	5	5	6	N=21	
WS02	4.00	4.15	4.45	CPT	4	3	5	5	6	8	N=24	
WS03	1.00	1.15	1.45	CPT	2	2	2	3	4	4	N=13	
WS03	2.00	2.15	2.45	CPT	2	3	3	3	4	4	N=14	
WS03	3.00	3.15	3.45	CPT	3	3	3	4	5	5	N=17	
WS03	4.00	4.15	4.45	CPT	4	4	4	5	5	6	N=20	
WS04	1.00	1.15	1.45	CPT	2	3	4	4	4	5	N=17	
WS04	2.00	2.15	2.45	CPT	2	2	2	4	4	5	N=15	
WS04	3.00	3.15	3.45	CPT	3	3	3	3	4	4	N=14	
WS04	4.00	4.15	4.45	CPT	3	4	4	5	6	6	N=21	
WS05	1.00	1.15	1.45	CPT	2	2	2	2	3	3	N=10	
WS05	2.00	2.15	2.45	CPT	3	2	3	3	4	4	N=14	
WS05	3.00	3.15	3.45	CPT	3	3	4	4	4	5	N=17	
WS05	4.00	4.15	4.45	CPT	4	4	4	4	5	6	N=19	
WS06	1.00	1.15	1.45	CPT	2	2	3	4	4	4	N=15	
WS06	2.00	2.15	2.45	CPT	4	4	4	5	6	6	N=21	
WS06	3.00	3.15	3.45	CPT	3	3	4	4	4	6	N=18	
WS06	4.00	4.15	4.45	CPT	4	4	4	5	5	6	N=20	
WS07	1.00	1.15	1.45	CPT	2	4	3	2	2	3	N=10	
WS07	2.00	2.15	2.45	CPT	2	2	2	3	3	5	N=13	
WS07	3.00	3.15	3.45	CPT	3	3	3	3	2	3	N=11	
WS07	4.00	4.15	4.45	CPT	3	4	5	5	5	6	N=21	
WS08	1.00	1.15	1.45	CPT	2	3	4	4	6	6	N=20	
WS08	2.00	2.15	2.45	CPT	2	2	3	3	3	4	N=13	
WS08	3.00	3.15	3.45	CPT	3	3	4	6	6	7	N=23	
WS08	4.00	4.15	4.45	CPT	5	5	6	6	6	7	N=25	

Standard Penetration Test Results

Job Number
17-1536

Sheet

3 / 3

Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
WS09	1.00	1.15	1.45	CPT	3	3	3	4	4	5	N=16	
WS09	2.00	2.15	2.45	CPT	2	3	4	4	5	6	N=19	
WS09	3.00	3.15	3.45	CPT	3	4	4	4	6	6	N=20	
WS09	4.00	4.15	4.45	CPT	3	4	5	5	7	7	N=24	
WS10	1.00	1.15	1.45	CPT	2	3	3	4	4	4	N=15	
WS10	2.00	2.15	2.45	CPT	3	4	4	4	4	4	N=16	
WS10	3.00	3.15	3.45	CPT	3	3	4	4	3	4	N=15	
WS10	4.00	4.15	4.45	CPT	4	4	5	4	5	6	N=20	
WS11	1.00	1.15	1.45	CPT	2	3	4	4	5	6	N=19	
WS11	2.00	2.15	2.45	CPT	3	4	4	4	6	6	N=20	
WS11	3.00	3.15	3.45	CPT	3	3	6	6	6	6	N=24	
WS11	4.00	4.15	4.45	CPT	3	4	4	7	7	6	N=24	

APPENDIX N

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Home Farm. Gresford Road, Llay, Wrexham					Borehole Number BH03						
Installation Type Single Installation			Dimensions Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm			Client 					Job Number 17-1536					
													Location			Ground Level (mOD)
Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling										
				0.10	Concrete	Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)	
					Bentonite Seal							5 min	10 min	15 min		20 min
				0.50		17/03/17		0.50		Seepage						
					Well Screen	Groundwater Observations During Drilling										
						Date	Start of Shift					End of Shift				
						Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	
				2.50												
					Bentonite Seal	Instrument Groundwater Observations										
						Inst. [A] Type : Slotted Standpipe										
		Date	Instrument [A]			Remarks										
		Time	Depth (m)	Level (mOD)												
				6.45	Bottom Fill											
Remarks																

Geo-Ventures (UK) Limited Geotechnical and Environmental Services						Site Home Farm, Gresford Road, Llay, Wrexham							Borehole Number BH07				
Installation Type Single Installation				Dimensions Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm				Client								Job Number 17-1536	
				Location			Ground Level (mOD)		Engineer Robert E Fry & Associates Limited							Sheet 1/1	
Legend		Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling										
					0.10	Concrete	Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)	
												5 min	10 min	15 min	20 min		
					1.00	Bentonite Seal											
							Groundwater Observations During Drilling										
							Date	Start of Shift				End of Shift					
							Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	
							Instrument Groundwater Observations										
						Well Screen	Inst. [A] Type : Slotted Standpipe										
							Date	Instrument [A]			Remarks						
	Time	Depth (m)	Level (mOD)														
					7.00	Bottom Fill											
					7.45												
Remarks																	

[illegible]

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>							Site Home Farm, Gresford Road, Llay, Wrexham						Borehole Number WS07					
Installation Type Single Installation				Dimensions Internal Diameter of Tube [A] = 35 mm Diameter of Filter Zone = 70 mm				Client								Job Number 17-1536		
				Location			Ground Level (mOD)			Engineer Robert E Fry & Associates Limited								Sheet 1/1
Legend		Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling											
					0.10	Concrete	Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate		Readings				Depth Sealed (m)	
						Bentonite Seal							5 min	10 min	15 min	20 min		
					1.00		Groundwater Observations During Drilling											
							Date	Start of Shift						End of Shift				
							Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)		
							Instrument Groundwater Observations											
						Well Screen	Inst. [A] Type : Slotted Standpipe											
							Date	Instrument [A]			Remarks							
							Time	Depth (m)	Level (mOD)									
					4.00	Bottom Fill												
					4.45													
Remarks																		

APPENDIX O



The Coal
Authority

Resolving the **impacts** of mining

CON29M Non-Residential Mining Report

K & P CARS
CROWN INN
THE DORMOUSE GRESFORD ROAD
WREXHAM

Date of enquiry: 10 March 2017
Date enquiry received: 10 March 2017
Issue date: 10 March 2017

Our reference: 51001387659001
Your reference: 117209248_1 |



CON29M Non-Residential Mining Report

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

Client name

LANDMARK INFORMATION GROUP LIMITED

Enquiry address

K & P CARS, CROWN INN, THE DORMOUSE
GRESFORD ROAD, WREXHAM

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

 /company/the-coal-authority

 /thecoalauthority

 /coalauthority



Approximate position of property



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Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	Yes
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	No
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	Yes
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is in a surface area that could be affected by underground mining in 5 seams of coal at 660m to 1000m depth, and last worked in 1966.

Any movement in the ground due to coal mining activity should have stopped.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

5. Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10. Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Withdrawal of support

The property is in an area where a notice to withdraw support was given in 1944.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13. Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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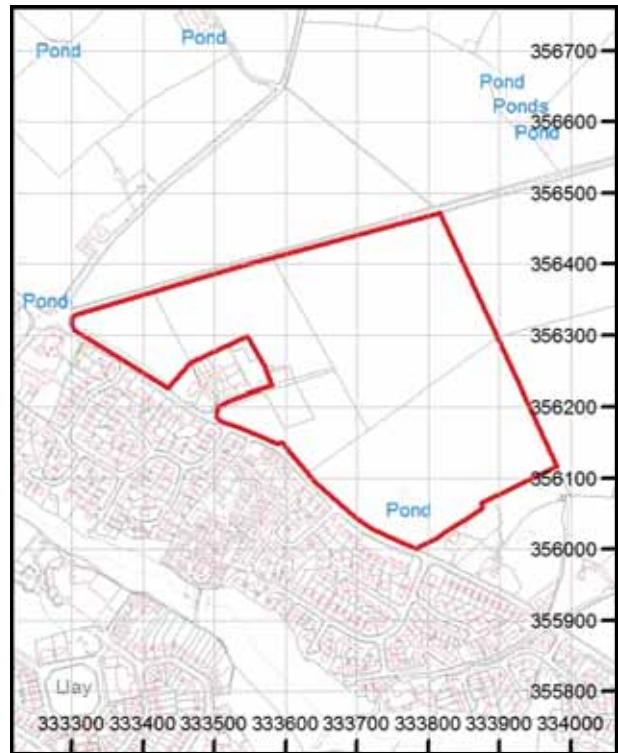
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If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
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APPENDIX P

Mark Davies

From: Stephenson, John (APHA) <John.Stephenson@apha.gsi.gov.uk>
Sent: 28 February 2017 15:45
To: Mark Davies
Subject: RE: Gresford Rd, Llay
Attachments: Code of Practice.doc

Hi Mark,

I've checked our records of burials due to outbreaks and can find no details. What I imagine the farmer is referring to, is on-farm burials which used to be common place prior to 2001. Farmers were allowed to bury fallen stock on their land provided no reportable disease was suspected.

Unfortunately, our department would not be informed of these burial locations as they posed no danger to human or animals, allegedly.

I have attached our Code of Practice which has a 24 hour contact number in the event you uncover any remains during your development.

Sorry I could not be more helpful in this instance.

Cheers,
John

John Stephenson
Animal Health Officer

Animal and Plant Health Agency (APHA)

Telephone: 0191 2153009 | Mobile: 07768 462082 | Email: john.stephenson@apha.gsi.gov.uk
Website: www.gov.uk/apha | Twitter: [@APHAgovuk](https://twitter.com/APHAgovuk) | Facebook: [aphagov](https://www.facebook.com/aphagov)

Address: APHA, Whitley Road, Longbenton, Newcastle upon Tyne, NE12 9SE

From: Mark Davies [<mailto:md@refa.co.uk>]
Sent: 28 February 2017 15:24
To: Stephenson, John (APHA)
Subject: Gresford Rd, Llay

Hi John,

We have been asked to look at the above site and we have been informed by our client that the farmer has previously buried some cattle and sheep within his land and I was wondering if you have any records of this? As far as I am aware this did not relate to any outbreaks such as foot and mouth but this is purely word of mouth from the farmer. The centre of the site is located at SJ 33720 56262. I have also attached a site location plan.

Regards

Mark Davies BSc (Hons)
Geo-Environmental Engineer
Tel: 01942 826020 Mobile: 07452 824058
md@refa.co.uk

Robert E Fry & Associates Ltd (REFA)
45 Bridgeman Terrace, Wigan, WN1 1TT
Tel: 01942 826020
www.refa.co.uk



Animal and Plant Health Agency (APHA)

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APPENDIX Q

Precautions to Prevent the Spread of Animal & Poultry Disease

Code of Practice for Civil Engineers, Surveyors & Contractors

There are a number of animal and poultry diseases, which are highly infectious either to other animals or to man. Usually these can be transmitted only by contact with infected livestock, but they can also be carried on boots or clothing. The only way of preventing the spread of these diseases is first to avoid contact with farm animals (including poultry), and second to ensure that the farmers own precautions are carefully observed.

The following precautions will minimise the risk of spreading disease:

1. Always consult the farmer before entry onto his land. This will give him the opportunity to remove livestock temporarily from the fields concerned or to draw attention to special precautions, which need to be taken on his farm.
2. Avoid all contact with animals and keep strictly to the route or area agreed with the farmer.
3. The work site and access roads should be secured by a stock proof fence to ensure that livestock cannot escape from their premises. This is important where work such as the construction of roads or the laying of pipelines are carried out over or adjacent to land on which livestock are or may be kept.
4. If it is necessary to go onto land which is or has been occupied by livestock, either wear suitable robust footwear which is capable of being cleansed and disinfected* before entry and on leaving or over-boots which can be cleansed and disinfected. This need not apply where such land is traversed only within a working area totally enclosed by the contractor.
5. Buildings occupied or used by livestock should not be entered without the express permission of the farmer. When such entry is necessary, wear robust footwear which is capable of being cleansed and disinfected before entry and on leaving, or over-boots which can be cleansed and disinfected and protective over-garments which should be cleansed and disinfected before entry and on leaving.
6. Close all gates and avoid damage to fences, hedges and walls in order to prevent livestock from straying.
7. Do not leave polythene bags, paint tins or other litter where animals can get to them. This applies particularly to discarded food such as meat sandwiches or pies which may carry infectious agents harmful to animals.
8. Contractors are reminded that paragraphs 1-7 of this code in no way supersede the appropriate clauses as detailed in the current British Standards Institution's Code of Practice (CP 2010 Part 1 Installation of Pipelines Inland).

If there is any doubt about the precautions, which should be taken in particular circumstances, contact the Duty Vet (details below). In the case of major works they

* Boots and other articles cannot be properly disinfected if they are caked with dirt; they must be cleaned first. The only disinfectants to be used should be those which carry a citation on the label stating that they have been approved by DEFRA. They must be used at the correct dilution, kept clean and regularly replenished.

should in any event be consulted to ascertain whether any particular disease restrictions apply to the area.

In addition to these general precautions there are some occasions when special care will be needed:

Foot & Mouth Disease

If an outbreak of this very highly infectious disease occurs there will be widespread publicity in the area concerned. Civil engineers, surveyors and contractors who are engaged on work which may take them on to farm land in the Infected Area should immediately contact the Duty Vet for advice.

Newcastle Disease (Fowl Pest), Swine Fever or Swine Vesicular Disease

Premises on which these diseases are present will carry a notice on the farm gate. Before entering the farm, advice should be sought from the Duty Vet.

Carcase Burial Pits

Animals, which have been slaughtered during outbreaks of certain disease, are often buried in pits. It is illegal to dig up such carcasses. Where there is prior knowledge that burial pits may exist in an area the Duty Vet may be able to help in locating them. If in the course of civil engineering operations such a pit is encountered work should be stopped and the Duty Vet informed immediately.

The advice given in this Code is without prejudice to any special requirements, contractual or otherwise, of the farmer or his agent.

Duty Vet Contact details;

Tel: 03000 200 301(Option 1)
Animal & Plant Health Agency
Whitley Road
Longbenton
Newcastle upon Tyne
NE12 9SE

APPENDIX R



Test Certificate

Client: Robert E Fry & Associates Ltd
45 Bridgeman Terrace, Wigan, Lancashire, WN1 1TT
Site: Gresford Road, Llay
Date Tested: 17/03/17
Date Reported: 27 March, 2017
Date Received: 17 March, 2017
Sample Type: Solid

Certificate No: 17/1423/RG/S/C1
File No: 17/1423/RG/S
Client Ref: 17040

Lab sample ref:	C265710	C265711	C265712	C265713	C265714
Client sample ref:	TP01 0.1m	TP02 0.2m	TP03 0.2m	TP06 0.2m	TP07 0.3m
Date sampled:	13/03/17	13/03/17	13/03/17	13/03/17	13/03/17
Sample matrix (see notes):	S	S	S	S	S

Determinand	Method	Units	ISO17025	MCERTS	LOD
-------------	--------	-------	----------	--------	-----

Deviation Assessment

Deviation(s)	C. Review	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
--------------	-----------	-----	-----	-----	-----	-----	-----	-----	-----	-----

pH	AN5a	Units	Y	Y	0.1	6.44	6.40	5.86	6.56	6.62
Sulphate (water soluble)	CTP 29	g/l	Y	Y	0.01	0.04	0.01	0.02	0.02	<0.01
Sulphide _{SM}	AN45b	mg/kg	N	N	2	8	7	<2	2	8
Cyanide (total) _{SM}	AN45a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Phenols (screen) _{SM}	AN45a	mg/kg	Y	Y	1	1	<1	3	2	<1
Arsenic	AN8b	mg/kg	Y	Y	2	6	7	6	7	6
Cadmium	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Chromium (total)	AN8b	mg/kg	Y	Y	2	25	26	26	25	19
Copper	AN8b	mg/kg	Y	Y	2	28	24	36	31	25
Lead	AN8b	mg/kg	Y	Y	2	31	30	39	30	29
Mercury	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Nickel	AN8b	mg/kg	Y	Y	2	11	12	12	13	10
Selenium	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Zinc	AN8b	mg/kg	Y	Y	2	97	79	86	96	82
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Stones	Stones	% w/w	N	N/A	0.1	<0.1	17.2	<0.1	4.5	<0.1
Moisture Content @ <30 °C	AN1	% w/w	Y	N/A	0.1	24.2	18.7	24.6	19.3	16.8
Moisture Content @ 105 °	AN1	% w/w	Y	N/A	0.1	24.8	21.6	25.5	22.8	20.6
Sample Description	MCERTS ver4.		N	N/A		2	2A	2	2A	2

Misc

TOC _S	AN48c	%	N	N	0.1	3.78	2.23	5.68	2.83	2.76
------------------	-------	---	---	---	-----	------	------	------	------	------

PAH (USEPA16)

Naphthalene (PAH) _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene _M	GCM501a	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene _M	GCM501a	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (USEPA16) Total _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1



Test Certificate

Client: Robert E Fry & Associates Ltd
45 Bridgeman Terrace, Wigan, Lancashire, WN1 1TT
Site: Gresford Road, Llay

Date Tested: 17/03/17
Date Reported: 27 March, 2017
Date Received: 17 March, 2017
Sample Type: Solid

Certificate No: 17/1423/RG/S/C1
File No: 17/1423/RG/S
Client Ref: 17040

Lab sample ref:	C265715	C265716	C265717	C265718	C265719
Client sample ref:	TP11 0.1m	TP15 0.1m	TP17 0.3m	TP18 0.1m	TP19 0.2m
Date sampled:	14/03/17	14/03/17	14/03/17	14/03/17	14/03/17
Sample matrix (see notes):	S	S	S	S	S

Determinand	Method	Units	ISO17025	MCERTS	LOD					
Deviation Assessment										
Deviation(s)	C. Review	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
pH	AN5a	Units	Y	Y	0.1	6.28	6.75	7.22	6.65	6.20
Sulphate (water soluble)	CTP 29	g/l	Y	Y	0.01	0.01	0.02	0.03	0.02	0.03
Sulphide _{SM}	AN45b	mg/kg	N	N	2	8	<2	4	<2	5
Cyanide (total) _{SM}	AN45a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Phenols (screen) _{SM}	AN45a	mg/kg	Y	Y	1	2	3	<1	3	1
Arsenic	AN8b	mg/kg	Y	Y	2	9	8	<2	5	5
Cadmium	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Chromium (total)	AN8b	mg/kg	Y	Y	2	29	16	9	17	15
Copper	AN8b	mg/kg	Y	Y	2	23	25	38	39	26
Lead	AN8b	mg/kg	Y	Y	2	33	44	118	43	34
Mercury	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Nickel	AN8b	mg/kg	Y	Y	2	13	10	17	12	10
Selenium	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Zinc	AN8b	mg/kg	Y	Y	2	87	99	92	144	93
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Stones	Stones	% w/w	N	N/A	0.1	9.5	3.6	16.3	<0.1	<0.1
Moisture Content @ <30°C	AN1	% w/w	Y	N/A	0.1	19.2	24.3	14.9	31.3	26.2
Moisture Content @ 105°	AN1	% w/w	Y	N/A	0.1	23.0	25.7	19.7	32.0	27.0
Sample Description	MCERTS ver4.		N	N/A		2A	2A	7A	2	2
Misc										
TOC _S	AN48c	%	N	N	0.1	2.43	4.05	5.27	5.64	4.53
Asbestos	ASB001	Qualitative	Y	N/A		-	-	NAD	-	-
PAH (USEPA16)										
Naphthalene (PAH) _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene _M	GCM501a	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	0.1	0.1	<0.1	0.3	0.1
Pyrene _M	GCM501	mg/kg	Y	Y	0.1	0.1	0.1	<0.1	0.3	<0.1
Benz(a)anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Chrysene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(b)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	0.1	0.1	<0.1	0.3	<0.1
Benzo(k)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Indeno(1,2,3-cd)pyrene _M	GCM501a	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	0.1	<0.1
PAH (USEPA16) Total _M	GCM501	mg/kg	Y	Y	0.1	0.5	0.5	<0.1	1.6	0.1



Test Certificate

Client: Robert E Fry & Associates Ltd
45 Bridgeman Terrace, Wigan, Lancashire, WN1 1TT
Site: Gresford Road, Llay

Date Tested: 17/03/17
Date Reported: 27 March, 2017
Date Received: 17 March, 2017
Sample Type: Solid

Certificate No: 17/1423/RG/S/C1
File No: 17/1423/RG/S
Client Ref: 17040

Lab sample ref:	C265715	C265716	C265717	C265718	C265719
Client sample ref:	TP11 0.1m	TP15 0.1m	TP17 0.3m	TP18 0.1m	TP19 0.2m
Date sampled:	14/03/17	14/03/17	14/03/17	14/03/17	14/03/17
Sample matrix (see notes):	S	S	S	S	S

Determinand	Method	Units	ISO17025	MCERTS	LOD					
TPH Banded(Alk/Aro) 1										
EC>5-6 Aliphatic _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
EC>6-8 Aliphatic _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
EC>8-10 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>10-12 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>12-16 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>16-35 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	9047	-	-
EC>35-44 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
Total Aliphatics (1) _M	SOP05a	µg/kg	Y	N	1000	-	-	9047	-	-
EC>5-7 Aromatic _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
EC>7-8 Aromatic _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
EC>8-10 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>10-12 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>12-16 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>16-21 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	1645	-	-
EC>21-35 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	5074	-	-
EC>35-44 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
Total Aromatics (1) _M	SOP05a	µg/kg	Y	N	1000	-	-	6719	-	-
Methyl t-butyl ether _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
Benzene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
Toluene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
Ethylbenzene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
m&p-Xylene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
o-Xylene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
Total VPH _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
TPH _M	SOP05a	µg/kg	Y	N	1000	-	-	15766	-	-



Test Certificate

Client: Robert E Fry & Associates Ltd
45 Bridgeman Terrace, Wigan, Lancashire, WN1 1TT
Site: Gresford Road, Llay

Date Tested: 17/03/17
Date Reported: 27 March, 2017
Date Received: 17 March, 2017
Sample Type: Solid

Certificate No: 17/1423/RG/S/C1
File No: 17/1423/RG/S
Client Ref: 17040

Lab sample ref:	C265720	C265721	C265722	C265723	C265724
Client sample ref:	TP20 0.1m	TP22 0.1m	TP26 0.1m	TP29 0.1m	TP30 0.2m
Date sampled:	14/03/17	14/03/17	14/03/17	15/03/17	15/03/17
Sample matrix (see notes):	S	S	S	S	S

Determinand	Method	Units	ISO17025	MCERTS	LOD					
Deviation Assessment										
Deviation(s)	C. Review	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
pH	AN5a	Units	Y	Y	0.1	6.32	6.64	6.39	6.60	6.66
Sulphate (water soluble)	CTP 29	g/l	Y	Y	0.01	0.01	<0.1	0.03	0.05	0.01
Sulphide _{SM}	AN45b	mg/kg	N	N	2	9	<2	10	14	3
Cyanide (total) _{SM}	AN45a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Phenols (screen) _{SM}	AN45a	mg/kg	Y	Y	1	<1	<1	1	<1	<1
Arsenic	AN8b	mg/kg	Y	Y	2	7	5	6	9	8
Cadmium	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Chromium (total)	AN8b	mg/kg	Y	Y	2	20	16	18	21	19
Copper	AN8b	mg/kg	Y	Y	2	11	25	24	20	20
Lead	AN8b	mg/kg	Y	Y	2	33	28	31	34	30
Mercury	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Nickel	AN8b	mg/kg	Y	Y	2	12	9	11	13	13
Selenium	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Zinc	AN8b	mg/kg	Y	Y	2	44	101	93	79	73
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Stones	Stones	% w/w	N	N/A	0.1	2.2	<0.1	2.2	4.7	8.2
Moisture Content @ <30°C	AN1	% w/w	Y	N/A	0.1	15.0	25.5	23.3	19.6	19.8
Moisture Content @ 105°	AN1	% w/w	Y	N/A	0.1	20.1	26.2	25.4	22.7	22.9
Sample Description	MCERTS ver4.		N	N/A		2A	2	2A	2A	2A
Misc										
TOC _S	AN48c	%	N	N	0.1	1.40	4.67	3.93	3.05	2.66
PAH (USEPA16)										
Naphthalene (PAH) _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene _M	GCM501a	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Pyrene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Benz(a)anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene _M	GCM501a	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (USEPA16) Total _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	0.3	<0.1	<0.1



Test Certificate

Client: Robert E Fry & Associates Ltd
45 Bridgeman Terrace, Wigan, Lancashire, WN1 1TT
Site: Gresford Road, Llay

Date Tested: 17/03/17
Date Reported: 27 March, 2017
Date Received: 17 March, 2017
Sample Type: Solid

Certificate No: 17/1423/RG/S/C1
File No: 17/1423/RG/S
Client Ref: 17040

Lab sample ref:	C265725	C265726	C265727	C265728	C265729
Client sample ref:	TP34 0.4m	TP35 0.5m	TP36 0.1m	TP37 0.3m	TP39 0.4m
Date sampled:	15/03/17	15/03/17	15/03/17	15/03/17	15/03/17
Sample matrix (see notes):	S	S	S	S	S

Determinand	Method	Units	ISO17025	MCERTS	LOD					
Deviation Assessment										
Deviation(s)	C. Review	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
pH	AN5a	Units	Y	Y	0.1	7.16	7.49	6.69	6.37	6.16
Sulphate (water soluble)	CTP 29	g/l	Y	Y	0.01	0.02	0.03	0.02	0.01	<0.01
Sulphide _{SM}	AN45b	mg/kg	N	N	2	<2	2	12	<2	4
Cyanide (total) _{SM}	AN45a	mg/kg	Y	Y	1	2	<1	<1	<1	<1
Phenols (screen) _{SM}	AN45a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Arsenic	AN8b	mg/kg	Y	Y	2	8	6	5	9	7
Cadmium	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Chromium (total)	AN8b	mg/kg	Y	Y	2	17	19	20	28	21
Copper	AN8b	mg/kg	Y	Y	2	27	17	19	26	22
Lead	AN8b	mg/kg	Y	Y	2	36	30	28	33	37
Mercury	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Nickel	AN8b	mg/kg	Y	Y	2	13	14	15	13	14
Selenium	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Zinc	AN8b	mg/kg	Y	Y	2	79	63	43	94	66
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Stones	Stones	% w/w	N	N/A	0.1	10.2	1.0	<0.1	4.3	6.3
Moisture Content @ <30°C	AN1	% w/w	Y	N/A	0.1	15.1	19.2	21.8	19.7	25.5
Moisture Content @ 105°	AN1	% w/w	Y	N/A	0.1	19.9	22.8	23.8	23.0	27.5
Sample Description	MCERTS ver4.		N	N/A		2A	6A	2	2A	2A
Misc										
TOC _S	AN48c	%	N	N	0.1	2.02	1.63	3.64	2.43	4.64
Asbestos	ASB001	Qualitative	Y	N/A		-	NAD	-	-	-
PAH (USEPA16)										
Naphthalene (PAH) _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene _M	GCM501a	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene _M	GCM501	mg/kg	Y	Y	0.1	0.2	<0.1	<0.1	<0.1	<0.1
Anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	0.9	<0.1	<0.1	<0.1	<0.1
Pyrene _M	GCM501	mg/kg	Y	Y	0.1	0.9	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene _M	GCM501	mg/kg	Y	Y	0.1	0.6	<0.1	<0.1	<0.1	<0.1
Chrysene _M	GCM501	mg/kg	Y	Y	0.1	0.9	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	1.2	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	0.4	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene _M	GCM501	mg/kg	Y	Y	0.1	0.8	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene _M	GCM501a	mg/kg	Y	Y	0.1	0.5	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene _M	GCM501	mg/kg	Y	Y	0.1	0.5	<0.1	<0.1	<0.1	<0.1
PAH (USEPA16) Total _M	GCM501	mg/kg	Y	Y	0.1	6.9	<0.1	<0.1	<0.1	<0.1



Test Certificate

Client: Robert E Fry & Associates Ltd
45 Bridgeman Terrace, Wigan, Lancashire, WN1 1TT
Site: Gresford Road, Llay

Date Tested: 17/03/17
Date Reported: 27 March, 2017
Date Received: 17 March, 2017
Sample Type: Solid

Certificate No: 17/1423/RG/S/C1
File No: 17/1423/RG/S
Client Ref: 17040

Lab sample ref:	C265725	C265726	C265727	C265728	C265729
Client sample ref:	TP34 0.4m	TP35 0.5m	TP36 0.1m	TP37 0.3m	TP39 0.4m
Date sampled:	15/03/17	15/03/17	15/03/17	15/03/17	15/03/17
Sample matrix (see notes):	S	S	S	S	S

Determinand	Method	Units	ISO17025	MCERTS	LOD					
TPH Banded(Alk/Aro) 1										
EC>5-6 Aliphatic _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
EC>6-8 Aliphatic _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
EC>8-10 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	<1000	-	-	-
EC>10-12 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	<1000	-	-	-
EC>12-16 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	<1000	-	-	-
EC>16-35 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	5611	-	-	-
EC>35-44 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	<1000	-	-	-
Total Aliphatics (1) _M	SOP05a	µg/kg	Y	N	1000	-	5611	-	-	-
EC>5-7 Aromatic _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
EC>7-8 Aromatic _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
EC>8-10 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	<1000	-	-	-
EC>10-12 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	<1000	-	-	-
EC>12-16 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	<1000	-	-	-
EC>16-21 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	<1000	-	-	-
EC>21-35 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	4145	-	-	-
EC>35-44 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	<1000	-	-	-
Total Aromatics (1) _M	SOP05a	µg/kg	Y	N	1000	-	4145	-	-	-
Methyl t-butyl ether _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
Benzene (VPH) _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
Toluene (VPH) _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
Ethylbenzene (VPH) _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
m&p-Xylene (VPH) _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
o-Xylene (VPH) _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
Total VPH _M	SOP05	µg/kg	N	N	10	-	<10	-	-	-
TPH _M	SOP05a	µg/kg	Y	N	1000	-	9756	-	-	-



Test Certificate

Client: Robert E Fry & Associates Ltd
45 Bridgeman Terrace, Wigan, Lancashire, WN1 1TT
Site: Gresford Road, Llay

Date Tested: 17/03/17
Date Reported: 27 March, 2017
Date Received: 17 March, 2017
Sample Type: Solid

Certificate No: 17/1423/RG/S/C1
File No: 17/1423/RG/S
Client Ref: 17040

Lab sample ref:	C265730	C265731	C265732	C265733	C265734
Client sample ref:	TP40 0.1m	TP42 0.3m	TP44 0.4m	TP45 0.4m	TP46 0.2m
Date sampled:	15/03/17	15/03/17	15/03/17	15/03/17	15/03/17
Sample matrix (see notes):	S	S	S	S	S

Determinand	Method	Units	ISO17025	MCERTS	LOD					
Deviation Assessment										
Deviation(s)	C. Review	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
pH	AN5a	Units	Y	Y	0.1	6.47	6.47	7.04	7.44	7.03
Sulphate (water soluble)	CTP 29	g/l	Y	Y	0.01	0.02	0.02	0.07	0.06	0.06
Sulphide _{SM}	AN45b	mg/kg	N	N	2	7	5	7	<2	6
Cyanide (total) _{SM}	AN45a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Phenols (screen) _{SM}	AN45a	mg/kg	Y	Y	1	3	<1	<1	<1	<1
Arsenic	AN8b	mg/kg	Y	Y	2	5	7	43	23	28
Cadmium	AN8a	mg/kg	Y	Y	1	<1	<1	2	1	1
Chromium (total)	AN8b	mg/kg	Y	Y	2	20	20	25	21	23
Copper	AN8b	mg/kg	Y	Y	2	37	15	200	106	112
Lead	AN8b	mg/kg	Y	Y	2	35	36	106	141	233
Mercury	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Nickel	AN8b	mg/kg	Y	Y	2	12	9	47	41	38
Selenium	AN8a	mg/kg	Y	Y	1	<1	<1	<1	<1	<1
Zinc	AN8b	mg/kg	Y	Y	2	124	42	401	490	303
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Stones	Stones	% w/w	N	N/A	0.1	2.8	3.6	11.0	25.3	17.9
Moisture Content @ <30°C	AN1	% w/w	Y	N/A	0.1	32.1	19.2	33.6	18.0	23.5
Moisture Content @ 105°	AN1	% w/w	Y	N/A	0.1	32.1	22.2	33.8	23.6	26.0
Sample Description	MCERTS ver4.		N	N/A		2A	2A	2A	2A	2A
Misc										
TOC _S	AN48c	%	N	N	0.1	6.47	2.28	4.60	2.59	4.31
Asbestos	ASB001	Qualitative	Y	N/A		-	-	NAD	NAD	NAD
PAH (USEPA16)										
Naphthalene (PAH) _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene _M	GCM501a	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	0.2	0.4	0.3
Anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	0.3	<0.1	0.5	0.9	0.8
Pyrene _M	GCM501	mg/kg	Y	Y	0.1	0.1	<0.1	0.5	0.7	0.8
Benz(a)anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	0.3	0.5	0.5
Chrysene _M	GCM501	mg/kg	Y	Y	0.1	0.3	<0.1	0.5	0.9	0.8
Benzo(b)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	0.3	<0.1	0.5	1.1	0.8
Benzo(k)fluoranthene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	0.3	0.5	0.4
Benzo(a)pyrene _M	GCM501	mg/kg	Y	Y	0.1	0.1	<0.1	0.3	0.7	0.7
Indeno(1,2,3-cd)pyrene _M	GCM501a	mg/kg	Y	Y	0.1	<0.1	<0.1	0.2	0.5	0.4
Dibenz(a,h)anthracene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	0.2	<0.1
Benzo(ghi)perylene _M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	0.3	0.6	0.4
PAH (USEPA16) Total _M	GCM501	mg/kg	Y	Y	0.1	1.0	<0.1	3.3	7.0	5.8



Test Certificate

Client: Robert E Fry & Associates Ltd
45 Bridgeman Terrace, Wigan, Lancashire, WN1 1TT
Site: Gresford Road, Llay

Date Tested: 17/03/17
Date Reported: 27 March, 2017
Date Received: 17 March, 2017
Sample Type: Solid

Certificate No: 17/1423/RG/S/C1
File No: 17/1423/RG/S
Client Ref: 17040

Lab sample ref:	C265730	C265731	C265732	C265733	C265734
Client sample ref:	TP40 0.1m	TP42 0.3m	TP44 0.4m	TP45 0.4m	TP46 0.2m
Date sampled:	15/03/17	15/03/17	15/03/17	15/03/17	15/03/17
Sample matrix (see notes):	S	S	S	S	S

Determinand	Method	Units	ISO17025	MCERTS	LOD					
TPH Banded(Alk/Aro) 1										
EC>5-6 Aliphatic _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
EC>6-8 Aliphatic _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
EC>8-10 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>10-12 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>12-16 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>16-35 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	2202	-	-
EC>35-44 Aliphatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
Total Aliphatics (1) _M	SOP05a	µg/kg	Y	N	1000	-	-	2202	-	-
EC>5-7 Aromatic _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
EC>7-8 Aromatic _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
EC>8-10 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>10-12 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>12-16 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>16-21 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
EC>21-35 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	2081	-	-
EC>35-44 Aromatic _M	SOP05a	µg/kg	Y	N	1000	-	-	<1000	-	-
Total Aromatics (1) _M	SOP05a	µg/kg	Y	N	1000	-	-	2081	-	-
Methyl t-butyl ether _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
Benzene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
Toluene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
Ethylbenzene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
m&p-Xylene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
o-Xylene (VPH) _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
Total VPH _M	SOP05	µg/kg	N	N	10	-	-	<10	-	-
TPH _M	SOP05a	µg/kg	Y	N	1000	-	-	4283	-	-

Notes

1. All analyses performed on the sample dried at <30°C, except analyses suffixed with 'M'.
2. Analyses suffixed 'M' were performed on the sample as received and corrected for '% moisture at <30°C' where applicable.
3. All results are expressed as dry weight.
4. Sample Matrix key: S - Soil OS - Other Solid MCERTS accreditation applicable to Sample Matrix 'S' only.
5. Natural stones (pebbles, gravels etc.) which do not pass a 4mm sieve are excluded from dried analyses (for chemical testing only).
6. Tests marked * indicate subcontracted analyses.
7. The laboratory has tested the material/items supplied by the client as sampled in accordance with the client's own requirements.
8. *Sample Description key: 1. - Sand, 2. Loam, 3. Clay, 4. Sand/loam mix, 5. Sand/clay mix, 6. Clay/loam mix, 7. Other.
suffixed with: A - Stones, B - Construction rubble, C - Visible Hydrocarbons, D - Vegetation, E - Glass/metal, F - Strong odour, G - Other.
9. Leachate preparation is not included in our UKAS accreditation.
10. Dates of testing for all parameters are available upon request.
11. EMR denotes Extraneous material.
12. Sampling location details and sample information were supplied with the sample.
13. Bulk Analysis carried out in accordance with DIHM ASB/01 which is based on Health & Safety Executive procedure
Appendix 2: Asbestos in Bulk Materials: Sampling and identification by polarised light microscopy (PLM) set out in HSG248.
14. Asbestos material identification is based on visual examination only. Comments are not covered by UKAS accreditation.
15. NAD denotes - 'No Asbestos Detected'.
16. Any additional letter or number suffix included after the method reference is for internal use only.
17. Please note that results relate only to the items tested and that this test report should not be reproduced except with full permission of the laboratory.
18. LOD denotes Limit of Detection (also our reporting limit)

Signed for, and on behalf of Exova (UK) Ltd.

Prepared by:



F Barr
Administrator

Approved by:



J McEleny
Operations Manager



0568

Registered Office: Exova (UK) Ltd. Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL United Kingdom. Reg No. SC 70429

APPENDIX S



LABORATORY REPORT



4043

Contract Number: PSL17/1395

Report Date: 30 March 2017
Client's Reference: 17040
Client Name: REFA Consulting Engineers
45 Brdgeman Terrace
Wigan
WN1 1TT

For the attention of: Mark Davies

Contract Title: Gresford Road, Llay
Date Received: 24/3/2017
Date Commenced: 24/3/2017
Date Completed: 30/3/2017

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)


S Royle
(Laboratory Manager)

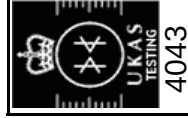
A Fry
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP01			0.40		Brown gravelly very sandy CLAY.
TP02			1.00		Brown slightly gravelly very sandy CLAY.
TP03			1.30		Brown slightly gravelly very sandy CLAY.
TP10			1.00		Brown slightly gravelly very sandy CLAY.
TP10			1.40		Brown slightly gravelly very sandy CLAY.
TP13			2.50		Brown slightly gravelly very sandy CLAY.
TP14			2.00		Brown gravelly very sandy CLAY.
TP18			1.50		Brown slightly gravelly very sandy CLAY.
TP21			2.00		Brown slightly gravelly very sandy CLAY.
TP23			2.50		Brown very sandy CLAY.
TP25			1.00		Brown slightly gravelly very sandy CLAY.
TP26			1.50		Brown slightly gravelly sandy CLAY.
TP27			1.00		Brown slightly gravelly SAND.
TP30			1.00		Brown slightly gravelly very sandy CLAY.
TP31			1.50		Brown slightly gravelly very sandy CLAY.
TP34			1.00		Brown slightly gravelly very sandy CLAY.
TP37			1.50		Brown slightly gravelly very sandy CLAY.
TP39			1.50		Brown slightly gravelly very sandy CLAY.
TP40			1.00		Brown slightly gravelly very sandy CLAY.



PSL
Professional Soils Laboratory

Gresford Road, Llay

Contract No:

PSL17/1395

Client Ref:

17040

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP01			0.40		16			27	15	12	86	Low plasticity CL.
TP02			1.00		16			34	17	17	94	Low plasticity CL.
TP03			1.30		16			29	15	14	96	Low plasticity CL.
TP10			1.00		19			27	14	13	92	Low plasticity CL.
TP10			1.40		17			33	17	16	96	Low plasticity CL.
TP13			2.50		19			36	19	17	90	Intermediate plasticity CL.
TP14			2.00		13			25	13	12	84	Low plasticity CL.
TP18			1.50		16			32	17	15	94	Low plasticity CL.
TP21			2.00		14			26	14	12	92	Low plasticity CL.
TP23			2.50		16			28	15	13	100	Low plasticity CL.
TP25			1.00		14			27	15	12	96	Low plasticity CL.
TP26			1.50		23			45	23	22	96	Intermediate plasticity CL.
TP27			1.00		14				NP			
TP30			1.00		16			38	18	20	94	Intermediate plasticity CL.
TP31			1.50		15			30	16	14	92	Low plasticity CL.
TP34			1.00		14			26	14	12	92	Low plasticity CL.
TP37			1.50		12			30	15	15	94	Low plasticity CL.
TP39			1.50		14			31	16	15	92	Low plasticity CL.
TP40			1.00		16			32	16	16	92	Low plasticity CL.

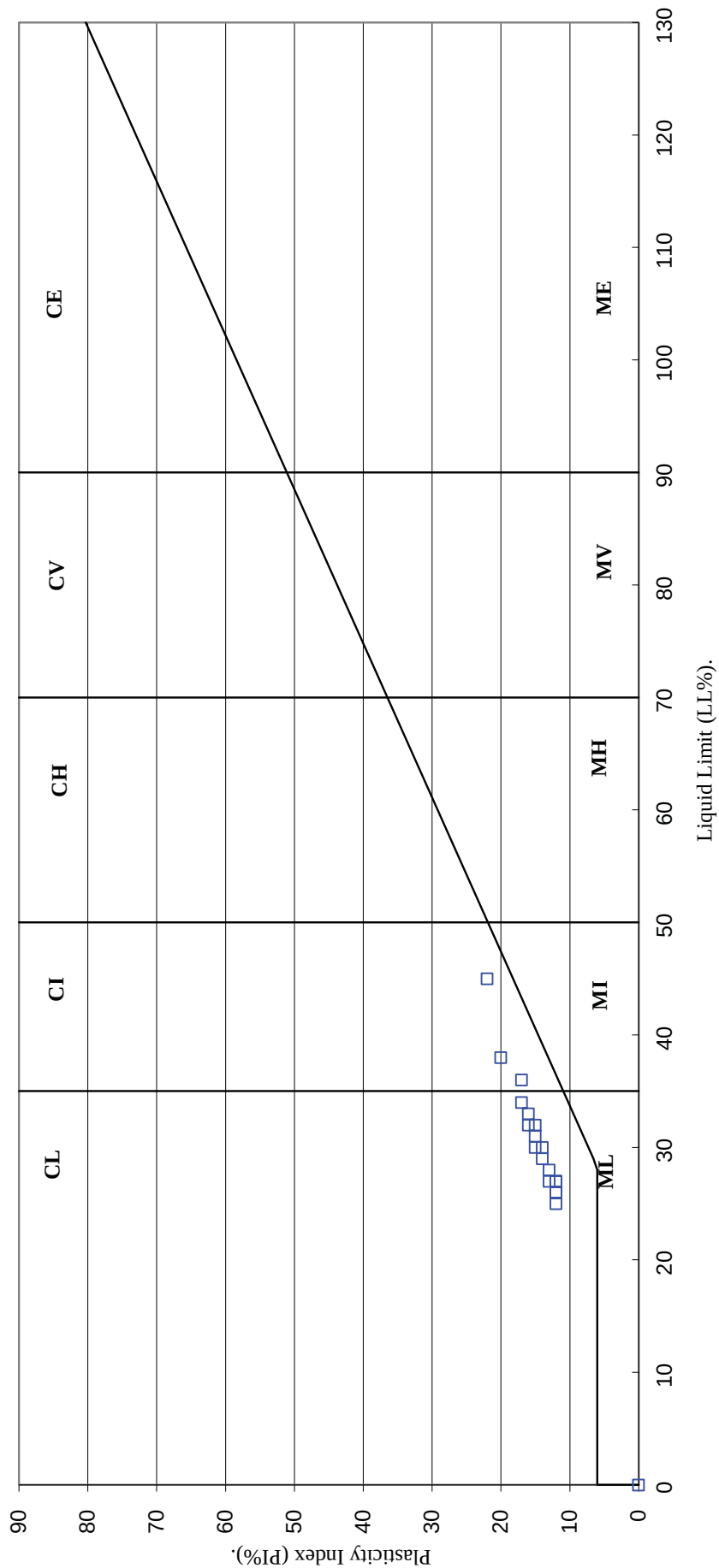
SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

			Gresford Road, Llay		Contract No:	
					PSL17/1395	
					Client Ref:	
					17040	

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(BS5930 :2015)



Gresford Road, Llay		Contract No:
		PSL17/1395
		Client Ref:
		17040

(BS1377 : PART 2 : 1990)

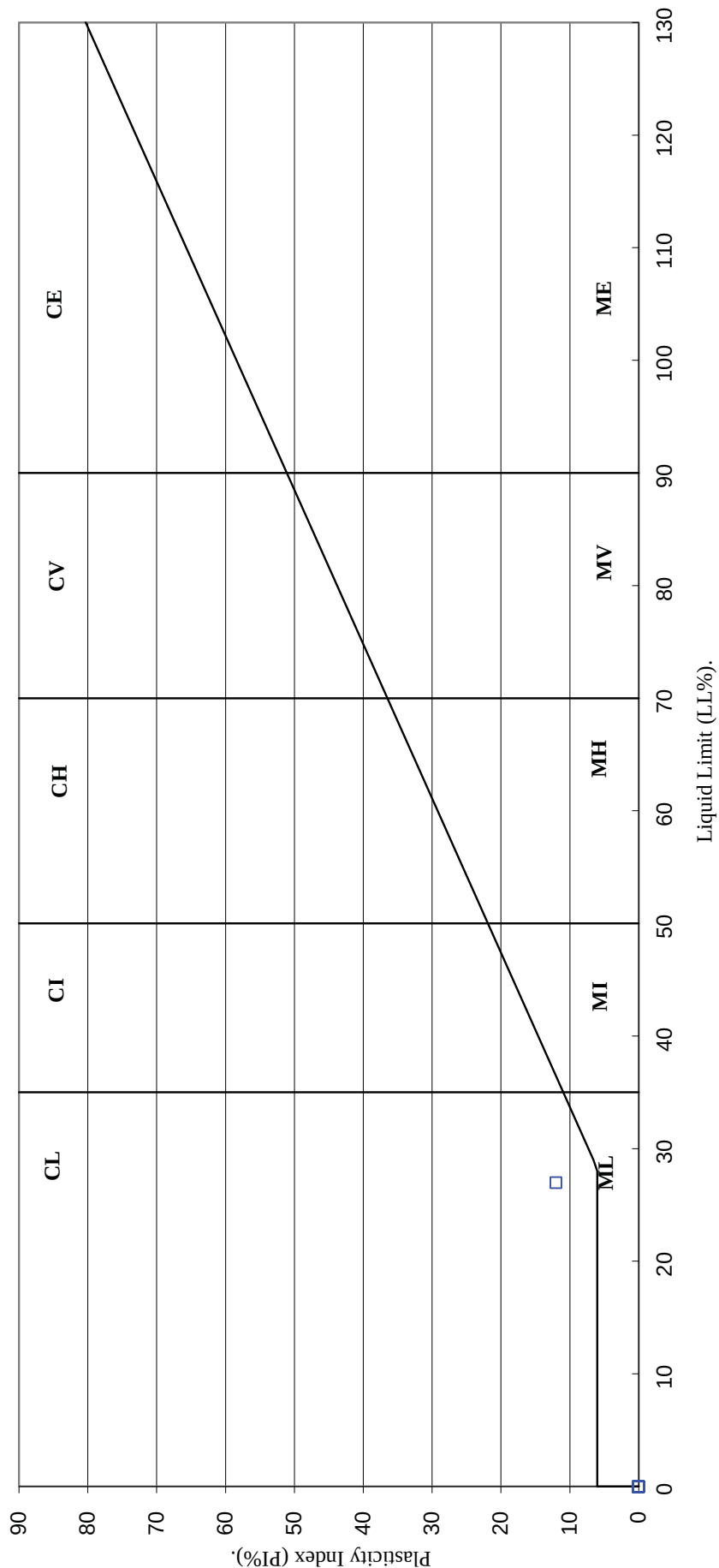
SYMBOLS: NP : Non Plastic
* : Liquid Limit and Plastic Limit Wet Sieved.



Contract No:	PSL17/1395
Client Ref:	17040

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(BS5930 :2015)



Gresford Road, Llay		Contract No:
		PSL17/1395
		Client Ref:
		17040

APPENDIX T

Ground Gas Monitoring Record

[illegible]

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by: Weather : Equipment used: Visible signs of vegetation stress: Boreholes sampled for laboratory analysis: Other comments / observations:	S. Edwards Sunny, dry LMS Type G3 xi Gas Meter	Contract: Home Farm Llay Date: 27.03.2017 Job No. Sheet No. 1
--	--	---

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD
Tel. 01925 240476 email: paul.platt@geoventures.co.uk

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Borehole Pressure (Pa)	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Nitrogen (%v/v)		Depth to water (m bgl)	Atmospheric Pressure (mB)	Comments
			Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
BH01	0.0	0	0.0				0.4		17.8		81.7		4.76	1025	
BH03	0.0	0	0.0				0.9		20.2		78.8		0.30	1025	
BH07	0.0	0	0.0				0.0		20.6		79.3		5.66	1025	
WS01	0.0	0	0.0				0.0		20.6		79.3		DRY	1025	
WS07	0.0	0	0.0				0.1		20.4		79.4		0.75	1025	
WS08	0.0	0	0.0				0.0		20.4		79.5		1.02	1025	

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by: Weather : Equipment used: Visible signs of vegetation stress: Boreholes sampled for laboratory analysis: Other comments / observations:	P. Platt Dry LMS Type G3 xi Gas Meter												Contract:	Home Farm Llay	
													Date:	11.04.2017	
													Job No.		
													Sheet No.	2	

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD
Tel. 01925 240476 email: paul.platt@geoventures.co.uk

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Borehole Pressure (Pa)	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Nitrogen (%v/v)		Depth to water (m bgl)	Atmospheric Pressure (mB)	Comments
			Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
BH01	0.0	0	0.0				0.2		17.4		82.3		4.26	1021	
BH03	0.0	0	0.0				0.7		20.1		79.1		0.28	1021	
BH07	0.0	0	0.0				0.0		20.6		79.3		0.67	1021	
WS01	0.0	0	0.0				0.0		20.4		79.5		DRY	1021	
WS07	0.0	0	0.1				0.1		20.5		79.4		0.73	1021	
WS08	0.0	0	0.0				0.0		20.6		79.2		0.95	1021	

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by: Weather : Equipment used: Visible signs of vegetation stress: Boreholes sampled for laboratory analysis: Other comments / observations:	J. Crook / P. Platt Dry LMS Type G3 xi Gas Meter		Contract:	Home Farm Llay
			Date:	27.04.2017
			Job No.	
			Sheet No.	3

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD
Tel. 01925 240476 email: paul.platt@geoventures.co.uk

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Borehole Pressure (Pa)	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Nitrogen (%v/v)		Depth to water (m bgl)	Atmospheric Pressure (mB)	Comments
			Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
BH01	0.0	0	0.0				0.4		17.8		81.7		4.80	1017	
BH03	0.0	0	0.0				0.9		20.2		78.8		0.28	1017	
BH07	0.0	0	0.0				0.0		20.6		79.3		5.60	1017	
WS01	0.0	0	0.0				0.0		20.6		79.4		DRY	1017	
WS07	0.0	0	0.0				0.1		20.5		79.3		0.78	1017	
WS08	0.0	0	0.0				0.0		20.4		79.5		1.00	1017	

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by: Weather : Equipment used: Visible signs of vegetation stress: Boreholes sampled for laboratory analysis: Other comments / observations:	J. Crook Dry LMS Type G3 xi Gas Meter												Contract:	Home Farm Llay	
													Date:	10.05.2017	
													Job No.		
													Sheet No.	4	

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD
Tel. 01925 240476 email: paul.platt@geoventures.co.uk

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Borehole Pressure (Pa)	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Nitrogen (%v/v)		Depth to water (m bgl)	Atmospheric Pressure (mB)	Comments
			Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
BH01	0.0	0	0.0				0.3		19.3		80.3		DRY	1022	
BH03	0.0	0	0.0				0.5		19.7		79.7		0.53	1022	
BH07	0.0	0	0.0				0.0		20.5		79.4		6.30	1022	
WS01	0.0	0	0.0				0.0		20.6		79.3		DRY	1022	
WS07	0.0	0	0.0				0.0		20.6		79.3		0.70	1022	
WS08															Damaged / lost

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by: Weather : Equipment used: Visible signs of vegetation stress: Boreholes sampled for laboratory analysis: Other comments / observations:	P. Platt Dry, sunny LMS Type G3 xi Gas Meter													Contract:	Home Farm Llay
														Date:	27.05.2017
														Job No.	
														Sheet No.	5

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD
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Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Borehole Pressure (Pa)	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Nitrogen (%v/v)		Depth to water (m bgl)	Atmospheric Pressure (mB)	Comments
			Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
BH01	0.0	0	0.0				0.2		20.3		79.4		DRY	1013	
BH03	0.0	0	0.0				0.6		20.1		79.2		0.73	1013	
BH07	0.0	0	0.0				0.0		20.4		79.6		6.60	1013	
WS01	0.0	0	0.0				0.0		20.5		79.5		DRY	1013	
WS07															Lost
WS08															Damaged / lost

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by: Weather : Equipment used: Visible signs of vegetation stress: Boreholes sampled for laboratory analysis: Other comments / observations:	P. Platt / S Edwards Dry LMS Type G3 xi Gas Meter												Contract:	Home Farm Llay	
													Date:	06.07.2017	
													Job No.		
													Sheet No.	6	

Geo-Ventures (UK) Limited

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