



Preliminary Investigation Report

at

Gillyflower Farm, Lostwithiel, Cornwall PL22 0HR

for

We Are Ease Ltd

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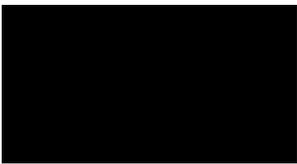
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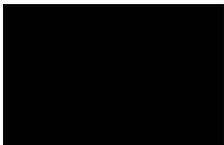
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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Commission

Soils Limited was commissioned by We Are Ease Ltd to undertake a Preliminary Investigation on Gillyflower Farm, Lostwithiel, Cornwall PL22 0HR. The scope of the investigation was outlined in the Soils Limited quotation reference Q23445, dated November 2020.

Caveat

Whilst reasonable skill and care has been taken to determine the site history and the environmental setting within the time constraints applied by the project, it should be appreciated that uncertainties may occur owing to the natural variability of soil material within a defined area or as a result of unknowns that are associated with contaminated land assessment in general. The site conditions may be different from that indicated by this Preliminary Investigation, particularly on a site with a history of past development. No responsibility can be accepted should such conditions alter the recommendations made in this report.

This Preliminary Investigation does not include a detailed UXO risk assessment, it does however contain a basic assessment in accordance with CIRIA C681 and CIRIA C785. In preparing a Preliminary Investigation reference is made to historical maps and web-based sources to assess the risk of the site potentially having been impacted by bombing during the World Wars. The data readily available is not necessarily definitive. Certain areas were bombed heavily such as centres of industrial manufacture, airfields, shipyards, docklands, railways sidings and junctions. The assessment is based on the likely area risk, bomb patterns (i.e. lines of recorded bomb impacts with gaps where an impact would be anticipated) and the age of structures on and in close proximity to the site.

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Section I Introduction

I.1 Objective

The Preliminary Investigation Report was undertaken to advise the client on the risk pertaining to the site, with special reference to historic and current potential contaminative activities and processes. This also included the assessment of their impact on current and future sensitive receptors such as human health, controlled waters, ecological features, building structures and services.

I.2 Legislation and Liability

The primary legislative mechanism for contaminated land management in the UK is Part 2A of the Environmental Protection Act, 1990 (EPA). Part 2A was introduced into the EPA under Section 57 of the Environment Act 1995 to help deal with the substantial legacy of land contamination. The legislation provides powers in relation to the identification, remediation and apportionment of liability for contaminated land. Part 2A applies where there is unacceptable risk, assessed on the basis of the current use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission.

Under Part IIA of the Environment Act 1995, Local Authorities are required to identify contaminated land and serve on every person who is an appropriate person a remediation notice setting out what is to be done by way of remediation and the period within which it must be done.

If the person who caused, or knowingly permitted, the contaminating substance cannot be found, the owner and/or, occupier for the time being, of the property can be the appropriate person.

Under the legislation, Contaminated Land is defined as: -

“Land which is in such a condition by reason of substances in, on or under the land that significant harm is being caused or that there is a significant possibility of such harm being caused or that pollution of controlled waters is being, or is likely to be caused.”

Where the Act defines harm as:

“harm to the health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property.”

and pollution of controlled waters is defined as: -

“the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter.”

In addition, The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 introduced the supplementary definition of harm to include: lasting exposure to any person resulting from the after-effects of a radiological emergency, past practice or past work activity.

With regard to contaminated waters, the Environment Act 1995 amends the Water Resources Act 1991 and provides the Environment Agency with the power to force clean-up of historical contamination by issuing a Works Notice, with remediation paid for by the responsible parties.

The Groundwater Regulations (1998) stated that entry of List 1 substances into groundwater must be prevented, and List II substances must be controlled.

1.3 Limitations and Disclaimers

This Preliminary Investigation Report relates to the site located at Gillyflower Farm, Lostwithiel, Cornwall PL22 0HR and was prepared for the sole benefit of We Are Ease Ltd (The "Client") for the brief described in the Commission of this report.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the contract with the Client, incorporation of our General Conditions of Contract of Business and taking into account the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given

remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

There may be other sources of information not included in those listed that hold data relevant to the Preliminary Investigation Report undertaken at the site that could materially affect the conclusions made in this report.

Ownership of land brings with it onerous legal liabilities in respect of harm to the environment. "Contaminated Land" is defined in Section 57 of the Environment Act 1995.

Where a contaminative use is identified in the Preliminary Investigation Report this does not determine whether contamination has actually occurred, or if it has the degree to which it may have taken place. An intrusive investigation(s) and analysis is required to establish the nature and degree of any contamination present.

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1.4 Site Location

The site was located at Gillyflower Farm, Lostwithiel, Cornwall PL22 0HR on land centred around an O.S Land Ranger Grid Reference of SX 11295 60576

The site location map is presented in Figure 1 and the full Site Walkover is discussed in Section 2.1 of this report.

1.5 Proposed Development

At the time of writing, the proposal comprised a mixed-use development consisting of a central building referred to as 'The Hub', a small number of holiday accommodation buildings referred to as 'Drum Cabins', and a single residential building to the east of the site. 'The Hub' is to be a large, irregular shaped building comprising a market display, meeting room, admin room, apple store, café, exhibition centre and toilets.

It is assumed that the residential building will have a soft-landscaped private garden. In addition, it is assumed that macadam access paths will be provide access across the site.

In compiling this report reliance was placed on the drawings presented within SMIT/7/ Gillyflower/PL0, dated December 2020 and prepared By Roderick James Architects LLP'. Any change or deviation from the scheme outlined in the drawing could invalidate the recommendations presented within this report. Soils Limited must be notified about any such changes.

The proposed development plans have been provided in Appendix A.

Section 2 Site Conditions

2.1 Site Walkover

A site walkover was undertaken in November 2020, by Soils Limited. During the site walkover observations were made in relation to current activities, evidence of historical activities, sources of potential contamination such as fuel storage tanks, oil drums and chemical storage and evidence of contamination. The walkover also looked for evidence of soil contamination in the form of staining odours and stressed or discoloured vegetation. The notes of the site walkover are presented in Table 2.1 and Table 2.2.

Table 2.1 Site Walkover Record (On-site)

Use of Site	At the time of the site walkover, the site was undeveloped and comprised a number of grassed fields. In the south-western section of the site was a small fruit tree nursery. Based on anecdotal information, the site was previously used as a golf course.
Structures	None present.
Site Topography	The site sloped down relatively steeply towards the south-west, with a drop across the site of approximately 30m, at a gradient of approximately 6°.
Site Covering	The majority of the site was covered by grass, with a small, steep soil access track in the southern tip of the site.
Vegetation	The majority if the site was covered by grass and sporadic low-lying weeds. Numerous mature trees, semi-mature trees and bushes were present, predominately along the site boundaries and within a central portion of the site. Based upon the walkover survey no obvious evidence of Japanese Knotweed (<i>Fallopia japonica</i>) was noted on site. It should be noted that a detailed survey of the possible presence or absence of invasive species is outside of the scope of investigation.
Potential Contamination Sources	The site was previously used as a golf course.
Odour	None noted.
Drainage & Services	Overhead electric cables running approximately north-south in the eastern section of the site.

Table 2.2 Site Walkover Record (Off-site)

Use of Land	<ul style="list-style-type: none"> • The land to the north, east and south of the site comprised farmland. • The land to the west of the site comprised undeveloped land, in similar condition to that of the site. • The Town of Lostwithiel was located approximately 250m south of the site. • A moderately sized depot/yard was situated 90m south-east of the site.
Area Topography	The land surrounding the site sloped down relatively steeply towards the south-west.
Vegetation	Mature trees, semi-mature trees and bushes were present along roadsides and adjacent field boundaries. An area of woodland was located approximately 90m north of the site.
Potential Contamination Sources	Depot/yard situated 90m south-east of the site.

2.2 Site Drainage

No drainage was present onsite. Surface water is anticipated to flow down towards the south-west, in line with the wider topography.

2.3 Site Photographs

The site photographs have been included within Appendix E.

Section 3 Geology, Hydrogeology, Hydrology and Radon

3.1 Anticipated Geology

The 1:50,000 BGS Geology map showed the site generally to be situated on the Bovisand Formation bedrock, with no overlying superficial deposits. It is indicated that superficial deposits of Head are situated within the southern and western site boundaries.

3.1.1 Head

Head Deposit are drifts produced by solifluxion, the downslope movement of debris outwash during the periglacial period, and characteristically comprise poorly sorted sands and gravels of local derivation

3.1.2 Bovisand Formation

The Bovisand Formation comprises slaty mudstone, medium to dark grey, with thin sandstone beds and sporadic thin limestone beds. Packets of quartzitic sandstone beds are present in the form of the Upper and Lower Longsands Sandstone members. The Bovisand Formation formed between 393 and 411 million years ago during the Devonian.

The Bovisand Formation demonstrates a gradationally weathered soil profile typically more weathered and fine grained near surface but becoming increasingly granular and competent with depth.

3.2 Hydrogeology

To assess the vulnerability of groundwater to contamination, consideration must be given to the leaching characteristics of the overlying soils and the characteristics of the strata in the unsaturated zone. Information on the geological strata such as lithological type and permeability characteristics has been combined with the physical properties of the soil to produce varying degrees of vulnerability.

Table 3.1 presents the hydrological data that is relevant to the site.

Table 3.1 Hydrogeological Assessment

Hydrogeological Data		Comment
On-site	Superficial	Secondary Aquifer – Undifferentiated ¹
Aquifers	Bedrock	Secondary Aquifer – A ²
Groundwater Vulnerability		High ³
Source Protection Zones (SPZ)		None
Abstraction	Potable	None within 250m
	Non-potable	Lostwithiel Gold and Country Club: Surface water abstraction for spray irrigation – 74m South.
Sensitive land uses		<ul style="list-style-type: none"> None onsite Polsoe/Trap Woods (Ancient Woodland)⁴ – 75m North
Surface Water Features		<ul style="list-style-type: none"> None onsite.

Hydrogeological Data	Comment
	<ul style="list-style-type: none"> • Unnamed stream (Indicated to flow towards the west) – 19m South • Spring – 159m West • River Fowey – 201m West
Flood Risk from Rivers or Seas	<ul style="list-style-type: none"> • No risk – Onsite. • Risk of extreme flooding – 125m North-west. • Risk of flooding – 179m North-west.
Flood Risk from Surface Water	<ul style="list-style-type: none"> • Low risk (1000-year return) – along sites southernmost tip and western boundary. • Medium risk (100-year return) – 17m south, • High risk (30-year return) – 19m south.
Flood Risk from Groundwater	<ul style="list-style-type: none"> • Limited potential for groundwater flooding to occur – Onsite. • Potential for groundwater flooding to occur – 3m South. • Potential for groundwater flooding of property situated below ground level – 56m south-west.

Notes: ¹ Has been assigned where it is not possible to attribute either category A or B to a rock type. Typically, this means that the layer has variable characteristics. ² 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. ³ Relates to the well-connected fractures within the bedrock. ⁴ Woodland that has existed continuously since 1600 or before.

Any works or development which has the potential to have an impact on surface water, aquifer or groundwater quality must be approved by the Environment Agency prior to implementation.

3.3 Hydrology

The approximate elevation of the site was ~80m Above Ordnance Datum (AOD) in the north-eastern section of the site, dropping to ~30m AOD in the south-western section of the site. The anticipated groundwater flow direction is given in Table 3.2.

Table 3.2 Hydrological Assessment

Type	Direction	Notes
Surface water	South-west	Surface water is anticipated to flow down towards the south-west, in line with the wider topography, towards the River Fowey.
Groundwater	South-west	Groundwater is anticipated to flow down towards the south-west, predominately through the well-connected fractures within the bedrock, in line with the wider topography towards the River Fowey.

3.4 Radon Gas

The British Geological Survey, in conjunction with the Radiation Protection Division of the Health Protection Agency, indicates the site to lie within an area where there is a probability of more than 10-30% of present or future homes being above the action level of 200Bq/m³. As such, the site is classified as a Radon Affected Area.

Therefore, the guidance suggests that the installation of full radon protective measures is likely to be required.

Section 4 Site History

4.1 Historic Map Study

The object of this study was to report on the evidence of site history and redevelopment of the site and its environs from available County Series and Ordnance Survey Maps dating from the mid to late 19th Century to the present day as downloaded from Landmark Environmental.

The published maps only represent a “snapshot” of the site and its environs at the date of the survey. The detail of the information recorded can vary between epochs, map scale and county areas. It should be noted that changes in land uses, processes or activities may have occurred outside of published epochs and these may not have been recorded on subsequent epochs. Also note that as methods of projection, production and recording have changed over time, this can result in geo-reference errors that may indicate the established site boundary is off-centre from its true location on older historical maps. Where this is potentially significant it will be noted.

Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. Where dates have been noted in brackets, these are the actual dates applicable to the map editions and may not reflect the date of the original survey it is based on. The information reported might not represent all pertinent information that could be obtained. The interpretation of the maps and/or other data commented on in this report is subjective.

As part of the review of the historical plans, only features considered to have or to have had a potential contaminative impact on the site and usually within a notional 250m radius are discussed, and are presented within Table 4.1, Table 4.2 and Table 4.3.

The historic maps referred to are appended to this report (Appendix B). The north point and approximate extent of the site are indicated on each figure

Table 4.1 Historic Development of the Site

Site History	Date Range	
	From	To
The site is a large, irregular shape, comprising numerous fields. The site boundaries are formed approximately 50% by field boundaries and the remaining 50% by unnamed roads.	1881 ¹	1972
The road forming the western site boundary is now referred to as ‘Cott Road’.	1972	1999
The site has been redeveloped into a large Golf Course.	1999	Present ²

Notes: ¹ First available map. ² Time of reporting December 2020.

Table 4.2 Historic Off-site Development

Off-site Development	Date Range	
	From	To
The majority of land surrounding the site comprised farmland. Surface workings, a quarry, an old quarry and workings are situated 7m south-east, 15m east, 242m north-east and 260m east of the site respectively. A corn mill is located 172m south-east of the site and a railway 183m to the west. A small settlement, referred to as 'Lower Polscoe' is present 50m south-west of the site and 'Higher Polscoe' is 100m south-east of the site.	1881 ¹	1888
The town of 'Lostwithiel' is situated 800m south-west of the site.	1888	1907
The quarry 15m east of the site is no longer present.	1907	1972
The corn mill located 172m south-east of the site is no longer present. An electric substation is located 112m to the south-west.	1972	1986
A tip (disused) is present 546m west of the site.	1986	1999
The land surrounding the site has been developed into a golf course, and a car park is located 45m to the west of the site.	1999	Present ²

Notes: ¹ First available map. ² Time of reporting December 2020.

Table 4.3 Potential Sources of Pollution Indicated from Historic Maps

Source	Direction	Distance (m)	Date Range	
			From	To
Farmland	Onsite	0	1881 ¹	1999
Golf Course	Onsite	0	1999	2020 ³
Farmland	North, East, South, West	5	1881 ¹	1999
Surface Workings	South-east	7	1881 ¹	Present ²
Quarry	East	15	1881 ¹	1907
Car Park	West	45	1999	Present ²
Electric Substation	South-west	112	1972	Present ²
Corn Mill	South-east	172	1881 ¹	1972
Railway	West	183	1881 ¹	Present ²
Old Quarry	North-east	242	1881 ¹	Present ²
Workings	East	260	1881 ¹	Present ²
Tip (Disused)	West	546	1986	Present ²

Notes: ¹ First available map. ² Time of reporting December 2020. ³ At the time of the site walkover the site was no longer in use as a golf course.

4.2 Bomb damage and the potential for Unexploded Ordnance

In accordance with guidance presented in C681 'Unexploded Ordnance (UXO) A guide for the Construction Industry' and CIRIA C785 'Unexploded ordnance (UXO) risk management guide for land-based projects', a review has been undertaken of the historic maps, and the Zetica UXO unexploded bomb risk maps, which has indicated that the site is at a low risk of UXO hazards.

Based on the assessment of the historical maps, it is not considered necessary to undertake a specialist UXO risk assessment to determine the risk to the proposed development.

4.3 Historic Mining Features

A historical mining search undertaken by Westcountry Mines and Property Surveys (reference 66689, dated 17th December 2020), on behalf of the client, upon which full reliance has been assumed. The full report is presented in Appendix G.

The report details that the site is located within a historic mining area with intensive underground and surface mining activity. The site lies to the west of the Lostwithiel Consols Mining Sett (mineral lease area).

There is little information and no mine plans of the very early underground workings in the Lostwithiel area. However, there are a number of known, indicated and suspected mining and geological features within close proximity to the property including:

- The nearest confirmed mining feature is an adit, of unknown depth, located 95m east south east of the property.
- The geological plans show an area of alluvium to the west of the property. Certain alluvial tracts were extensively worked for tin. However, there is no evidence that this type of activity was undertaken in the vicinity of the property.
- Small disused quarries surround the area, with the nearest example being located immediately south of the site. Whilst these features are not confirmed, or in this instance believed to be mining related, very often within mining areas old abandoned features were later recorded as quarries, pits or ponds.
- A well is located approximately 40 metres to the southwest of the properties south-eastern boundary. Whilst this feature is not confirmed, or in this instance believed to be mining related, very often within mining areas old abandoned shafts were later used for a local water supply.
- The early editions of the Ordnance survey and local mine plans show the site of the property to be undisturbed by any surface signs of past metalliferous mining activity.
- There is no known evidence of deep underground metalliferous mine workings in the immediate vicinity, although the presence of unrecorded mining activity cannot be entirely ruled out.
- It is considered unlikely that future metalliferous mining operations would be carried out within this district.

It is indicated that the property is clear of known significant metalliferous mining activity. Whilst mining features would not be expected, as in any mineralised area, there is always a possibility of further unrecorded or unsecured mining related activity.

If the property were to be redeveloped it would be recommended that, prior to construction, all foundation and service trenches be inspected by a mining consultant as a precautionary measure due to the possible risk of backfill or untoward mining features occurring within the site.

Section 5 Environmental Records and Consultation

5.1 Dataset Information

The Landmark Envirocheck Report was obtained by Soils Limited and includes site specific information. The extent of the search has initially been limited to a radius of 250m as it is considered that sources of contamination beyond 250m are unlikely to impact on the site. This search radius may however, be increased if a significant source of contamination or sensitive receptor is identified within 1000m of the site. A copy of the report is appended to this report in Appendix C summarised in Table 5.1-Table 5.3.

Table 5.1 Environmental Significance of Data

Source	Direction	Distance (m)	Detail
Contaminated Land Register Entries and Notices	None		None
Discharge Consents	South	71	Timber Distribution – Discharge of treated sewage/effluent into land/soakaway. License issued 21 st January 1994. License cancelled.
	East	108	Domestic property – Discharge of treated sewage/effluent into land/soakaway. License issued 22 nd June 1992 – Present.
Integrated Pollution Prevention and Control	None		None
Local Authority Pollution Prevention and Controls	None		None
Local Authority Pollution Prevention and Control Enforcements	None		None
Nearest Surface Water Feature	South	19	Unnamed stream.
Pollution Incidents to Controlled Waters (Significant Incidents only)	None		None
Prosecutions Relating to Authorized Processes	None		None
Registered Radioactive Substances	None		None
Substantiated Pollution Incident Register	None		None
Nearest Potable Abstraction Point	None		None
Nearest Non-Potable Abstraction Point	South	74	Lostwithiel Golf and Country Club Ltd – Surface water abstracted from a single point. Permit start date: 3 rd September 1992 – Present.
Water Industry Act Referrals	None		None
Source Protection Zones	None		None

Source	Direction	Distance (m)	Detail
Extreme Flooding from Rivers or Sea Without Defences	North-west	125	-
Flooding from Rivers or Sea Without Defences	West	172	-
Areas Benefiting from Flood Defences	None		None
Flood Water Storage Areas	None		None
Flood Defences	None		None
BGS Recorded Landfill Sites	None		None
Historical Landfill Sites	None		None
BGS Recorded Mineral Sites	East	7	Higher Dolscoe – Opencast slate quarry. No dates supplied.
	North-east	268	
Licensed Waste Management Facilities	None		None
Local Authority Recorded Landfill Sites	None		None
Potentially Infilled Land (Non-Water)	East	29	Unknown filled ground (Pit, quarry etc).
Potentially Infilled Land (Water)	None		None
Registered Landfill Sites	None		None
Registered Waste Transfer Sites	None		None
Registered Waste Treatment or Disposal Sites	None		None
Control of Major Accident Hazards Sites (COMAH)	None		None
Notification of Installations Handling Hazardous Substances	None		None
Planning Hazardous Substance Consents	None		None

Table 5.2 Contemporary Trade Directory

Contemporary Trade Directory within 250m	Direction	Distance (m)	Status	Viable Source
R J Motors – Garage Services	South-east	91	Active	✓
Quarry (Disused)	North-east	261	-	

Note: ¹ Status refers whether a current listing for the business can be found within a current contemporary trade directory, it does not indicate the trading status of the business.

Table 5.3 Geological Hazards

Source	Nearest Distance from Site/Type
Coal Mining Affected Areas	In an area not affected by coal mining.
Mining Instability	None recorded.
Natural and Mining Cavities	Unknown mine (Meadfoot Beds) – 98m south-east.
Potential for Collapsible Ground Stability Hazards	Very low risk – Onsite.
Potential for Compressible Ground Stability Hazards	No risk – Onsite. Moderate risk – 136m south-east.
Potential for Ground Dissolution Stability Hazards	No risk – Onsite.
Potential for Landslide Ground Stability Hazards	Low risk – Onsite.
Potential for Running Sand Ground Stability Hazards	Very low risk – Onsite.
Potential for Shrinking or Swelling Ground Stability Hazards	Very low risk – Onsite.

5.2 Site Sensitivity Maps

No other significant potential sources of contamination were shown on the Landmark Envirocheck Site Sensitivity Maps, which have not been listed in Table 5.1, Table 5.2 and Table 5.3, and copies of which are appended to this report (Appendix C).

5.3 Soil Geochemistry

The BGS data indicates the following concentrations of naturally occurring metals to be representative of background levels in natural soil underlying the site. The levels are based on those present in rural soils and are not necessarily representative of levels within Made Ground which may be encountered on site.

The results of this survey are contoured on the Landmark Envirocheck Site Sensitivity Maps (Appendix C).

The results of the local soil chemistry are presented in Table 5.4.

Table 5.4 Soil Geochemistry

Determinant	Indicated Soil Geochemistry (mg kg⁻¹)
Arsenic	25-35
Cadmium	<1.8
Chromium	90-120
Lead	<100
Nickel	15-30

Section 6 Data Collection Summary

6.1 General

The findings of the data collection are summarised below:

Table 6.1 summarises the site Environs, which include geology, hydrogeology, the risk from radon and potential risk from flooding.

Table 6.1 Site Environs

Environs	Summary
Geology	The site is situated upon the bedrock of the Bovisand Formation, with overlying superficial deposits of Head situated within the sites southern and western boundaries.
Hydrogeology	The superficial deposits of head are classed as a Secondary Aquifer – Undifferentiated and could locally support shallow groundwater. The Bovisand Formation bedrock is classed as a Secondary Aquifer – A and could support both shallow and deep groundwater,
Source Protection Zone (SPZ)	None present.
Surface Water Flow	Surface water is anticipated to flow down towards the south-west, in line with the wider topography, towards the River Fowey.
Groundwater Flow	Groundwater is anticipated to flow down towards the south-west, predominately through the well-connected fractures within the bedrock, in line with the wider topography towards the River Fowey.
Radon	The site is situated within an area where 10-30% of homes are estimated to be at or above the action level. Full radon protection measures are therefore likely to be required.
Flooding	<ul style="list-style-type: none"> • No risk of flooding from rivers or seas – Onsite. • Risk of extreme flooding from rivers or seas – 125m north-west. • Low risk (1000-year return) of flooding from surface water – Along sites southernmost tip and western boundary. • Medium risk (100-year return) of flooding from surface water – 17m south. • High risk (30-year return) of flooding from surface water – 19m south. • Limited potential for groundwater flooding to occur – Onsite. • Potential for groundwater flooding to occur – 3m south. • Potential for groundwater flooding of property situated below ground level – 56m south-west.
Geological Hazard	<ul style="list-style-type: none"> • In an area not affected by coal mining. • Unknown mine – 98m south-east. • No risk of compressible ground or ground dissolution stability hazards – Onsite. • Very low risk of collapsible ground, running sand, and shrinking or swelling ground stability hazards – Onsite. • Low risk of landslide ground stability hazards – Onsite.
Soil Chemistry	Background geochemistry levels were not identified as a potential hazard.

Table 6.2 provides a summary of potential on-site and off-site contamination sources identified during the study of the historic maps, the Landmark Envirocheck Dataset Report and the Site Walkover

Table 6.2 Summary of Potential Contamination Sources

Contaminative Sources /Environmental Impact	Direction	Distance (m)	Date Range		Data Source
			From	To	
On-Site					
Farmland	Onsite	0	1881 ¹	1999	HM
Golf Course	Onsite	0	1999	2020	HM
Radon	Onsite	0	-	Present	DS
Off-Site					
Farmland	North, East, South, West	5	1881 ¹	1999	HM/ SW
Higher Dolscoe Opencast Quarry	East	7	Unknown	Unknown	DS
Surface Workings	South-east	7	1881 ¹	Present ²	HM
Quarry	East	15	1881 ¹	1907	HM
Potentially Infilled Land (Non-water)	East	29	Unknown	Unknown	DS
Car Park	West	45	1999	Present ²	HM
Discharge Consent	South	71	1994	Unknown	DS
R J Motors – Garage Services	South-east	91	Unknown	Unknown	SW/ DS
Discharge Consent	East	108	1992	Present	DS
Electric Substation	South-west	112	1972	Present ²	HM
Corn Mill	South-east	172	1881 ¹	1972	HM
Railway	West	183	1881 ¹	Present ²	HM
Old Quarry	North-east	242	1881 ¹	Present ²	HM
Quarry (Disused)	North-east	261	Unknown	Unknown	DS
Higher Dolscoe Opencast Quarry	North-east	268	Unknown	Unknown	DS
Workings	East	260	1881 ¹	Present ²	HM
Tip (Disused)	West	546	1986	Present ²	HM

Notes: SW – Site walkover, HM – Historic Maps, DS – Datasheet

Section 7 Preliminary Conceptual Site Model

7.1 General

Environment Agency guidance provided in CLR11 indicates that the Conceptual Site Model should identify those contaminants, pathways and receptors which are 'likely' to represent an 'unacceptable' risk either to human health or the surrounding environment. The following sections present potential contaminants, pathways and receptors based on the information collected during the desktop study. Pathways have been established based on scientific knowledge of the behaviour of the contaminants in the ground.

7.2 Sources and Pathways of Contamination

The Landmark Site Specific Envirocheck Report and Site Walkover have been used to identify potential contaminative sources. These sources have been presented in Table 6.2. An assessment of the likely pathways and the likelihood of each contaminative source that was considered a risk has been presented in Sections 7.2.1 to 7.2.5.

7.2.1 Potential Pathways

A review of the potential pathways on and off the site has been undertaken based on the site, ground conditions, hydrology and scientific knowledge of the behaviour of the contaminants in the ground. The pathways applicable to the site and the proposed development have been marked in Table 7.1.

Table 7.1 Applicable Pathways

Pathway	Present	Comment
Inhalation of dust	✓	Possible during and following redevelopment.
Inhalation of vapour/gases	✓	
Ingestion and absorption via direct contact	✓	
Migration via surface runoff	✓	
Migration in solution via groundwater	✓	
Migration of gases via permeable soils	✓	
Direct contact with construction material	✓	
Services and Utilities	✓	

7.2.2 Potential Sources of On-site Contamination.

A study of Landmark Envirocheck Report and Site Walkover has identified the following potential on-site sources of contamination which may present a risk to future uses of the proposed development.

The sources are presented in Table 7.2.

Table 7.2 On-site Potential Contamination Sources

Source	Likely	Reasoning
Farmland		Site was redeveloped into a golf course in 2000 and is therefore unlikely to have impacted the site.
Golf Course	✓	Potential use of herbicides and pesticides which may have impacted the site.
Radon	✓	10-30% of homes in this area are anticipated to be at or above the action level.

7.2.3 Potential Off-site Sources of Contamination

A study of Landmark Envirocheck Report and Site Walkover has identified the following potential off-site sources of contamination which may present a risk to future uses of the proposed development.

These sources have been presented in given in Table 7.3.

Table 7.3 Off-site Potential Contamination Sources

Source	Direction	Distance (m)	Likely	Reasoning
Farmland	North, East, South, West	5		The land surrounding the site was redeveloped into a golf course in 2000 and is therefore unlikely to have impacted the site.
Higher Dolscoe Opencast Quarry	East	7		Considered as one source. Whilst there is no available data for potentially infilled land, historical mapping, particularly the 1881 map, indicates that this material is inert soil and stones in the form of quarry spoil, which significantly reduces the gassing risk ¹ .
Surface Workings Quarry	South-east	7		
Potentially Infilled Land (Non-water)	East	15		
Car Park	West	45		Down hydraulic gradient of the site and is therefore considered unlikely to have impacted the site.
Discharge Consent	South	71		
R J Motors – Garage Services	South-east	91		
Discharge Consent	East	108		Given the distance, the discharge consent is considered unlikely to have impacted the site.
Electric Substation	South-west	112		Whilst the electric substation predates the PCB ban of 1981, given the low mobility of PCB contaminants and the distance, it is considered unlikely to have impacted the site.
Corn Mill	South-east	172		The corn mill is down hydraulic gradient, and given the distance, it is considered unlikely to have impacted the site.
Railway	West	183		The railway is down hydraulic gradient of site, and given the distance, it is considered unlikely to have impacted the site.
Old Quarry	North-east	242		Considered as one source. Whilst there is no available data for potentially infilled land, historical mapping, particularly the 1881 map, indicates that this material is inert soil and stones in the form of quarry spoil, which significantly reduces the gassing risk ¹ .
Quarry (Disused)	North-east	261		
Higher Dolscoe Opencast Quarry	North-east	268		
Workings	East	260		

Source	Direction	Distance (m)	Likely	Reasoning
Tip (Disused)	West	546		Given the distance, the tip is considered unlikely to have impacted the site.

Notes: ¹ Based on principles described in the "Local authority guide to ground gas" published by the Chartered Institute of Environmental Health (CIEH, 2008) which is compatible with the guidance in CIRIA Report C665 and British Standard BS 8485: 2007.

7.3 Potential Contaminants

To ascertain the chemicals associated with identified potential onsite and offsite sources, the Department of the Environment Industry Profiles have been reviewed. In cases where the DOE profiles have no, or limited information other sources have been reviewed detailing the processes involved in the activity carried out on-site.

Table 7.4 presents the range of possible contaminants associated with the onsite and off-site activities and sources identified following a review of historical maps and datasets.

Table 7.4 Potential Contaminants

Potential Contaminative Sources / Activities / Processes	Contaminants / Chemical Properties
Golf Course	Herbicides, Pesticides
Radon	Radon

7.4 Potential Exposure Receptors

The receptors to any potential contamination have been evaluated from our understanding of the current and planned land use of the site, an assessment of surrounding land uses and currently available information pertaining to the site.

The assessment for potential receptors is presented in Table 7.5.

Table 7.5 Potential Receptors

Potential Receptor	Present	
Human Health	Future users of the site	✓
	Construction workers on-site	✓
	Service and maintenance workers	✓
	Site neighbours and wider public	
Groundwater/Controlled Waters	Surface Water	
	Groundwater/Future Potable Water Supply	
Buildings & Materials	Buildings and confined spaces	
	Construction materials	
	Services and Utilities (e.g drinking water pipes)	
Ecosystems	Flora and fauna	✓

7.5 Preliminary Conceptual Site Model and Risk Assessment

A preliminary risk assessment has been undertaken based on the proposed development. The assessment has been based on the likelihood of the presence of a pollutant linkage.

A pollutant linkage is the relationship between a contaminant source, a pathway and a receptor. Unless all three elements of a pollutant linkage are present, a risk is not considered to exist. Each of the three elements has been considered within Table 7.1 to Table 7.5. The preliminary conceptual site model and risk assessment is presented in Table 7.6. The classification tables on which the level of risk has been determined have been modified from 'Contaminated land risk assessment: A guide to good practice, 2001, CIRIA C552' and are presented in Appendix F.

Table 7.6 Preliminary Conceptual Site Model and Risk Assessment Methodology

Source (See Table 7.2 and Table 7.3)	Potential Contaminant (See Table 7.4)	Exposure Pathway (See Table 7.1)	Receptor (See Table 7.5)	Initial Assessment from Preliminary Investigation Report Information			Comments	Proposed Investigation
				Severity	Probability	Risk		
Golf Course On-site contaminative source.	Herbicides, Pesticides	Ingestion and absorption via direct contact	Site Workers/Site Maintenance	Mild	Low	Low	Proposed development includes significant proportions of soft landscaping as such the main pathway is to end users following development as well as construction workers during construction.	Phase II ground investigation to confirm the ground conditions present and chemical testing prior to undertaking a generic quantitative risk assessment.
			End Users	Mild	Low	Low		
		Migration via surface runoff	Surface Water	Mild	Unlikely	Very Low		
		Migration in solution via groundwater	Surface Water	Mild	Unlikely	Very Low		
			Shallow Aquifer	Mild	Unlikely	Very Low		
Radon On-site and off-site contaminative source.	Radon	Inhalation of Radon	Site Workers/Site Maintenance	Mild	Low	Low	The site is within an area where more than 10-30% of homes are above the action level.	Full Radon protection must be used in the proposed development.
			End Users	Medium	Likely	Moderate		
			Off-site Users	Minor	Unlikely	Very Low		

Section 8 Recommendations

8.1 General

Based on the information obtained during the compilation of this Preliminary Investigation and the preliminary conceptual site model, a potential for a very low to moderate/low risk of contamination has been identified, an intrusive investigation is therefore considered to be necessary to further quantify the risks identified. Any subsequent intrusive investigation may reveal additional on-site sources of contamination that were not identified in the Preliminary Investigation and Site Walkover. Any additional sources of contamination or unexpected ground conditions that may promote the migration of contamination will be included and assessed in terms of significance within an updated Conceptual Site Model.

Full radon protection measures are likely to be required within the proposed development.

8.2 UXO

A review of the historic maps indicated that the site is not situated within an area that was subject to bombing. As such, further UXO risk assessment is considered unnecessary.

8.3 Historic Mining Features

It is indicated that the site is clear of known metalliferous mining related features. However, as the site is situated within a historic mining area, there is the possibility of early unrecorded workings. Therefore, foundation and service trenches should be inspected by a mining consultant prior to construction, as a precautionary measure.

8.4 Proposed Further Site Works

An intrusive investigation is considered necessary to quantify the potential risks and remaining uncertainties that have been identified within the preliminary CSM. The preliminary CSM identifies the test parameters relevant to the sources that have a pathway to a receptor. Dependant on the findings of an intrusive investigation the test parameters may be modified. The intrusive investigation will be designed to investigate and assess the pollutant linkages identified in the preliminary Conceptual Site Model.

The general requirements for further environmental investigation are presented in Table 8.1.

Table 8.1 Proposed Further Environmental Investigation

Proposed Works	General Purpose	Required
Investigatory Holes	To collect sufficient samples for a robust assessment	✓
Laboratory Testing	To quantify the risks identified in the Conceptual Site Model	✓
Risk Assessment	Assess pollutant linkages based on current contaminated land guidance and screening criteria's	✓
Borehole well installation	To allow for continued groundwater and/or gas monitoring	

Proposed Works	General Purpose	Required
Remediation	If the site-specific risk assessment reveals that the site was contaminated	If Required
Validation & Verification	To validate and verify the remedial objectives based on the site-specific risk assessment	If Required

8.5 Discovery Strategy

There may be areas of contamination not identified during the course of the investigation. Such occurrences may also be discovered during the demolition and construction phases for the redevelopment of the site.

Care should be taken during excavation works especially to investigate any soils which appear by eye (e.g. such as fibrous materials, large amounts of ash and unusual discolouration), odour (e.g. fuel, oil and chemical type odours or unusual odours such as sweet odours or fishy odours) or wellbeing (e.g. light headedness and/or nausea, burning of nasal passages and blistering or reddening of skin due to contact with soil) to be contaminated or of unusual and/or different character to standard soils or those analysed.

In the event of any discovery of potentially contaminated soils or materials, this discovery should be quarantined and reported to the most senior member of site staff or the designated responsible person at the site for action. The location, type and quantity must be recorded, and the Local Authority and a competent and appropriate third-party Engineer/Environmental consultant notified immediately. An approval from the Local Authority must be sought prior to implementing any proposed mitigation action. The discovery strategy must remain on-site at all times and must demonstrate a clear allocation of responsibility for reporting and dealing with contamination. A copy of the strategy must be placed on the health and safety notice board and /or displayed in a prominent area where all site staff are able to take note of and consult the document at any time. Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the discovery strategy.

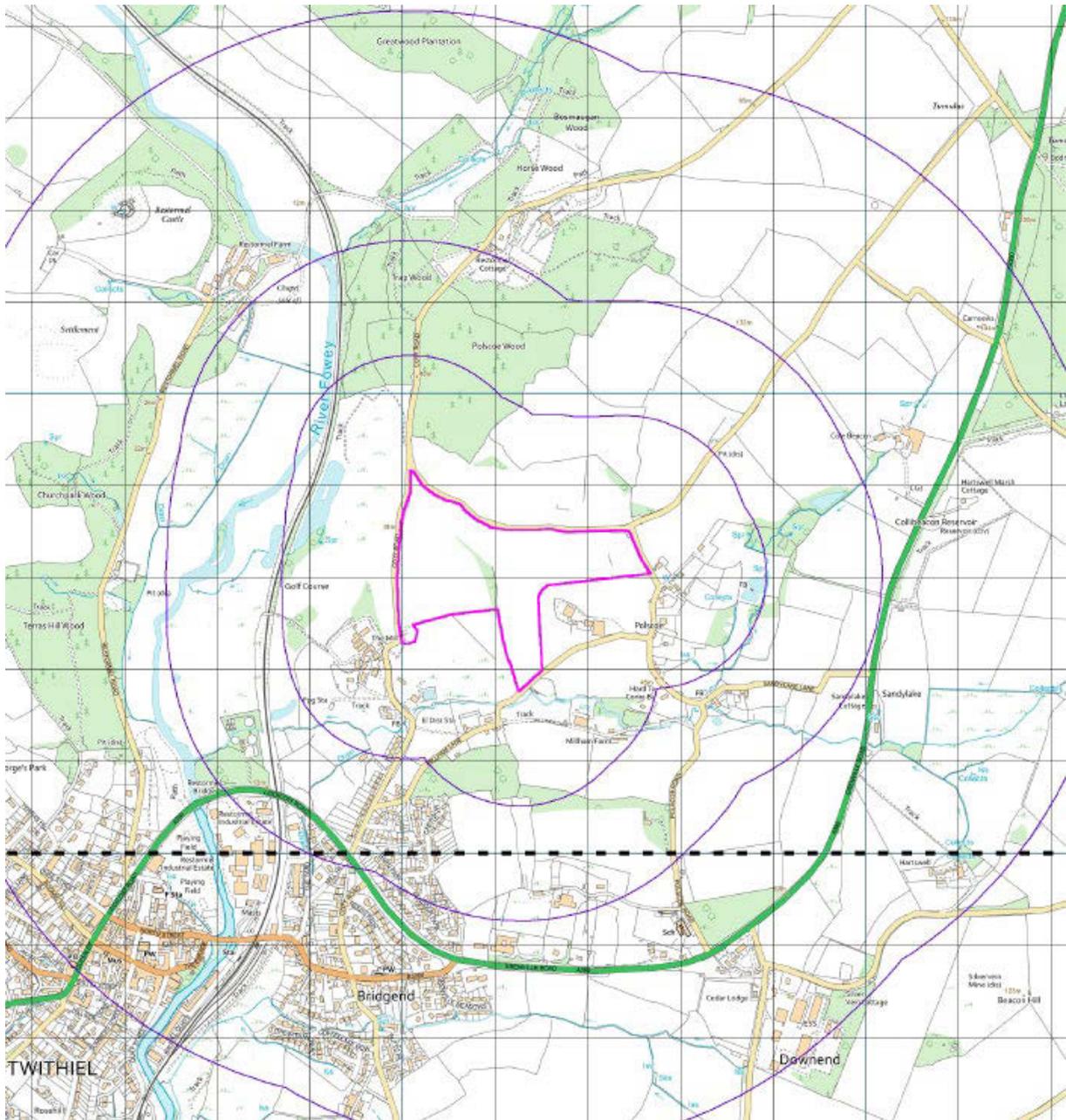


Figure 1 – Site Location Map

Job Number

18812

Project

Gillyflower Farm, Lostwithiel, Cornwall PL22 0HR

Client

We Are Ease Ltd

Date

December 2020

Appendix A Proposed Development Plans

- Notes:**
1. Do not scale from drawings. All dimensions to be confirmed on site prior to construction.
 2. Roderick James Architects LLP to be notified of any discrepancies before construction continues.
 3. These drawings are the copyright property of Roderick James Architects LLP.
 4. All Roderick James Architects LLP drawings to be read in conjunction with the proposed building notes, ask framing drawings and the structural engineers drawings and specification.
 5. All external works shown are indicative. Design and extent is to be provided by others.
 6. This document should only be used for the purpose indicated by the drawing status below.
 7. Construction (Design & Management) Regulations 2015. The CDM 2015 regulations apply to this project. If constructed then the contractor should prepare a Construction Phase Plan for the project. Guidance on how to complete this is available from the HSE or CIB. If there is to be more than one contractor on the project (including sub-contractors) a Health and Safety File should be created by the contractor at completion of the works for the client to retain.



revision	date	details
drawing status		
DRAFT - FOR COMMENT		
project	Gillyflower Project, former Lostwithiel Golf Course Site, Lostwithiel, Cornwall.	
client	Sir T Smith & A Smith	
scale	1:750 @ A1	date 07/12/2020
drawing number	Smith77/Gillyflower/PL0	revision
		-

Appendix B Country Series and Ordnance Survey Maps

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

	Gravel Pit		Sand Pit		Other Pits
	Quarry		Shingle		Orchard
	Osiers		Reeds		Marsh
	Mixed Wood		Deciduous		Brushwood
	Fir		Furze		Rough Pasture
	Arrow denotes flow of water		Trigonometrical Station		
	Site of Antiquities		Bench Mark		
	Pump, Guide Post, Signal Post		Well, Spring, Boundary Post		
	•285 Surface Level				
	Sketched Contour		Instrumental Contour		
	Main Roads		Minor Roads		
	Sunken Road		Raised Road		
	Road over Railway		Railway over River		
	Railway over Road		Level Crossing		
	Road over River or Canal		Road over Stream		
	Road over Stream				
	County Boundary (Geographical)				
	County & Civil Parish Boundary				
	Administrative County & Civil Parish Boundary				
	County Borough Boundary (England)				
	County Burgh Boundary (Scotland)				
	Rural District Boundary				
	Civil Parish Boundary				

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Coppice		Bracken
	Heath		Rough Grassland
	Marsh		Reeds
	Saltings		
	Building		Glasshouse
	Sloping Masonry		Pylon
	Electricity Transmission Line		Pole
	Cutting		Embankment
	Standard Gauge Multiple Track		Standard Gauge Single Track
	Siding, Tramway or Mineral Line		Narrow Gauge
	Geographical County		
	Administrative County, County Borough or County of City		
	Municipal Borough, Urban or Rural District, Burgh or District Council		
	Borough, Burgh or County Constituency Shown only when not coincident with other boundaries		
	Civil Parish Shown alternately when coincidence of boundaries occurs		
	BP, BS Boundary Post or Stone		Poi Sta Police Station
	Ch Church		PO Post Office
	CH Club House		PC Public Convenience
	F E Sta Fire Engine Station		PH Public House
	FB Foot Bridge		SB Signal Box
	Fn Fountain		Spr Spring
	GP Guide Post		TCB Telephone Call Box
	MP Mile Post		TCP Telephone Call Post
	MS Mile Stone		W Well

1:10,000 Raster Mapping

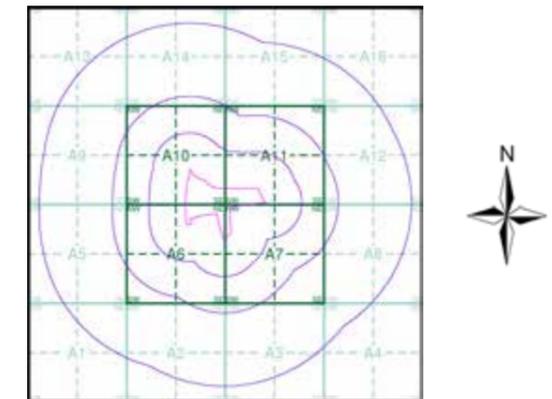
	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, parish or community boundary
	District, Unitary, Metropolitan, London Borough boundary		Constituency boundary
	Area of wooded vegetation		Non-coniferous trees
	Non-coniferous trees (scattered)		Coniferous trees
	Coniferous trees (scattered)		Positioned tree
	Orchard		Coppice or Osiers
	Rough Grassland		Heath
	Scrub		Marsh, Salt Marsh or Reeds
	Water feature		Flow arrows
	MHW(S) Mean high water (springs)		MLW(S) Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	Bench mark (where shown)		Triangulation station
	Point feature (e.g. Guide Post or Mile Stone)		Pylon, flare stack or lighting tower
	Site of (antiquity)		Glasshouse
	General Building		Important Building



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Cornwall & Isles Of Scilly	1:10,560	1888	2
Cornwall & Isles Of Scilly	1:10,560	1908	3
Ordnance Survey Plan	1:10,000	1962 - 1963	4
Ordnance Survey Plan	1:10,000	1969	5
Ordnance Survey Plan	1:10,000	1976	6
Ordnance Survey Plan	1:10,000	1986	7
10K Raster Mapping	1:10,000	2000	8
10K Raster Mapping	1:10,000	2006	9
VectorMap Local	1:10,000	2020	10

Historical Map - Slice A



Order Details

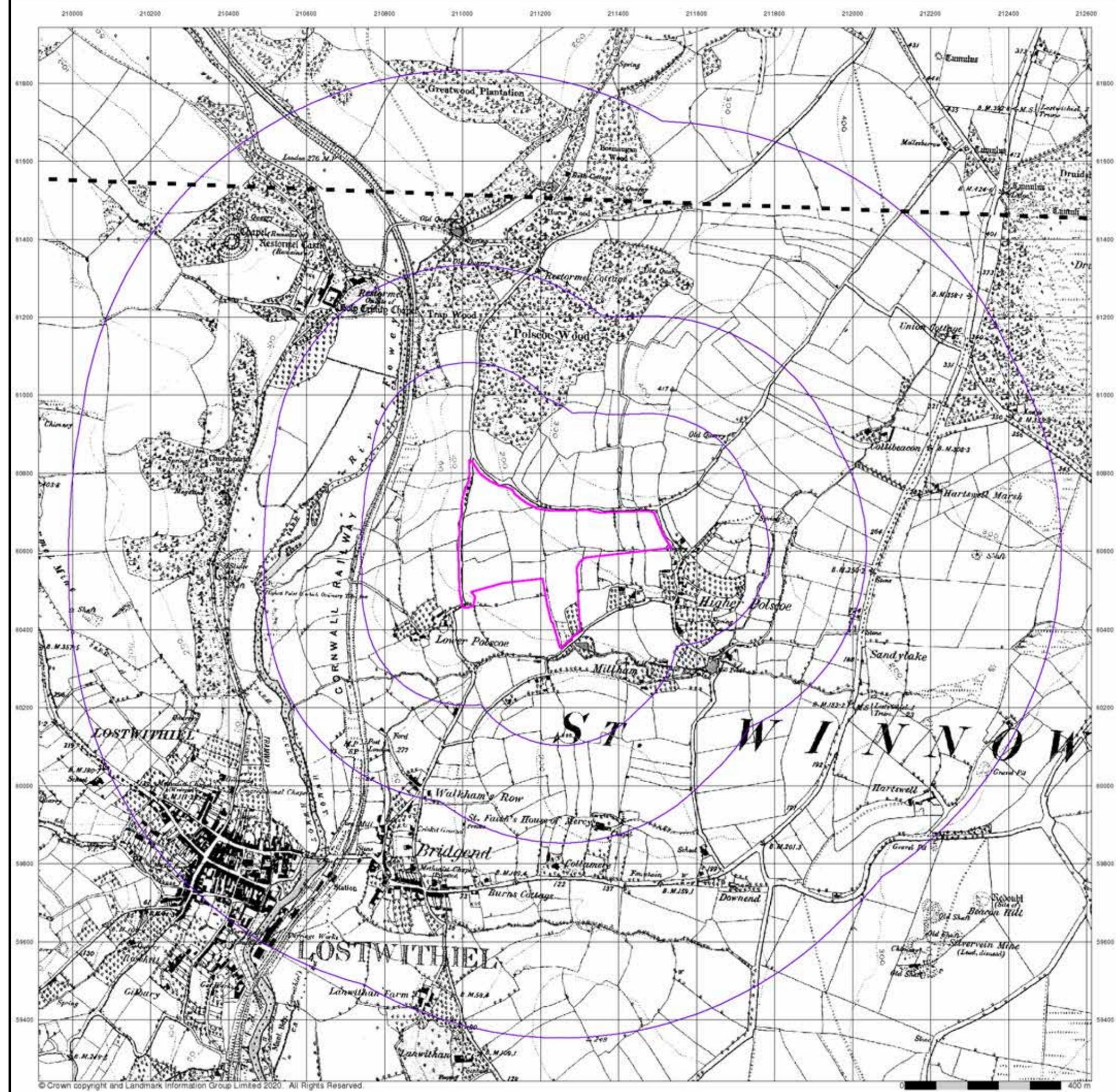
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 Customer Ref: 18812
 National Grid Reference: 211220, 60610
 Slice: A
 Site Area (Ha): 10.46
 Search Buffer (m): 1000

Site Details

Higher Polscoe, Access to Higher Polscoe Farm, LOSTWITHIEL, PL22 0HR



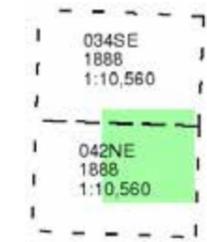
Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



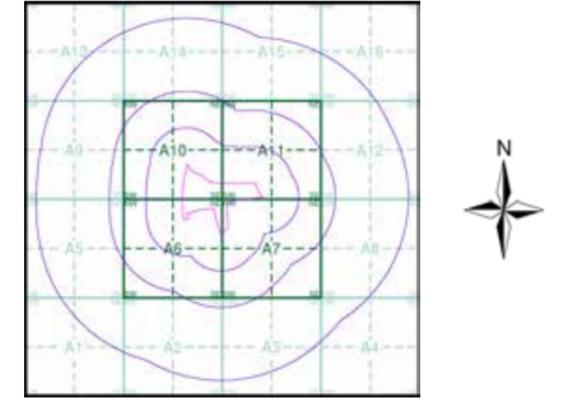
Cornwall & Isles Of Scilly
Published 1888
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 270367329_1_1
 Customer Ref: 18812
 National Grid Reference: 211220, 60610
 Slice: A
 Site Area (Ha): 10.46
 Search Buffer (m): 1000

Site Details

Higher Polscoe, Access to Higher Polscoe Farm, LOSTWITHIEL, PL22 0HR



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