

8.4 Results – Inorganics

8.4.1 Metals

A suite of toxic metals comprising arsenic, cadmium, total chromium, copper, lead, mercury, nickel, selenium and zinc was tested in all nine samples. All recorded metal concentrations were below their respective criteria.

8.4.2 pH

All samples were analysed for pH. Results ranged from a slightly acidic pH of 5.34 in the organic rich topsoil of TP2, to a neutral pH of 7.33 in the sample collected from TP6 where topsoil was absent.

8.4.3 Asbestos Screen

The samples from TP4, TP5 and TP7 were screened for fibres and asbestos identification. No fibres were detected.

8.5 Results- Organics

8.5.1 Polyaromatic Hydrocarbons (PAHs)

Four samples were analysed for speciated 16 PAHs, and in addition a general SVOC suite (which includes PAHs) was analysed on an additional two samples. All samples reported all of the individual PAHs well below their screening criterion, with the exception of the sample collected from TP3 which showed a single result for dibenzo(ah) anthracene of 330ug/kg compared with the screening criterion of 280ug/kg. The mean and US₉₅ concentrations for the dibenzo(ah)anthracene data set are 105ug/kg and 200ug/kg respectively; well below the assessment criterion. A maximum value test undertaken at the 10% (conservative) level indicated the 330ug/kg result was not an outlier. The result is therefore not considered to indicate any particular issue at the site.

8.5.2 Semi-volatile organic compounds

Two samples (TP6 and TP9) were analysed for the general suite of semi-volatile organic compounds. The results for the standard suite library substances were all reported below the limit of detection of 100ug/kg.

8.5.3 Petroleum Hydrocarbons

Two samples (TP4 and TP5), from the area near the car storage, were analysed for a suite of banded petroleum hydrocarbons and BTEX (benzene, toluene, ethylbenzene and xylenes). There were no exceedences of the screening criteria and all values were low.

9 Revised Conceptual Site Model and Risk Assessment

The preliminary conceptual model and risk assessment has been revised to take into account the information obtained from the site investigation and is presented below. No significant contamination was identified at the site, and so the likelihood of source-pathway-receptor linkages from contaminants in the soil has been able to be reduced to very unlikely (0-5%).

The highest identified risk is the risk from naturally occurring radon gas which was assessed as low to moderate as a consequence of the HPA classification of the site within a radon affected area.

Table 8: Summary of Potential Feasible Pollutant Linkages and Risk Estimation following Site Investigation

Contaminant (Source)	Pathway(s)	Receptor	Potential Consequence of Hazard	Likelihood of Source-Pathway-Receptor Linkage&	Risk Estimation	Comments
Near-surface soils on site containing potentially elevated concentrations of metals	inhalation/ingestion of dust, dermal contact, ingestion of contaminants through fruit and vegetable consumption grown in contaminated soil	Humans (Future site users)	Moderate	Very Unlikely	Negligible to Low	No elevated metal concentrations found on site during investigation
Near-surface soils on site containing potentially elevated concentrations of metals	inhalation/ingestion of dust, dermal contact	Humans (Construction Workers)	Moderate	Very Unlikely	Negligible to Low	No elevated metal concentrations found on site during investigation
Near-surface soils on site containing potentially elevated concentrations of metals, PAHs/Oils/Fuels	inhalation/ingestion of dust	Off-site residents	Mild	Very Unlikely	Negligible	No indication of PAH or Oil or Fuel contamination found on site during investigation
Soils on site containing potentially elevated concentrations of PAHs/Oils/Fuels	inhalation/ingestion of dust, inhalation of indoor vapours, inhalation of outdoor vapours, dermal contact, ingestion of contaminants through fruit and	Humans (Future site users)	Severe	Very Unlikely	Low	No indication of PAH or Oil or Fuel contamination found on site during investigation

Contaminant (Source)	Pathway(s)	Receptor	Potential Consequence of Hazard	Likelihood of Source- Pathway-Receptor Linkage&	Risk Estimation	Comments
vegetable consumption grown in contaminated soil	Inhalation/ingestion of dust, inhalation of indoor vapours, inhalation of outdoor vapours, dermal contact	Humans (Construction Workers)	Moderate	Very Unlikely	Negligible to Low	No indication of PAH or Oil or Fuel contamination found on site during investigation
Soils on site containing potentially elevated concentrations of PAHs/Oils/Fuels	Direct Contact	Building Materials Plastic Pipes	Mild	Very Unlikely	Negligible	No indication of PAH or Oil or Fuel contamination found on site during investigation
Soils on site containing potentially elevated concentrations of PAHs/Oils/Fuels	Inhalation of fibres	Humans (Future Residents, Construction Workers, Off- site residents)	Severe	Very Unlikely	Low	No indication of asbestos contamination found on site during investigation, no fibres found in screened soil samples
Naturally occurring Radon gas	Migration through ground and build up of gas in enclosed spaces	Humans (Future Residents)	Severe	Unlikely	Low to Moderate	Risk can be managed through installation of appropriate radon gas protection measures during build

10 Summary

- Nine trial holes were dug at the site to a maximum depth of 0.75m bgl using a mechanical excavator
- No Made Ground was encountered on site – the soils were logged as topsoil or weathered bedrock (Shale).
- Nine soil samples were collected and variously analysed for contaminants including metals, pH, PAHs, TPH, SVOCs. The results compared to DEFRA C4SL values and CIEH/LQM suitable for use screening criteria. There was a single exceedance of a residential with home-grown produce criteria. The sample collected from TP3 in the north of the site recorded a dibenzo(ah)anthracene concentration of 330ug/kg compared to the screening criterion of 280ug/kg. The result was not considered an outlier per the maximum value test, and the US₉₅ value for the dibenzo(ah)anthracene data set as a whole was only 200ug/kg.
- Statistical analysis of the data indicates that the true mean concentrations of potential contaminants are less than the screening criteria used, suggesting the level of risk posed to human health under the proposed residential scenario is acceptably low.
- A revised risk assessment was produced incorporating the additional information gathered. The risks have been revised downwards, based on the lack of significant concentrations of potential contaminants recorded.
- The site falls within an area where full radon protection measures are required in new build dwellings under Building Regulations as between 10 and 30% of properties exceed the Health Protection Agency action level.

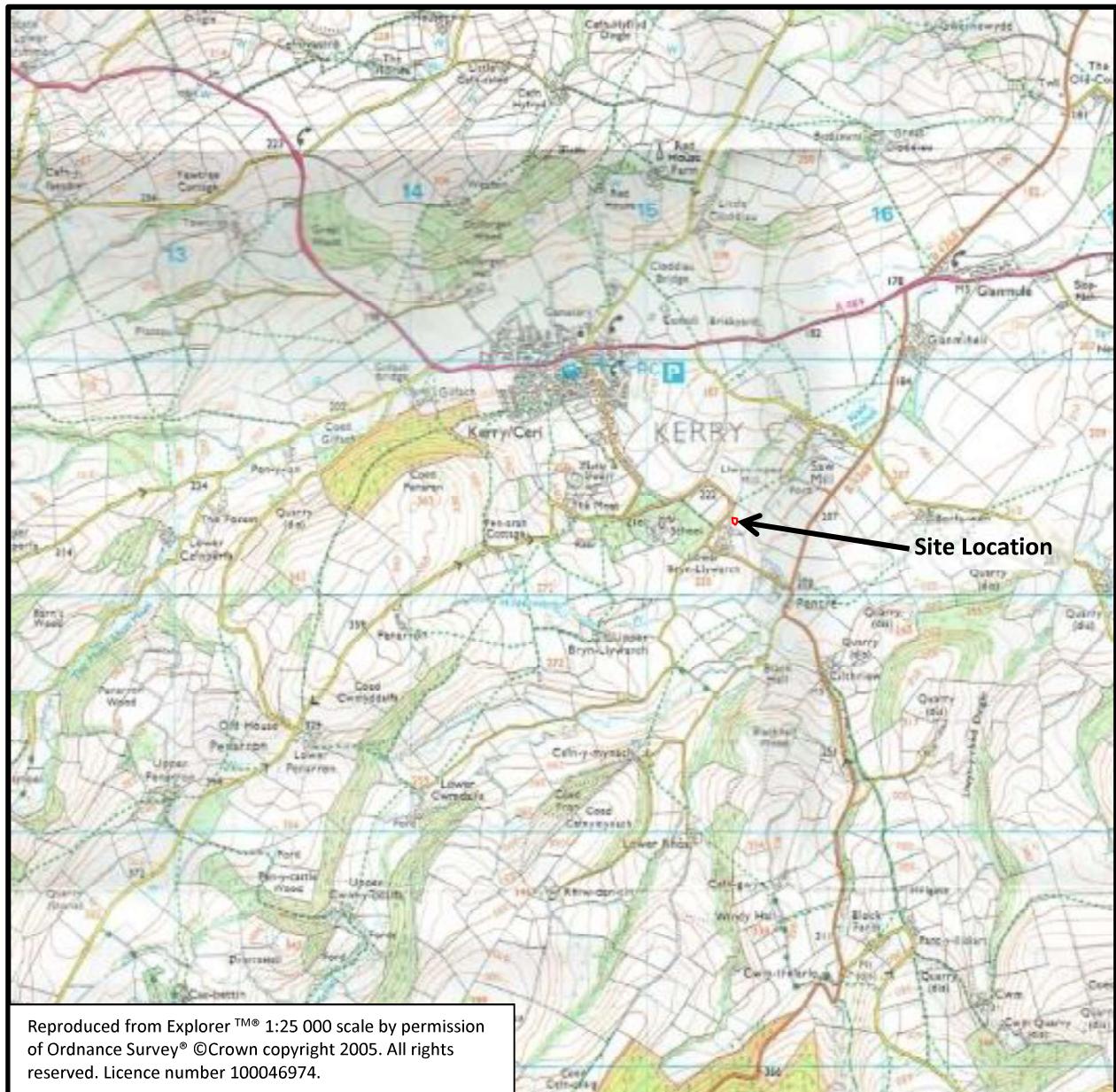
11 Conclusions & Recommendations

It is the conclusion of this report that provided appropriate radon protection measures are installed in the new dwellings to the satisfaction of the Building Inspector, then no specific remedial actions are required in respect of developing the site for residential use.

In the event that any suspect material or contamination is found at any time when carrying out the approved development that was not previously identified, it should be reported in writing immediately to the Local Planning Authority, and an appropriate re-assessment undertaken.

Figures

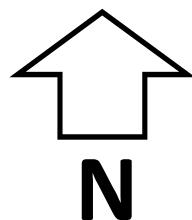
- | | |
|----------|--------------------------------|
| Figure 1 | Site Location Plan |
| Figure 2 | Current & Proposed Layout Plan |
| Figure 3 | Trial Hole Location Plan |

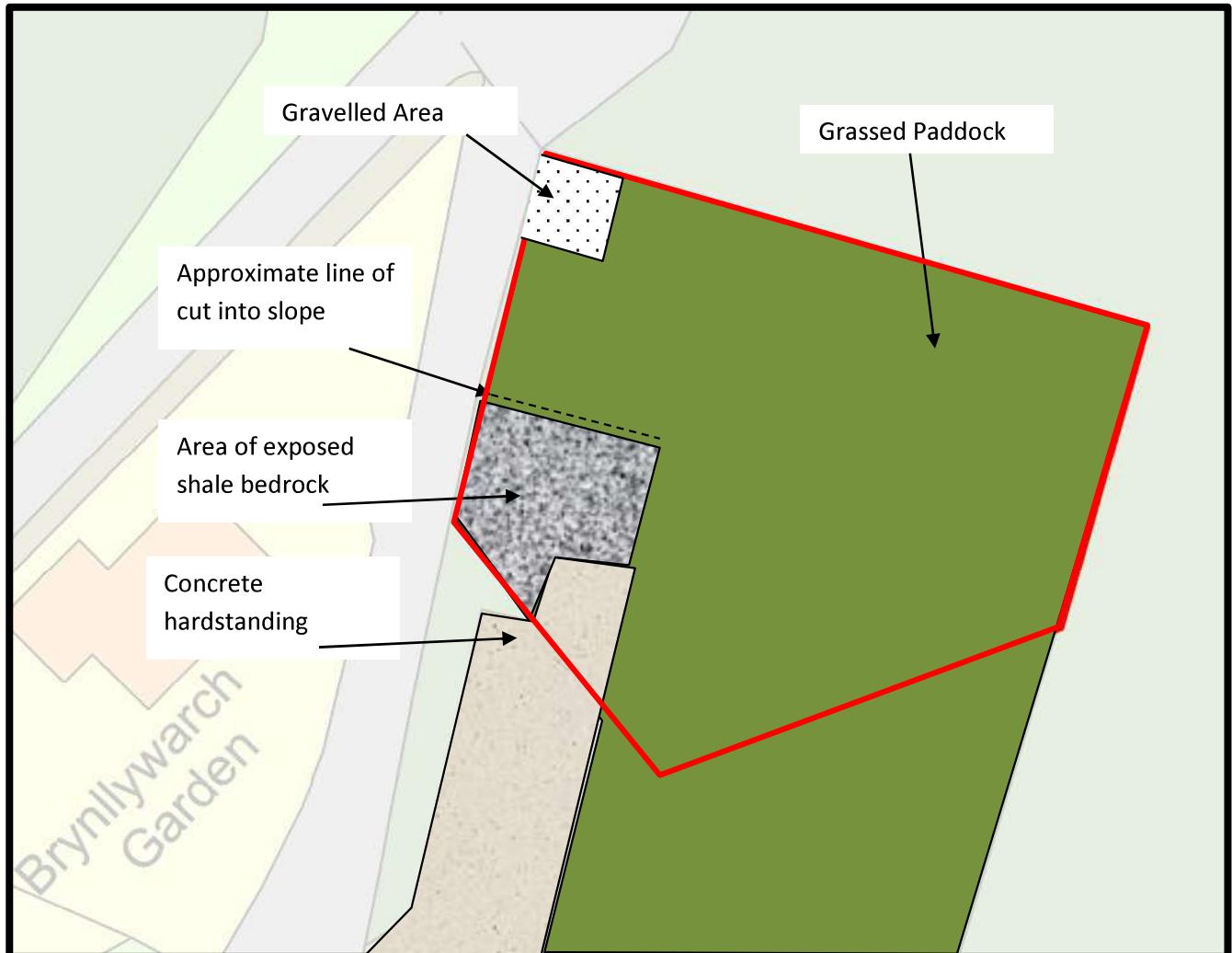


MENV07112 – Land at Brynllwarch Garden, Kerry, Powys

Figure 1: Site Location Map

Scale (Approx) : 0

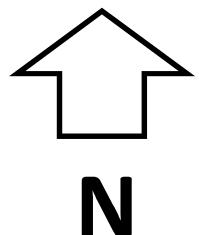




MENV07114 Land at Brynllwarch Garden, Kerry, Powys

Figure 2: Current Site Layout

Scale (approx): 0 25m



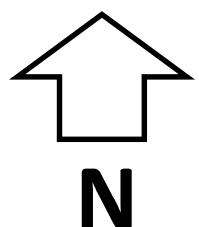
Approx Site Boundary: —

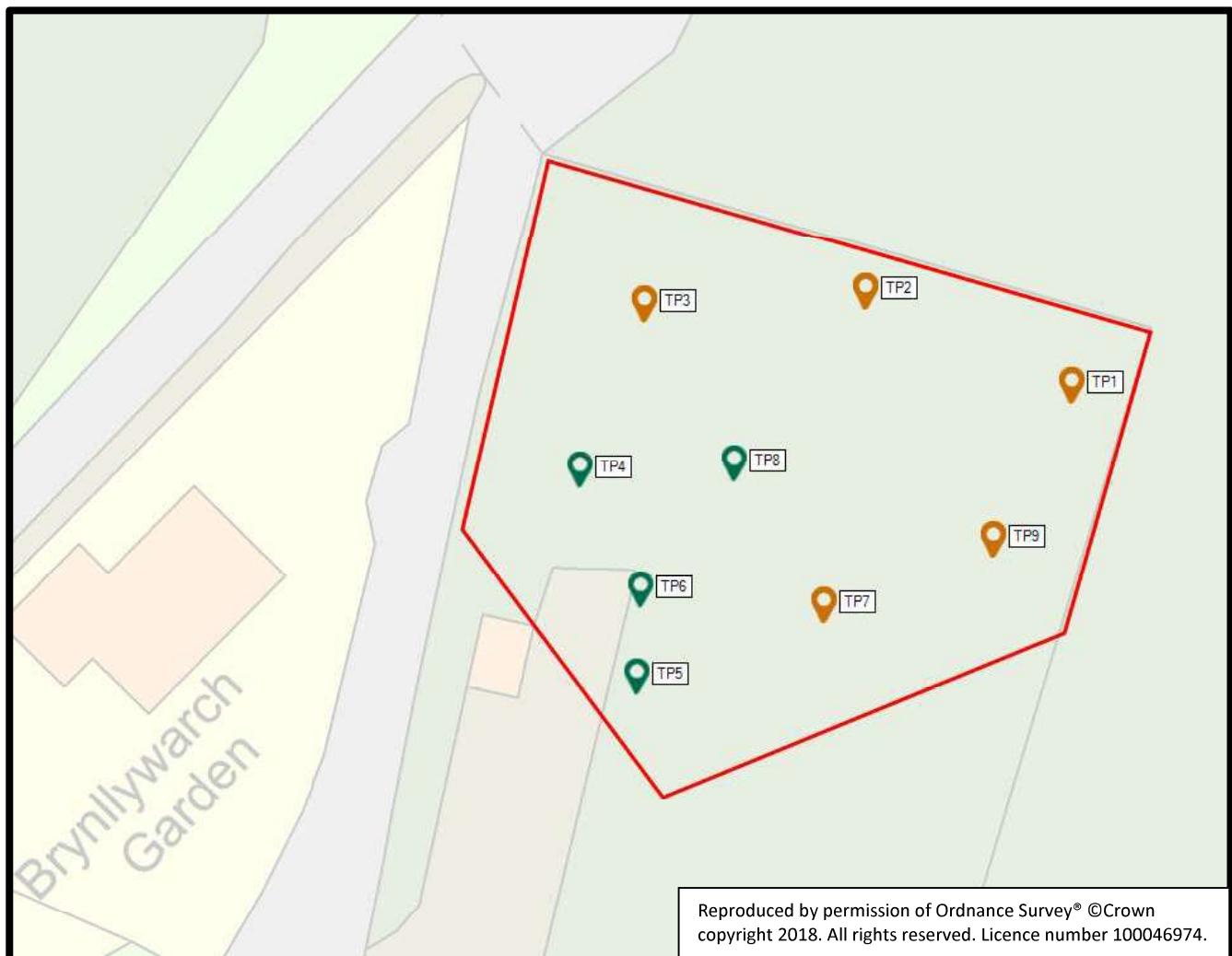


MENV07114 Land at Brynllwarch Garden, Kerry, Powys

Figure 3: Proposed Site Layout

Scale (approx): 0 25m





MENV07114 Land at Brynllwarch Garden, Kerry, Powys

Figure 4: Trial Hole Locations

Scale (approx): 0 25m



N

Appendix A

Photographs



Photo 1: NW Corner of site



Photo 5: temporary roofed area in front of cutting



Photo 2: At S of site, looking offsite towards wider plot area and access.



Photo 6: Grassed pastureland/paddock



Photo 3: Area of cutting into shale



Photo 7: Site looking SW towards Brynllwarch Gardens

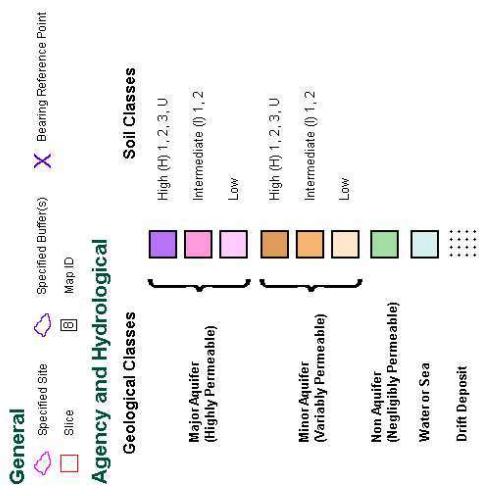


Photo 4: area adjacent cutting

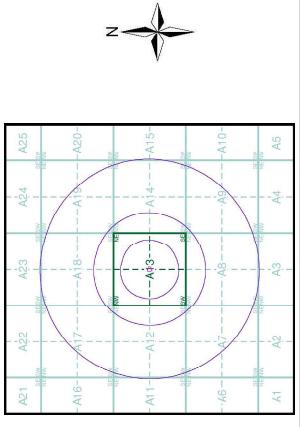
Appendix B

Landmark Envirocheck Data

Groundwater Vulnerability



Site Sensitivity Context Map - Slice A

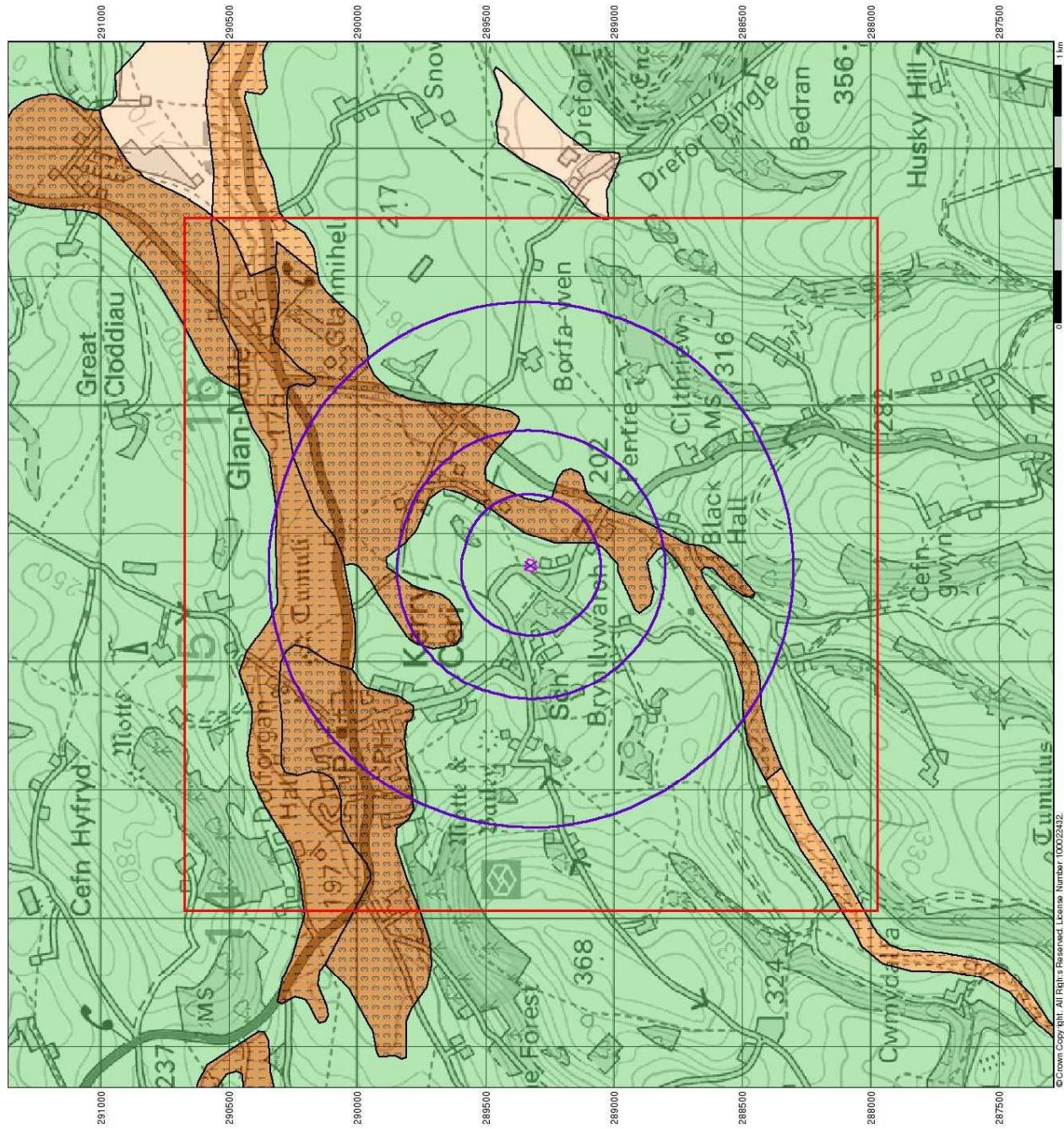


Order Details

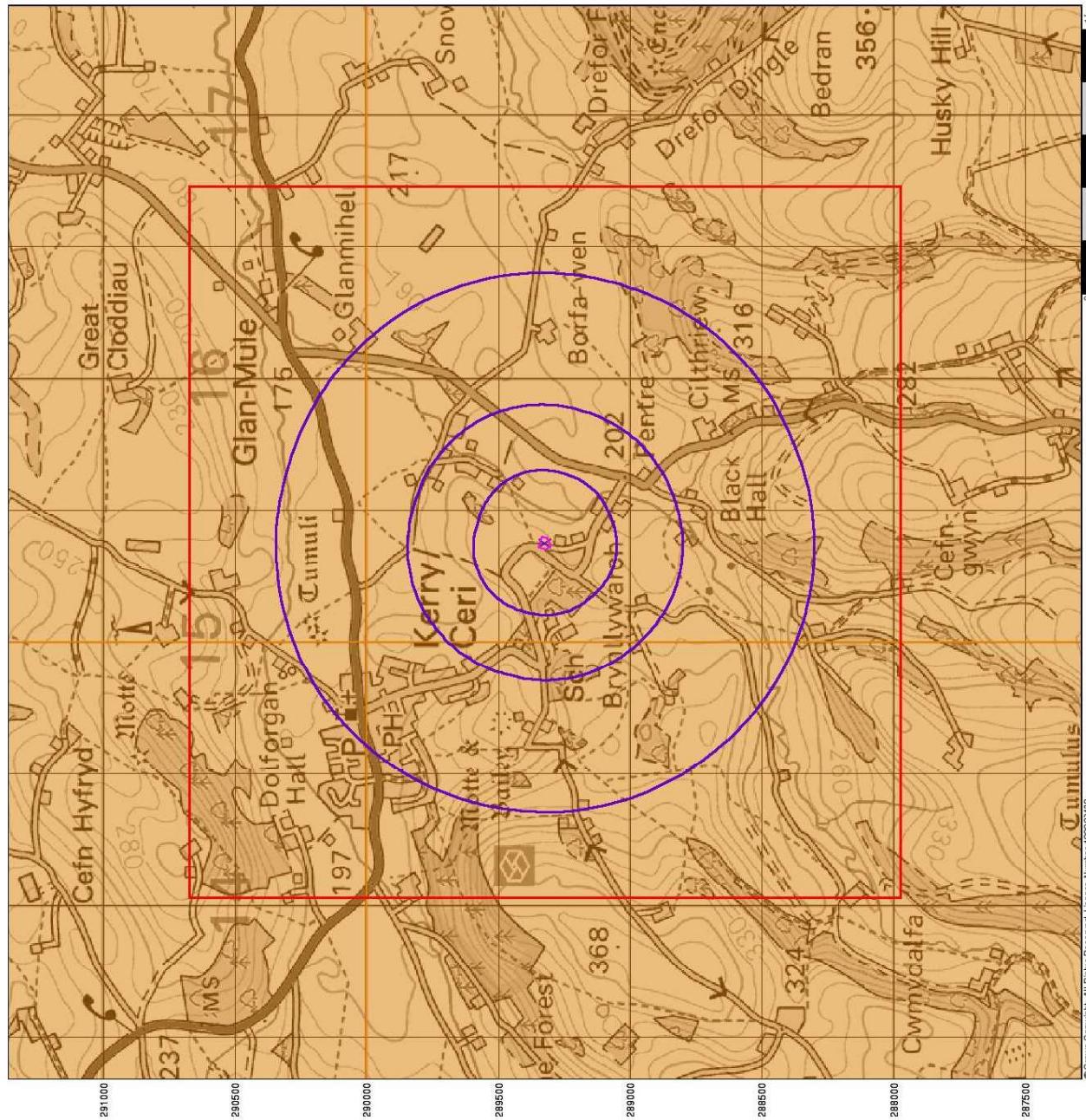
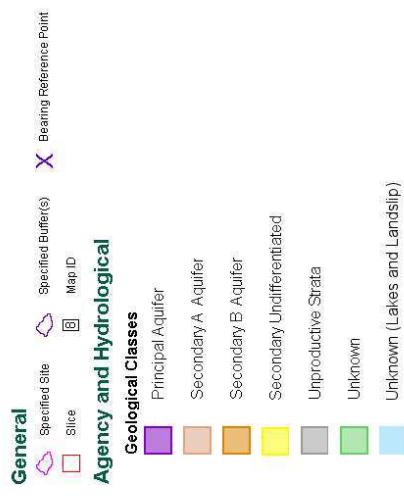
Order Number: 162311708 1_1
Customer Ref: MENV0715
National Grid Reference: 315380, 289330
Slice: A
Site Area (Ha): 0.14
Search Buffer (m): 1000

Site Details

Land at Brynllwyn Garden, Kerry/Ceri, Powys



Bedrock Aquifer Designation



Superficial Aquifer Designation

General Specified Site Specified Buffer(s) Bearing Reference Point

Specified Slice Map ID

Agency and Hydrological

Geological Classes Principal Aquifer

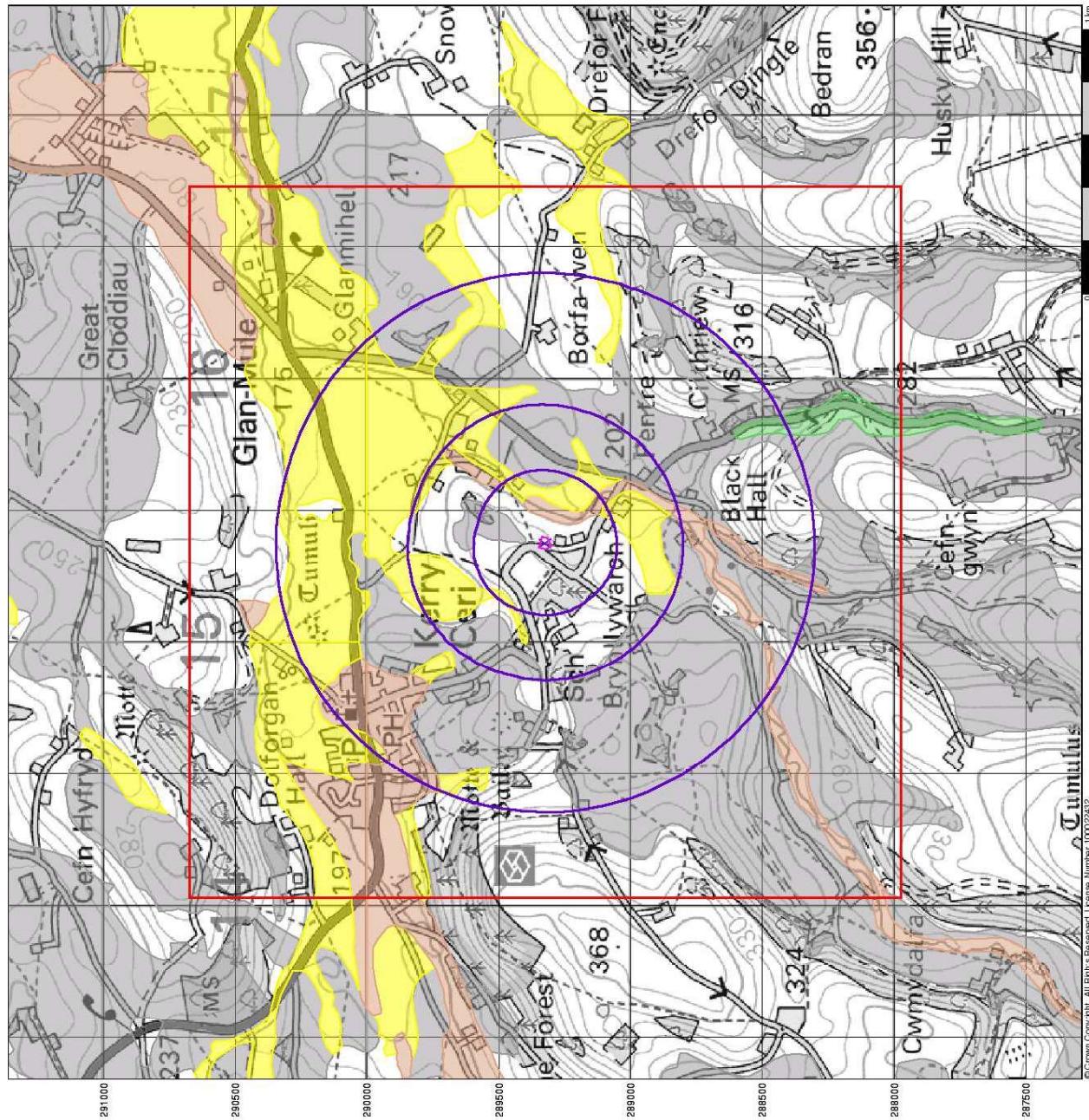
Secondary A Aquifer

Secondary B Aquifer

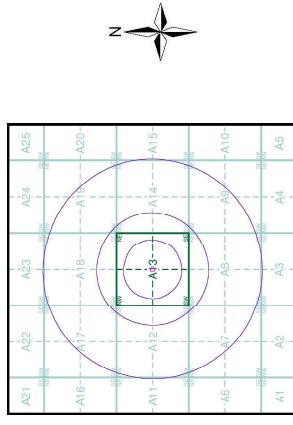
Unproductive Strata Secondary Undifferentiated

Unknown

Unknown (Lakes and Landslip)



Site Sensitivity Context Map - Slice A



Order Details

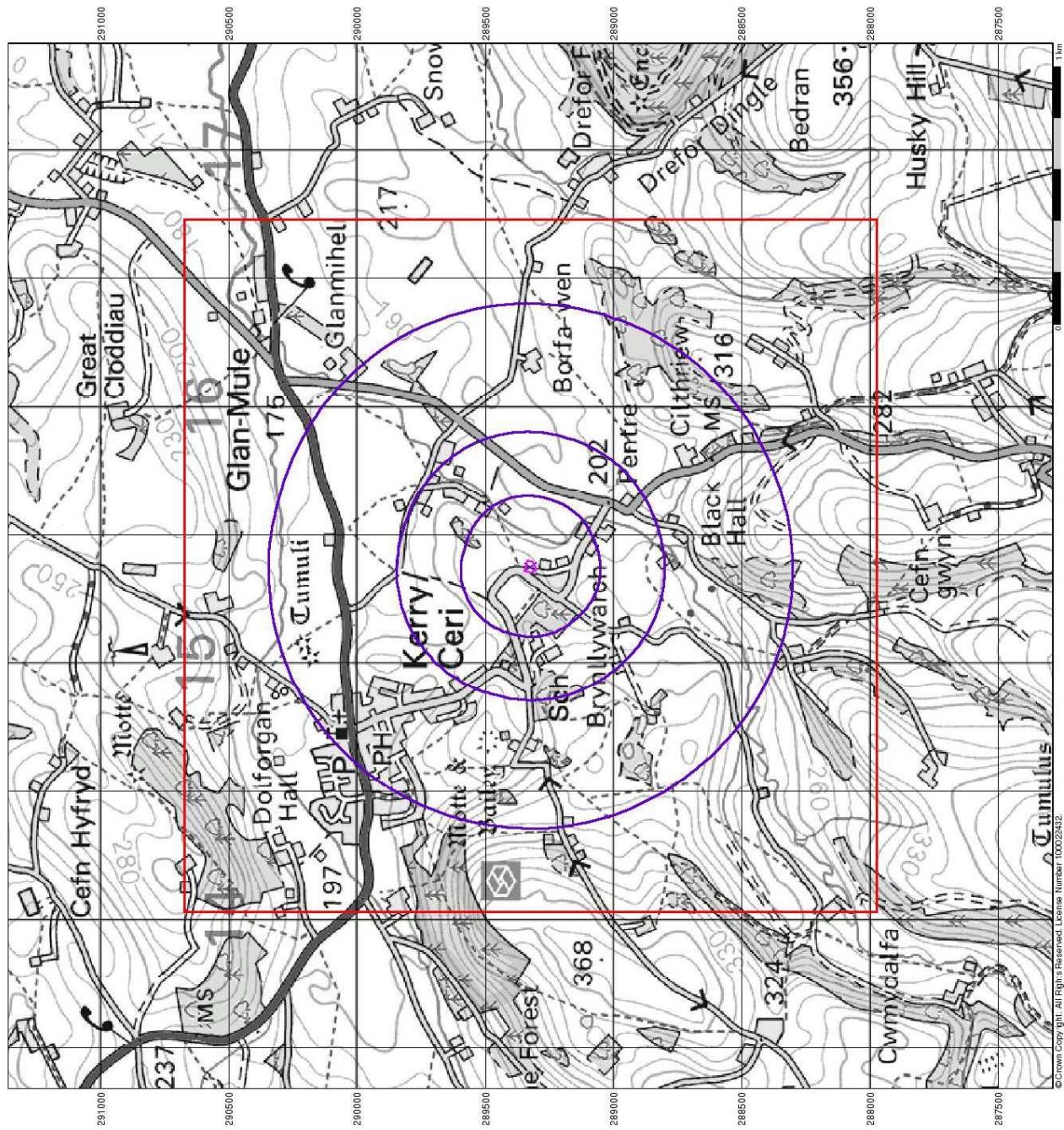
Order Number 162311708 1_1
Customer Ref. MENV0715
National Grid Reference: 315380, 289330
Slice A
Site Area (Ha): 0.14
Search Buffer (m): 1000

Site Details

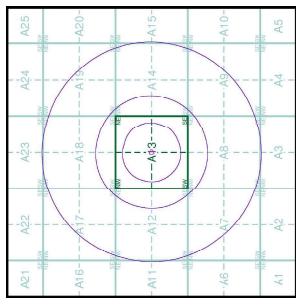
Land at Brynllwyn Garden, Kerry/Ceri, Powys

Source Protection Zones

- | General | | Agency and Hydrological | |
|---------|--|-------------------------|-------------------------|
| | Specified Site | | Specified Buffer(s) |
| | Slice | | Map ID |
| | Inner zone (Zone 1) | | Bearing Reference Point |
| | Inner zone - subsurface activity only (Zone 1c) | | |
| | Outer zone (Zone 2) | | |
| | Outer zone - subsurface activity only (Zone 2c) | | |
| | Total catchment (Zone 3) | | |
| | Total catchment - subsurface activity only (Zone 3c) | | |
| | Special interest (Zone 4) | | |



Site Sensitivity Context Map - Slice A



Order Details

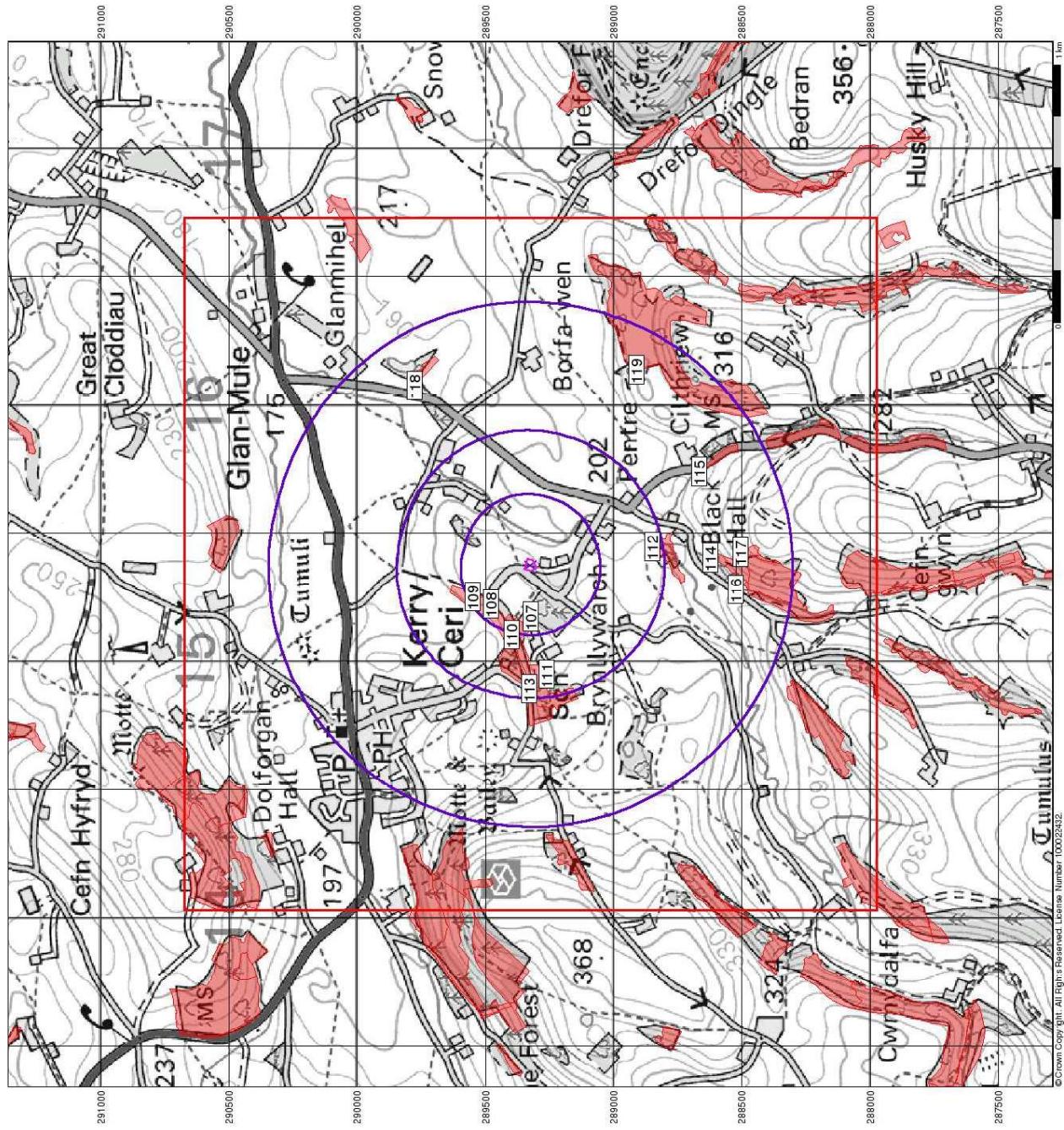
Order Number: 162311708 1_1
Customer Ref: MENV0715
National Grid Reference: 315380, 289330
Slice: A
Site Area (Ha): 0.14
Search Buffer (m): 1000

Site Details

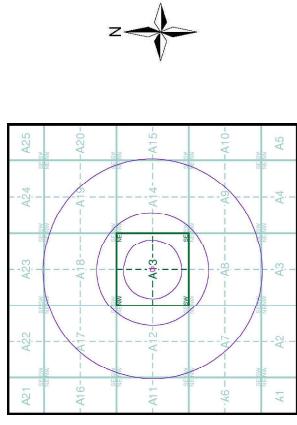
Land at Brynllwyn Garden, Kerry/Ceri, Powys

Sensitive Land Uses

General		Specified Site	Specified Buffer(s)	Bearing Reference Point
	Map ID			
Sensitive Land Uses				
Ancient Woodland				National Park
Area of Adapted Green Belt				Nitrate Sensitive Area
Area of Unadopted Green Belt				Nitrate Vulnerable Zone
Area of Outstanding Natural Beauty				Ramsar Site
Environmentally Sensitive Area				Site of Special Scientific Interest
Forest Park				Special Area of Conservation
Local Nature Reserve				Special Protection Area
Marine Nature Reserve				World Heritage Sites
National Nature Reserve				



Site Sensitivity Context Map - Slice A



Order Details

Order Number: 162311708 1_1
Customer Ref: MENV0715
National Grid Reference: 315380, 289330
Slice: A
Site Area (Ha): 0.14
Search Buffer (m): 1000

Site Details

Land at Brynllwyn Garden, Kerry/Ceri, Powys

Envirochec

LANDMARK INFORMATION GROUP®

Historical Manning & Photography included:

Mapping Type	Scale	Date	Pg
Monogrammyshire	1:2,500	1886	2
Montgomeryshire	1:2,500	1903	3
Ordnance Survey Plan	1:2,500	1883	4
Large-Scale National Grid Data	1:2,500	1894	5
Historical Aerial Photography	1:2,500	2000	6



Historical Mapping Legends

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:1,250

Historical Map - Segment A13

Order Details

162311708_1_1
MENV07115
.: 315380, 289330
A

Site Details Land at Brynllwyd

Site Details

1

Landmark®

INFORMATION GROUP

Montgomeryshire

Published 1886
Source map scale - 1:2 500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in 1840-5. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1866 it covered the whole of what was considered to be the cultivated parts of Great Britain. The date given below is often some years later than the surveyed date. Before 1938, 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 culturing areas.

Man Name(s) and Date(s)

Historical Map : Segment A13

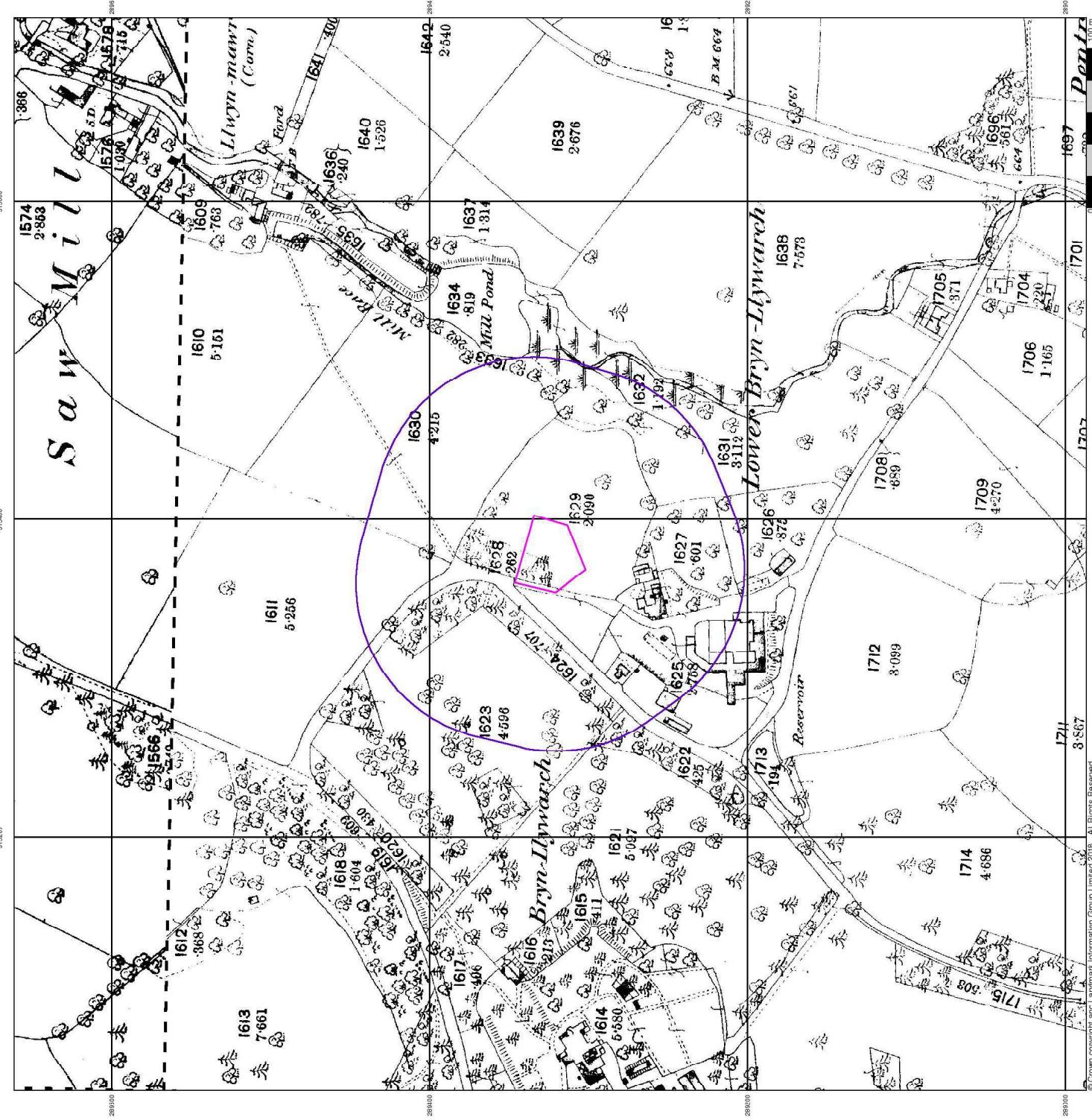


Order Details

Order Number: 162311708_1_1
Customer Ref: MENV07115
National Grid Reference: 315380, 289330
Slice: A

Sito Detalle

Site Details Land at Brynllwarch Garden, Kerry/Ceri, Powys

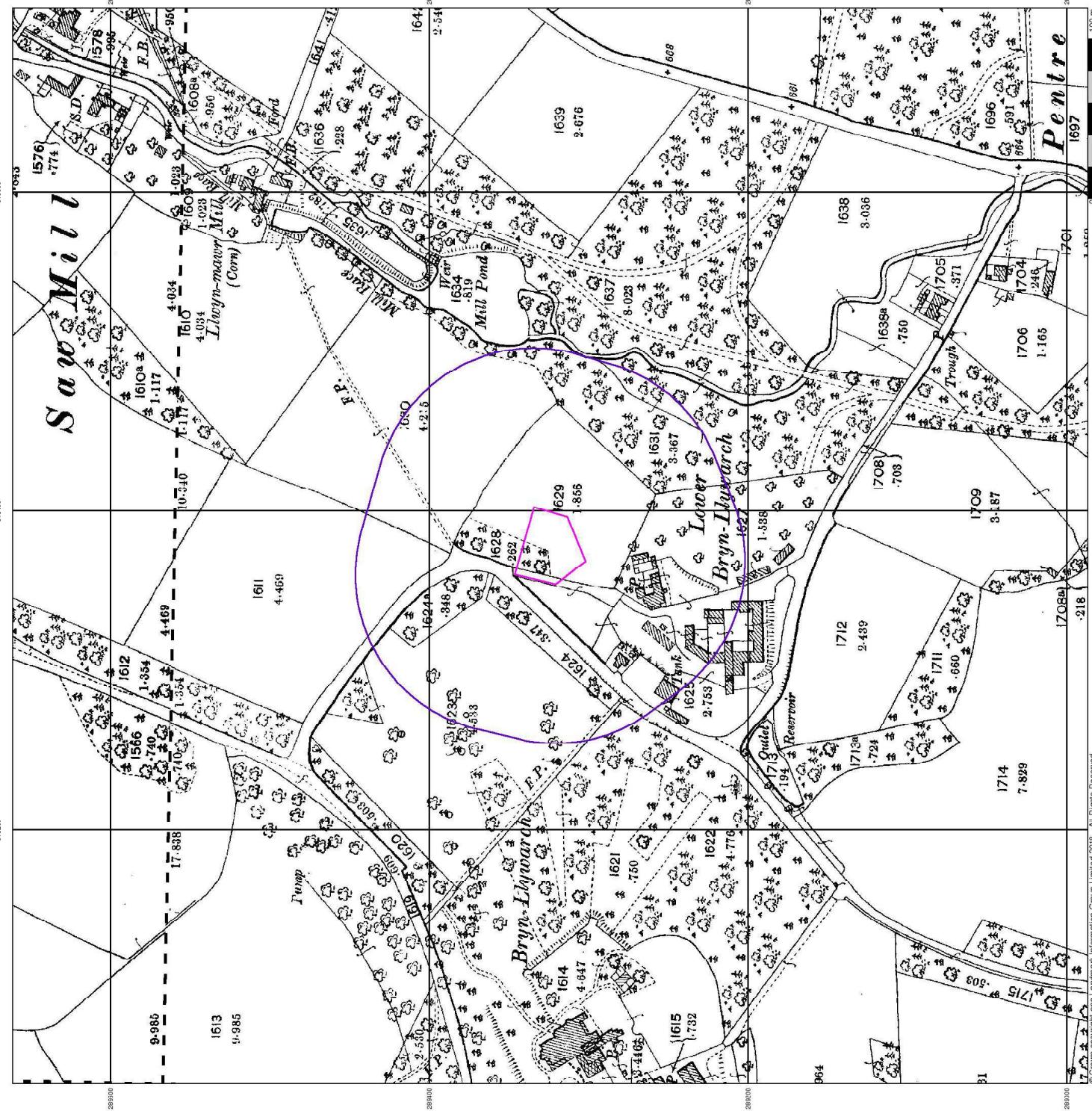


Montgomeryshire

Published 1903

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.



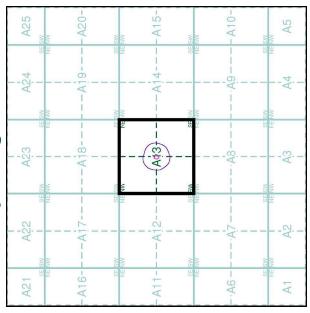
Ordnance Survey Plan

Published 1983
Source map scale - 1:2 500

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 1:2500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what was considered to be the cultivated parts of Great Britain. The published date given below 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 outlining areas.



Historical Map - Segment A13



Order Details

Order Number:	1623110811
Customer Ref:	MEN07115
National Grid Reference:	315380, 289330
Slice:	A
Site Area (Ha):	0.14
Search Buffer (m):	100

Site Details

Land at Brynllywarch Garden, Kerry/Ceri, Powys

Historical Aerial Photography

Published 2000

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain.



Historical Aerial Photography - Segment A13



A21	A22	A23	A24	A25
-A16-----A17-----A18-----A19-----A20-				
-A11-----A12-----A13-----A14-----A15-				
-A6-----A7-----A8-----A9-----A10-				
A1	A2	A3	A4	A5

Order Details

Order Number: 162311708_1
Customer Ref: MENV07115
National Grid Reference: 315380, 289330
Slice: A
Site Area (Ha): 0.14
Search Buffer (m): 100

Site Details

Land at Brynllwynwarch Garden, Kery/Ceri, Powys

Envirocheck® Report: Datasheet

Order Details:

Order Number:
162311708_1_1

Customer Reference:
MENV07115

National Grid Reference:
315380, 289330

Slice:
A

Site Area (Ha):
0.14

Search Buffer (m):
1000

Site Details:

Land at Brynllywarch Garden
Kerry/Ceri
Powys

Client Details:

Mrs C Williams
Mica Environmental Ltd
2 Lawn Cottage
Wattlesborough
Shrewsbury
Shropshire
SY5 9DY

Prepared For:

Mr K Harris