



Active Travel Route: Biglis to Dinas Powys

Agricultural Land Classification Report

Document Ref: 10058585-ARC-XX-060-TR-ZZ-00001

Revision: 01

October 2024

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Document Ref. 10058585-ARC-XX-060-TR-ZZ-00001

Date 11/10/2024

Revision Control

Revision	Date	Author	Checker	Reviewer	Approver	Changes
1	11/10/2024	ZL	ZL	BL	BL	
2	13/11/2024	ZL	ZL			Updating drawings with latest site boundary

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1 Introduction

1.1 Background

- 1.1.1 Arcadis Consulting (UK) Limited was commissioned by Vale of Glamorgan County Borough Council to undertake an Agricultural Land Classification (ALC) desk study. This study is to support a planning application for a proposed Active Travel Route (ATR) located between Biglis and Dinas Powys (hereafter referred to as the 'Proposed Development' or 'the Site').
- 1.1.2 The primary aim of this desk is to assess the ALC grade of the Site in light of a high annual flood risk from river, indicated from a flood risk model and research.
- 1.1.3 The central Grid Reference of the Proposed Development is ST 15393 70215 (Appendix A). The Proposed Development runs along the A4055 Cardiff Road between Biglis and Parc Bryn-y-Don of Dinas Powys and along a path through Parc Bryn-y-Don, which connects with Heol Y Frenhines, St Cadoc's Avenue and an abandoned railway.
- 1.1.4 The Site encompasses approximately 9 hectares of agricultural land, which will be potentially disturbed temporarily or permanently by the Proposed Development.

1.2 Purpose

- 1.2.1 The purpose of this ALC desk study is to assess the quality of agricultural land within the Site based on available soil data and information in relation to agricultural land and soils. This assessment will provide baseline information for further soil (or ALC) survey to inform a Soil Management Plan (SMP).

1.3 Policy and Guidance

- 1.3.1 The study is guided by the following national policies and guidance in relation to agricultural land and soils, with a particular focus on the best and most versatile (BMV) land.
- 1.3.2 Paragraph 180 of the National Planning Policy Framework (NPPF) (MHCLG, 2023)¹ states that:

“Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); (b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.”

- 1.3.3 Paragraphs 3.58 and 3.59 of Planning Policy Wales (WG 2024)² states that:

¹ Ministry of Housing, Communities and Local Government (MHCLG) (December 2023). National Planning Policy Framework (NPPF). <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

² Welsh Government (February 2024). Planning Policy Wales, Edition 12. <https://www.gov.wales/planning-policy-wales>

“Agricultural land of grades 1, 2 and 3a of the Agricultural Land Classification system (ALC) is the best and most versatile, and should be conserved as a finite resource for the future.” and

“When considering the search sequence and in development plan policies and development management decisions considerable weight should be given to protecting such land from development, because of its special importance. Land in grades 1, 2 and 3a should only be developed if there is an overriding need for the development, and either previously developed land or land in lower agricultural grades is unavailable, or available lower grade land has an environmental value recognised by a landscape, wildlife, historic or archaeological designation which outweighs the agricultural considerations. If land in grades 1, 2 or 3a does need to be developed, and there is a choice between sites of different grades, development should be directed to land of the lowest grade.”.

1.3.4 Paragraphs 5.12.3 of Planning Policy Wales states that:

“Construction sites inevitably require a degree of cut and fill engineering operations. Minimising the level of earthwork cut and fill volumes not only reduces waste but also protects soils, reduces energy consumption and reduces transport movements to and from a site.”.

1.3.5 Policy MD1 Location of New Development of Vale of Glamorgan Local Development Plan 2011–2026 (June 2017)³ states that:

“New development on unallocated sites should:

9. Have no unacceptable impact on the best and most versatile agricultural land.”.

1.3.6 Policy MD7– Environmental Protection of Vale of Glamorgan Local Development Plan 2011–2026 states that:

“Development proposals will be required to demonstrate they will not result in an unacceptable impact on people, residential amenity, property and / or the natural environment from either:

7. The loss of the best and most versatile agricultural land;”.

1.3.7 The Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land (MAFF, 1988) (‘the ALC guidelines’ hereafter)⁴ classifies agricultural land in England and Wales into grades 1, 2, 3a, 3b, 4 and 5 and defines as follows:

“Grade 1 is excellent quality agricultural land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 is very good quality agricultural land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

³ Vale of Glamorgan Council (June 2017). Vale of Glamorgan Local Development Plan 2011 – 2026

⁴ Ministry of Agriculture Fisheries and Food (1998). Agriculture land classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.

Grade 3a is good quality agricultural land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Grade 3b is moderate quality agricultural land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 is poor quality agricultural land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 is very poor quality agricultural land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.”

2 Methodology

2.1.1 The desk study was undertaken by collecting available baseline information related to agricultural land and soils within the Site, followed by an analysis and assessment of the quality of agricultural land.

2.1.2 The baseline information was gathered from the following sources:

- Aerial imagery from Google Earth;
- Ordnance Survey Map⁵;
- The BGS (British Geological Survey) Geology Viewer⁶;
- Predictive Agricultural Land Classification (ALC) Map 2 (WG, 2019)⁷;
- Soils of the Vale of Glamorgan (Crampton, 1972)⁸;
- Soils and their use in Wales⁹;
- Flood and Coastal Erosion Risk Maps from Natural Resources Wales¹⁰; and
- Climatological Data for Agricultural Land Classification (Met1989)¹¹.

2.1.3 The baseline data from the above sources was analysed to further assess the ALC grade of the agricultural land in accordance with Soil Survey Field Handbook (Hodgson, 2022)¹² and the ALC guidelines, to provide a baseline for a Soil Resource Survey (SRS) (or an ALC survey, if required) to support the setting out of soil protection measures during construction.

⁵ Ordnance Survey (2015). Map of Cardiff & Bridgend - OS Explorer Map 151 (Vale of Glamorgan).

⁶ BGS (British Geological Survey) Geology Viewer. <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/> [accessed 12/10/2024].

⁷ Welsh Government (December 2019). Predictive Agricultural Land Classification (ALC) Map 2. https://datamap.gov.wales/layers/inspire-wg:wg_predictive_alc2 [accessed 12/10/2024].

⁸ Crampton, by C.B. (1972). Soils of the Vale of Glamorgan, Rothamsted Experimental Station.

⁹ Rudeforth, C. C.; Hartnup, R.; Lea, J. W.; Thompson, T. R. E. & Wright, P. S. (1984) Soils and their use in Wales, Soil Survey of England & Wales.

¹⁰ Natural Resources Wales (2024). Flood and Coastal Erosion Risk Maps. <https://flood-risk-maps.naturalresources.wales/?locale=en> [accessed 12/10/2024].

¹¹ Meteorological Office (1989). Climatological Data for Agricultural Land Classification. London: The Meteorological Office.

¹² Hodgson, J. M (ed). (2022). The Soil Survey Handbook. Soil Survey Technical Monograph No.5, Cranfield

3 Baseline Information

3.1 Agricultural Land Use

- 3.1.1 Aerial satellite imagery indicates that agricultural land within the Site is predominantly grassland for dairy farming with one field used for arable farming and a small area in the south of Dinas Powys used as sport turf as shown in Appendix B.

3.2 Topography

- 3.2.1 A review of Ordnance Survey map shows that the majority area within the Site is level, lying within the 6m above sea level (asl) contour line, with small area in the south of Dinas Powys within the 10m asl contour line.

3.3 Geology

- 3.3.1 The majority of the Proposed Development is underlain by superficial deposits described as Alluvium - clay, silt, sand and gravel, a sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period, as indicated in the BGS Geology Viewer. Only a small area in the southeast of Parc Bryn-y-Don and the east of A4055 Cardiff Road lies directly over Mercia Mudstone Group.
- 3.3.2 Beneath the alluvial deposits is the Mercia Mudstone Group, a sedimentary bedrock formed between 252.2 and 201.3 million years ago during the Triassic period.

3.4 Agricultural Land Classification

- 3.4.1 Predictive ALC data from Welsh Government ALC Map2 shows that the Site is predominantly mapped as Grade 3a, with small areas in the southeast and west of Parc Bryn-y-Don mapped as Grade 3b (Appendix C).
- 3.4.2 Consultation with Post 1988 Agricultural Land Classification (Wales) Surveys - Boundary¹³ reveals there is no existing detailed ALC survey in the vicinity of the Site, Baglis and Dinas Powys.

3.5 Soils

- 3.5.1 Map Sheet 263 of Soil Survey of England and Wales (Figure A in Appendix D), Soils of the Vale of Glamorgan and Soils and their use in Wales indicate that the soils of the Site comprise predominantly Compton Series, with small area of Hurcot Series in the southeast of Parc Bryn-y-Don and to the east of A4055 Cardiff Road.

Compton Series

¹³ Welsh Government (November 2017). Post 1988 Agricultural Land Classification (Wales) Surveys – Boundary. https://datamap.gov.wales/layers/inspire-wg:Post_1988_ALC_Wales_Surveys_Boundary [accessed 12/10/2024].

- 3.5.2 Compton Series are reddish clayey river alluvium soils within the Compton Association, which contains clayey, severely waterlogged soils developed in reddish and greyish river alluvium subject to seasonal flooding. The association covers some 23 km² in Clwyd, Gwent and South Glamorgan. A typical soil profile description is shown in Figure B in Appendix D.
- 3.5.3 The Association occupies flat low-lying floodplains and the soils are subject to prolonged waterlogging by groundwater at shallow depths. They also suffer occasional damaging floods which can be extensive and protracted during the winter. When drained, both Compton and Fladbury soils can be improved to Wetness Class III or Wetness Class IV depending on their height above the river level.
- 3.5.4 The soils are mostly under permanent grass or rough grazing. Prolonged waterlogging at shallow depths and the risk of damaging seasonal floods preclude arable crops in all but the highest parts of the floodplain.

Hurcot Series

- 3.5.5 Hurcot Series consists of carbonatic loamy material passing to clay or soft mudstone. A detailed description of a typical soil profile is shown in Figure C in Appendix D.

3.6 Flooding

- 3.6.1 Flood and Coastal Erosion Risk Maps from Natural Resources Wales indicates that over half of the Site has a high flood risk from river as indicated by the dark blue colour on the flood risk map in Appendix E. High risk means that each year, this area has a chance of flooding of greater than 1 in 30 (3.3%).

3.7 Climatological Data

- 3.7.1 Table 3-1 Climatological data of the Site sets out the interpolated climatological data for the Site based on data from the Met Office.

Table 3-1 Climatological data of the Site

Parameter	Values
National Grid Reference	ST153702
Altitude (m)	6
Average Annual Rainfall (AAR) (mm)	972
Accumulated Temperature (AT0) (day degrees)	1554
Moisture deficit for wheat (mm)	92
Moisture deficit for potatoes (mm)	81
Field Capacity Days (FCD)	202

4 Assessment

4.1 Climatic Limitations

- 4.1.1 The climate data for the Site, with 1554 days degree of AT0 and 972mm of AAR, as shown in Table 3-1, indicates that the grade based on climate alone could be Grade is 1. As such, climate is not a limiting factor for the Site.

4.2 Site Limitations

- 4.2.1 As stated in 3.2, the Site (or agricultural land of the Site) is generally level. As such, gradient and microrelief are not considered to be limiting factors.
- 4.2.2 The majority of the Site is located within the floodplain and available maps from Natural Resources Wales indicate that a significant proportion of the Site has high risk from river (Appendix E) flooding. As such,.

4.3 Soil Limitations

- 4.3.1 According to the soil descriptions in 3.5 and the soil profiles shown in Appendix D, the soils of the Site would be deep, loamy or clayey and stoneless (or a few stones). Hence there is no individual soil limitation.

4.4 Chemical Limitations

- 4.4.1 No chemical limitations are expected from Compton and Hurcot soils due to their characteristics and formation. No contamination sources have been identified.

4.5 Interactive Limitations

Droughtiness

- 4.5.1 As analysed in 4.3.1 and in line with characteristics of Compton and Hurcot Soils, droughtiness is not expected to be a characteristic of these soils. As such, droughtiness is not considered to be a limiting factor.

Wetness

- 4.5.2 As indicated by the soil characteristics described in 3.5 and the soil profiles shown in Figure B and C in Appendix D, the soils are likely to be clay, particularly in subsoils, and gleyed within either 40cm or 70cm depth.

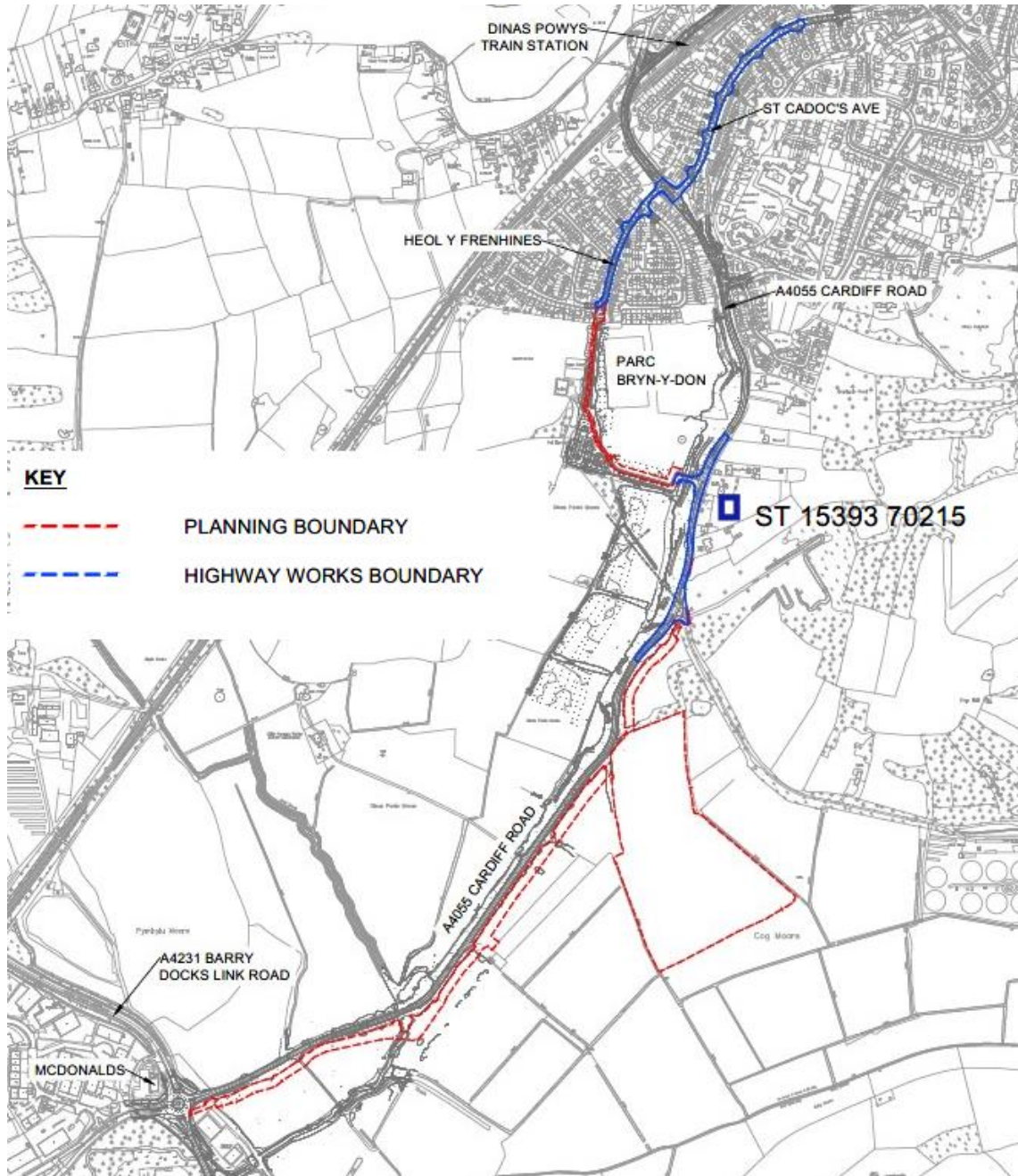
- 4.5.3 Consultation with Borehole records (ST16NW33, ST16NW34 and ST16NW363) from GeoIndex (onshore)¹⁴ (see Appendix F) indicates that the soil is gleyed within 40cm at Borehole ST16NW363, located within the area of high flood risk from river (dark blue area) as shown in Appendix E. This is in line with the soil characteristics of Compton and Hurcot Series and high flood risk from river. As a result, wetness is expected to be a limitation in the majority of the Site between Line A and Line B as shown Appendix C (or in the area of high flood risk from river flooding shown in Appendix E).
- 4.5.4 Considering the presence of gleying and clayey horizons within the soil profile in the majority of the area between Line A and B as shown Appendix C, the Wetness Class in this section (with the exception a small section in the northeast of A4055) would be either III or IV and this would make the majority of the land in this section ALC Grade 3b or 4.
- 4.5.5 No gleying was observed in Borehole records of ST16NW33 and ST16NW34 within 70cm depth, therefore Wetness Class for the rest of Compton Soil within the Site would be I. However, given the clayey topsoil of Compton Series, the ALC Grade would for these soils would also likely be 3b.

5 Conclusion and Recommendations

- 5.1.1 As set out above in relation to gleying with 40cm or 70cm depths and the presence of clayey horizons in combination with the high river flood risk, the land predicted to be ALC Grade 3a from Welsh Government ALC Map2 is likely to be non-BMV (Grade 3b or lower).
- 5.1.2 Given the minimal loss of agricultural land (approximately less than 3ha), the impact from the Proposed Development on agricultural land and soils would be negligible, even if the ALC Grade 3a from Welsh Government ALC Map2 is confirmed via a detailed ALC survey.
- 5.1.3 The construction of the Proposed Development would inevitably result in a minimal loss of agricultural land and disturbance of soils. To protect soil resources and ensure land required on a temporary basis can be returned to its preconstruction condition, a Soil Resources Survey should be undertaken to characterise soil attributes in order to inform the development of a Soil Management Plan.
- 5.1.4 A Soil Management Plan should be developed prior to construction to ensure that soil mitigation measures are in place before construction commencement.

¹⁴ British Geological Survey (2020). GeoIndex (onshore), <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/> [accessed 14/10/2024].

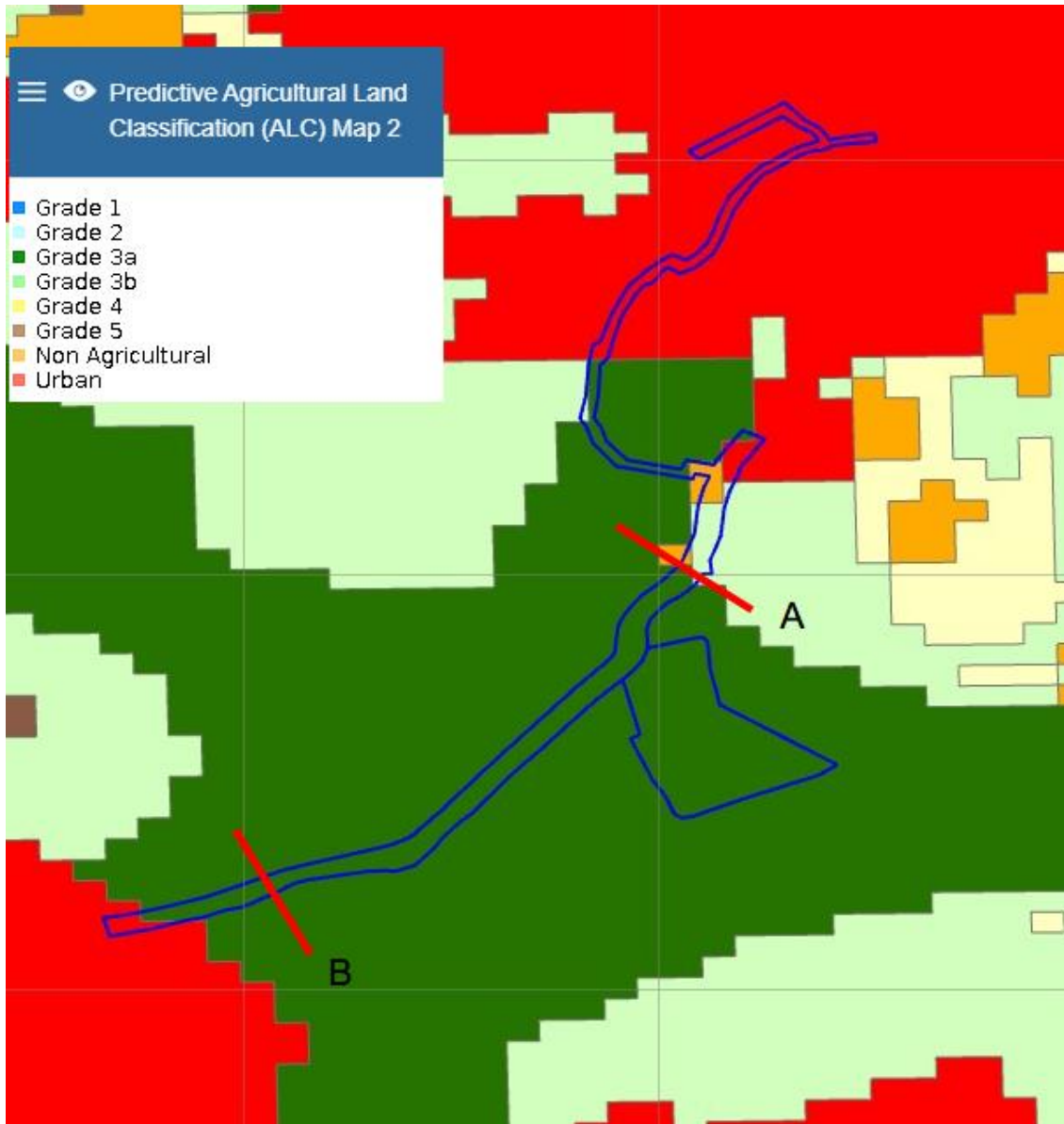
Appendix A Site Location Plan



Appendix B Satellite Imagery



Appendix C Predictive ALC Map



Appendix D Soil Map and Profiles

Figure A. Soil Map

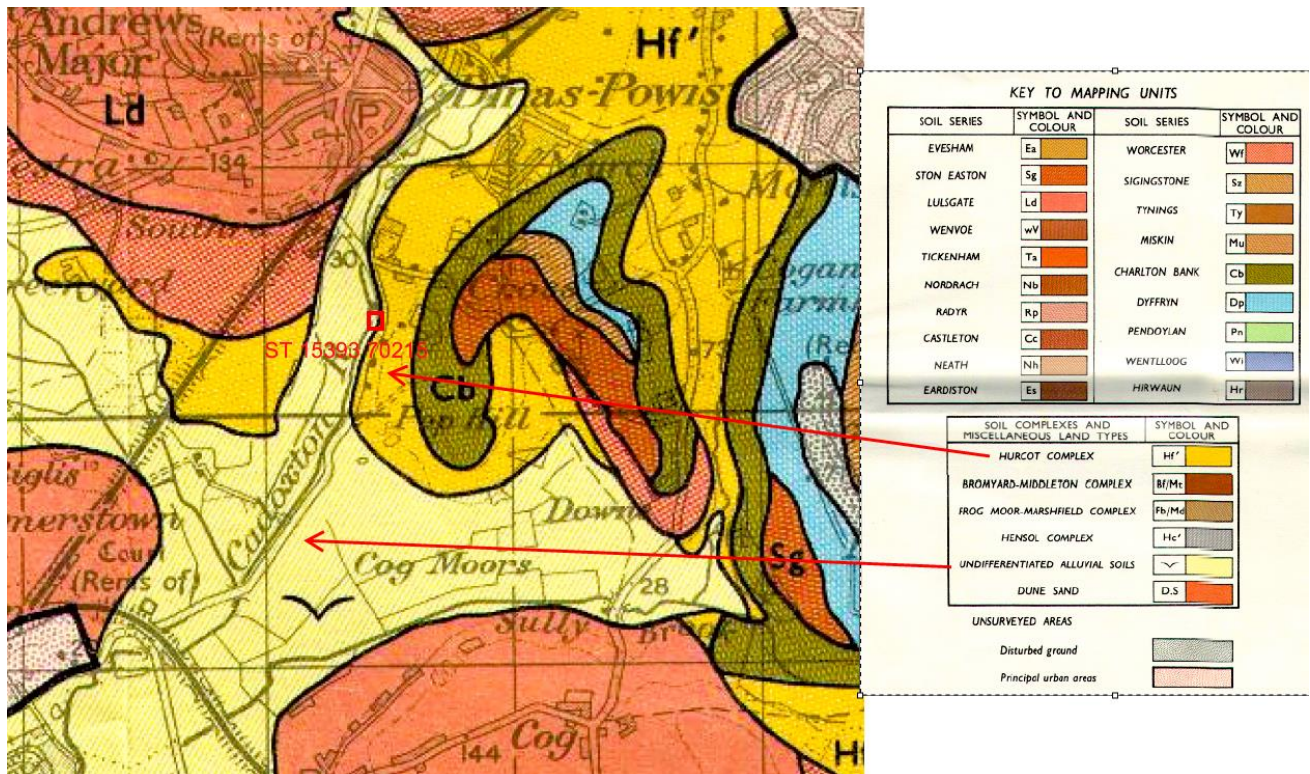


Figure B. Compton Soil Profile

Brief Profile Description

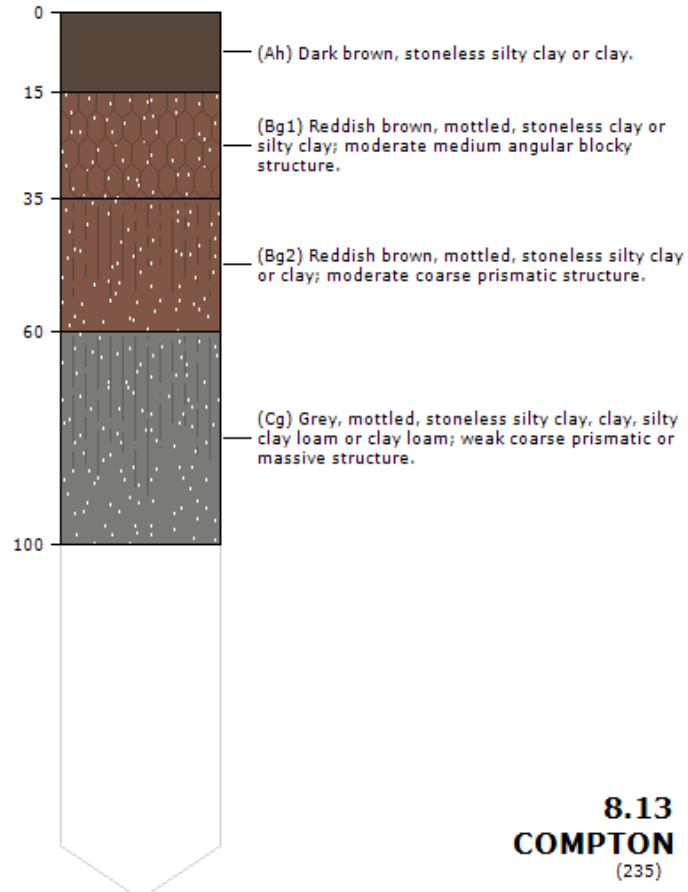
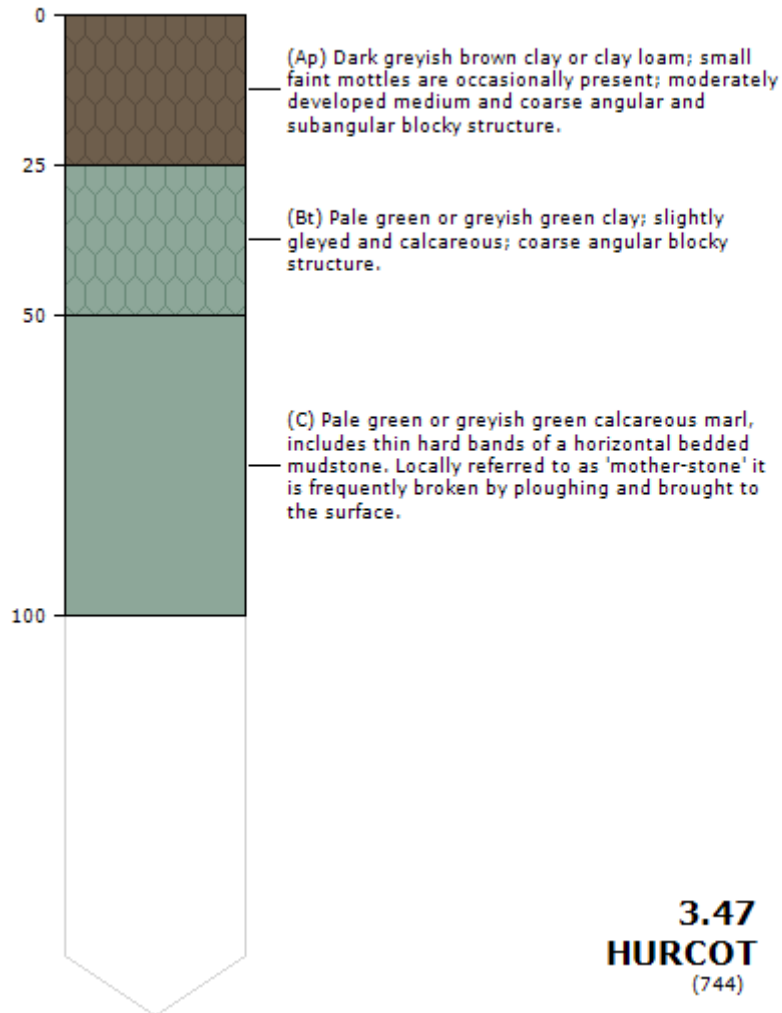
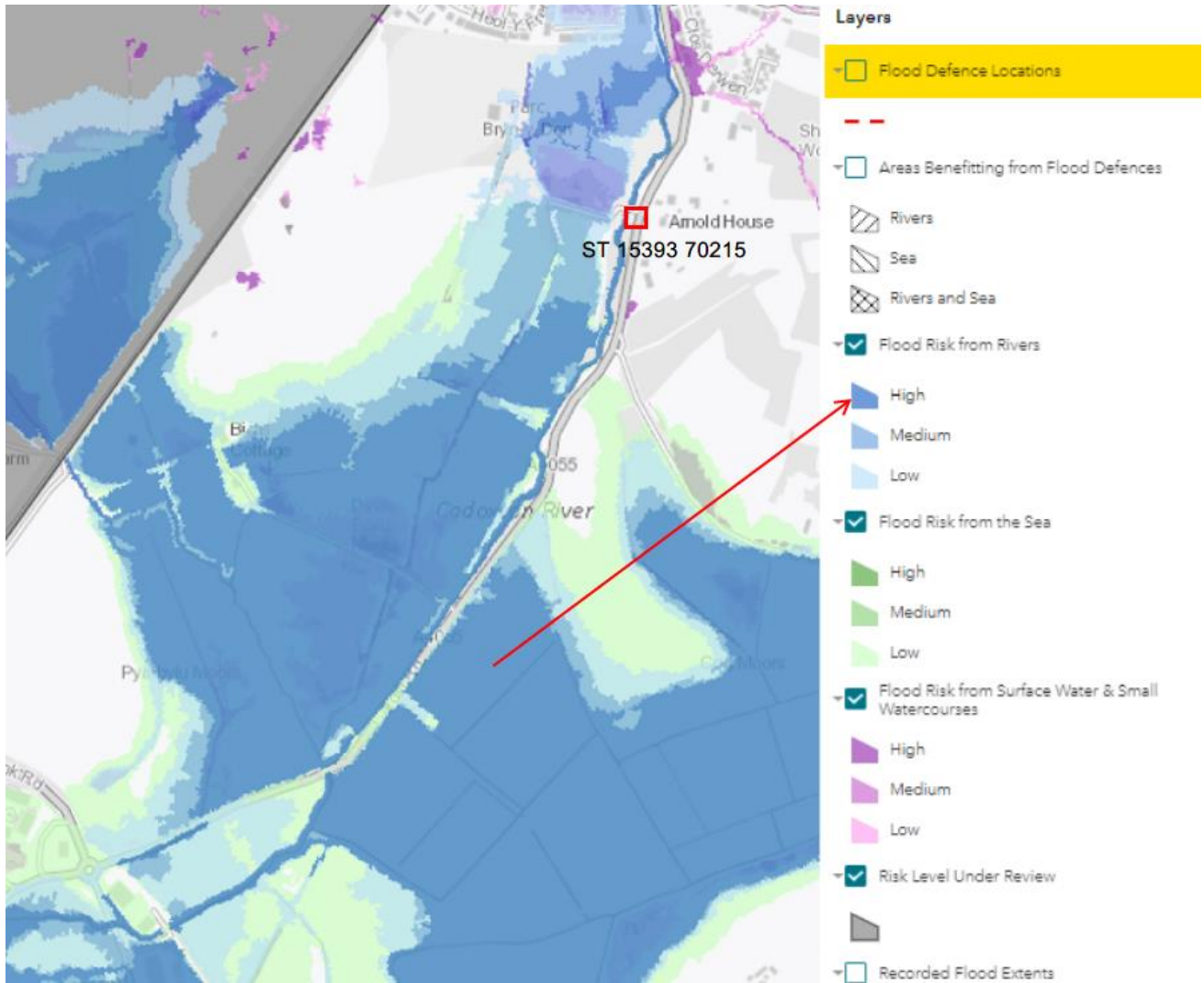


Figure C. Hurcot Soil Profile

Brief Profile Description



Appendix E Flood Risk Map



Appendix F BGS Borehole

Figure A. BGS Borehole Locations

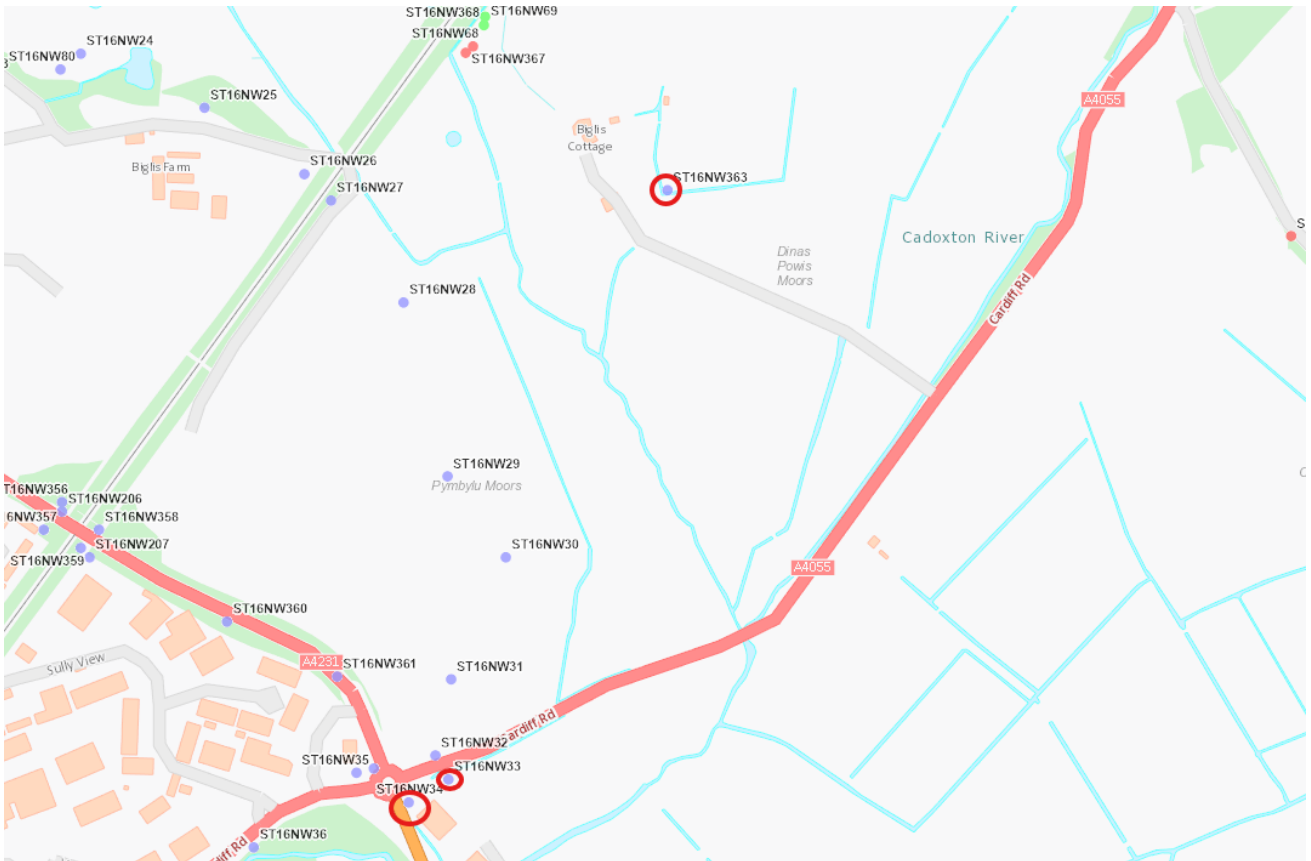


Figure B. BGS Borehole 378230 (ST16NW363)

This is probably the same as the well at Biglis in Cardiff Memoir (1912, 2nd edition page 108), although yield differs from that given by W.O.

Copy of log in memoir:-

Cadoxton—the well at Biglis.

Above Ordnance Datum, 23·8 feet.

	Ft. In.
Alluvial deposits:—	
Soil	1 6
Light-blue clay	1 6
Peat	3 0
Light-blue clay	1 0
Keuper:—	
Red mud	4 6
Hard red sandstone	10 9
Grey porous rock	8 0
	30 3

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There was formerly a strong spring from the bottom of the alluvial deposits; the spring still overflows in the winter-time. This well supplies Cadoxton and Barry. Its yield is said to be now 300,000 gallons a day, the surface-water being excluded, but it is suspected that the excavations for the Barry Docks have somewhat affected it.

Classification Agreed. DEDL.

D.J.D. Lawrence 1977

Probable Site indicated on G47-SW-W.

Figure C. BGS Borehole 377901 (ST16NW34)

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		Ft	in.	Ft	in.
	Top Soil	(0.46m)			6
	Brown Mottled Clay	(1.5m)		5	
	Light Brown mottled clay	(2.72m)		8	11
	Hole Ends: 8 8ft. 11 in				

Figure D. BGS Borehole 377900 (ST16NW33)

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		Ft	in.	Ft	in.
	S&T Brown Clay	(1.5m)		5	-
	S&T grey clay	(2.72m)		9	1
	S&T grey clay with traces of Peat	(3.1m)		10	
	Hole Ends 10ft				

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