A417 Missing Link
TR010056

6.4 Environmental Statement Appendix 9.6 Agricultural land classification report

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A417 Missing Link

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6.4 Environmental Statement Appendix 9.6 Agricultural land classification report

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Geoffrey Osborne Ltd




Agricultural Land Classification

A417 Missing Link, Birdlip, Gloucestershire

January 2021

ADAS

ADAS GENERAL NOTES

Project No.: 1010598-01

Title: A417 Missing Link, Birdlip, Gloucestershire – Agricultural Land Classification

Client: Geoffrey Osborne Ltd

Date: 03/02/2021

Office: **ADAS Rosemaund, Preston Wynne, Hereford, HR1 3PG**

Status: FINAL

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EXECUTIVE SUMMARY

ADAS has been instructed by Geoffrey Osborne Ltd to undertake a soil and agricultural land classification survey of land east of Gloucester, Gloucestershire, as part of the A417 Missing Link, Birdlip, Scheme.

The survey has identified the majority of the survey area as shallow and deeper silty clay loam soils over limestone bedrock. There are also large areas within central parts of the survey area which was found to have poorly draining clayey soils and silty clay loam over clayey soils that follow a similar coverage as the Evesham 1 soils mapped by the published Soil Survey of England and Wales mapping. Within the survey area 7.8% (14.7 ha) of the land is classified as subgrade 3a ('Best and Most Versatile Land) and 46.7% (90.3 ha) as subgrade 3b and grade 4 quality. A further 12.3% (23.8 ha) is classified as non-agricultural land, 15.7% (30.2 ha) as urban and 17.5% (34.0 ha) not requested to be surveyed. The principal limitation to agriculture varies across the survey area, as soil wetness, soil depth, soil stoniness, land gradient and climate.

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Appendices

1 INTRODUCTION

ADAS have been instructed by Geoffrey Osborne Ltd to undertake an agricultural land classification (ALC) survey. This report provides information on the soils and agricultural quality of land east of Gloucester, as part of the A417 Missing Link, Birdlip, Scheme. The report is based on a survey carried out from October 2020 to January 2021.

1.1 Site Environment & Agricultural Use

The land surveyed is formed of agricultural fields, small woodland areas, and hedgerows to the east of Gloucester, along the existing A417 dual carriageway. The site is surrounded by agricultural land to the east and south, with the existing A417 along the western boundary of the site, and the A436 to the northern boundary of the site. The survey area is made up of eleven land owners and each are described below:

Fly Up

Fly Up land is located to the south of the existing A417 road and west of the Air Balloon Roundabout. The area slopes steeply to the north-west with approximately 100 m in altitude difference between the north-west and south-east corner of the survey area. The survey area is rough grassland with dirt bike tracks meandering down the sloping site used for biking plus one horse grazing field. The boundaries of the survey area are mainly tall hedges and small woodland strips, as well as the A417 to the north of the site.

Crickley Tractors

This land is located to the south of the A417 road and west of the Air Balloon Roundabout. The area slopes very steeply to the south-east with 220 m AOD in the south-east corner and 169 m AOD in the north-west corner of the survey area. At the time of the survey the area was made up of permanent pasture, and had disassembled hedgerows which are likely old field boundaries that are no longer in use. The boundaries of the survey area are mainly tall hedges and small woodland strips, as well as the A417 to the north of the site.

Star College

Star College land is located to the north-east of the Air Balloon Roundabout and to the north the A436. The survey area slopes to the north-east from 238 m AOD in the south-west corner to 226 m AOD in the north-east corner of the survey area. At the time of the survey the area was made up of permanent pasture. The boundaries of the survey area are small woodland strips and tall hedges running alongside the A436 and unnamed road.

Medlock

This survey area is located to the east of the Air Balloon Roundabout. The survey area generally slopes to the north from 242 m AOD at the south of the field to 270 m AOD in the north. The boundaries of the survey area include hedges and small woodland areas.

Mendel

Mendal land includes 3 pieces of land across the project survey area. The first is a small area approximately 500 m to the east of the existing A417 dual carriageway and immediately south of Medlock land. This small area slopes to the north-east from 276 m AOD in the south-west corner to 262 m AOD in the north-east corner.

At the time of the survey the area was made up of permanent pasture. The boundaries include hedges to the north, fence boundaries to the west and small woodland strips to the south and east. The further two areas are adjacent to one another approximately 320 m to the east of the existing A417 dual carriageway and roughly 375 m east from the Barrow Wake carpark. These survey areas are slightly sloping to the east from 289 m AOD on the west boundary of the western site to 270 m AOD to the east boundary of the eastern site. At the time of the survey both areas were made up of permanent pasture. The boundaries include hedges, post/wire fences and small woodland strips.

Besterman

This land covers the majority of the project survey area. The area is located to the east of the A417. At the time of the survey this land was covered by a mixture of both arable and permanent pasture land. The area has varying gradients across the site. This includes the southern sections of this survey area generally sloping south, while individual fields to the east of the area have very steep slopes including valley features. The boundaries of this area includes small woodland strips, tall hedges, stone walls and wire/post fences.

De Lisle

This very small survey area is located approximately 800 m east of the A417 dual carriageway. The area slopes to the east and has an average height of 274 m AOD. At the time of the survey the small area was arable. The boundaries of the survey area are small woodland strips.

Parkinson

This small area is located approximately 800 m east of the A417 dual carriageway. The area is relatively flat with an average height of 275 m AOD. At the time of the survey the small area was permanent pasture used for grazing sheep. The boundaries of the survey area are small woodland strips.

Dick

This survey area is located approximately 500 m east of the A417 dual carriageway. The survey area slopes slightly to the south-east before dropping off significantly to a low lying area alongside a small woodland strip. At the time of the survey the area was area was rough grassland. The boundaries of the survey area includes small woodland strips to the east and south, a stone wall to the west, and hedgerow/buildings to the north.

Ford

This survey area is located at the south end of the project survey area to the east of the A417 dual carriageway and approximately 250 m to the south-east of Cowley Roundabout. The survey area slopes to the south-west from 265 m AOD in the north-eastern boundary to 255 m AOD in the south-western boundary. At the time of the survey the area was arable. The boundaries of the survey area includes stone walls to the north and west boundaries.

Overbury

This survey area is made up of three fields, one of which is under permanent pasture and the two others being arable. The area is located to the west of the A417 dual carriageway, and immediately west of Cowley Roundabout. The two arable areas slope to the south-east while the permanent pasture field falls to the south-west, from 251 m AOD to 230 m AOD. The boundaries of the site include hedges and small woodland strips.

1.2 Published Information

1.2.1 Geology

1:50,000 scale BGS information[1] records a variety of basal geology across the survey area. This includes the dominant basal geology of the Birdlip Limestone Formation, a sedimentary bedrock formed approximately 170-174 million years ago. This basal geology is found mainly across the northern, southern and eastern parts of the site. Much of the remaining site has recorded the basal geology as being sedimentary limestone bedrock all formed approximately 164-170 million years ago. This includes Salperton Limestone Formation, Aston Limestone Formation, Hampen Formation, White Limestone Formation, and Great Oolite Group.

In central parts of the survey area the basal geology has been recorded as Fuller's Earth Formation which is mudstone bedrock formed approximately 166-168 million years ago.

The north-western section of the survey has recorded the basal geology belonging to Lias Group and Inferior Oolite Group, described as Limestone interbedded with Argillaceous rocks and sandstone formed approximately 168-210 million years ago.

1.2.2 Soils

The Soil Survey of England and Wales shows a variety of soils across the survey area. The soil associations (a soil association is a group of soils that occur together in the landscape) mapped across the survey area includes:

a) **Sherborne** soil association is mapped in central and southern parts of the survey area. These soils are shallow well drained calcareous clayey soils over limestone bedrock.

b) **Evesham 1** soil association is mapped across central parts of the site and are recorded in a similar coverage as shown with the Fuller's Earth Formation – Mudstone basal geology. These soils are slowly permeable calcareous clayey soils over limestone, and are seasonally waterlogged.

c) **Elmton 1** soil association is mapped in northern parts of the survey area. These soils are shallow well drained calcareous fine loamy soils over limestone bedrock.

d) **Martock** soil association is mapped in the north-western section of the site. These soils are slowly permeable stoneless silty and clayey soils over siltstone/shale, and are seasonally waterlogged.

1.2.3 Previous Agricultural Land Classification

Detailed post-1988 agricultural land classification has been published for the very north-western quarter of this survey area[2]. This land is recorded as being of subgrade 3b and grade 4 quality. No further detailed agricultural land classification mapping is publically available for the rest of the survey area.

[1] British Geological Survey, 2019. *Geology of Britain viewer*. Online resource: http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html

[2] Defra, 2019. *Interactive map of Great Britain*. Online resource: https://magic.defra.gov.uk/MagicMap.aspx

2 METHODOLOGY

A detailed soil survey was carried out between September 2020 to January 2021. The survey was based on observations at intersects of a 100 m grid, giving a sampling density of a least one observation per hectare. During the survey soils were examined via a combination of auger borings and a soil description pit to a maximum depth of 1.2 m. Also on the shallow soils over limestone shallow pits were dug to 25-30cm deep (depth to limestone permitting) to assess stone content in the top 25cm. A log of the details of each observation point is attached to this report in an Appendix 1. A map showing the location of each observation point is attached to this report as Appendix 2.

At the soil description pits and other auger borings a soil sample was taken representative of the top 25 cm of the soil profile and this was submitted to NRM for particle size distribution (PSD) analysis. Full details of the analysis is included in Appendix 5.

3 SOILS

3.1 Soil Types

Three principal soil types were identified at this site – shallow and deeper soils over limestone, silty clay loam over clayey soils and clayey soils. The predominant soil type, covering the majority of the site, is shallow and deeper soils over limestone. The distribution of soil types is shown in Appendix 3 attached to this report.

3.1.1 Shallow and deeper soils over limestone bedrock

These soils are found across the majority of the survey area and appear to follow a similar pattern as found on the published soils mapping. These soils appear to be most like the Sherborne and Elmton 1 soil associations, with typically a shallow loamy or clayey topsoil over limestone.

The soils identified on site are typically a shallow dark brown/yellowish dark brown heavy silty clay loam topsoil over limestone bedrock. Stone content in the topsoil is generally slightly to very stony (6-50%) by volume, and this increases with depth to the limestone bedrock. The depth of these soils varies with examples ranging from 15 cm to 70 cm deep.

In all soil examples of this type, no gleying[3] is present indicating that the soil profile is well drained and no seasonal waterlogging occurs within the soil profile.

An example soil profile is described below from an auger at observation 29 (see Appendix 1). A soil description pit was not needed as these soils are well drained, and shallow depths meant no further information would be gained.

0-29 cm Dark yellowish brown (10YR 3/4) heavy silty clay loam; very stony (45%) with subangular medium and large limestone; strongly developed granular structure; friable; many fine fibrous roots; wavy boundary to:

29+ cm Limestone bedrock.

These soils are freely-draining and belong to soil Wetness Class I. They have a high capacity to absorb excess winter rainfall.

[3] Gleying is a greyish and ochreous colouring of the soil caused by periodic or permanent waterlogging.

3.1.2 Silty clay loam over clayey soils

These soils are found at a variety of locations across the survey area and appear to be found on the boundary cross-over between the well drained shallow soils over limestone (Sherborne & Elmton 1 soil associations) and the slowly permeable clayey soils (Evesham 1 soil association).

These soils typically have a medium/heavy silty clay loam topsoil over clayey subsoils. Approximately half of these soils identified on site have gleying typically within 40cm of the land surface, indicating seasonal waterlogging. However the remaining soils identified as being this soil type showed no evidence of gleying and would appear well drained. The soils with gleying present have weakly developed structures and are slowly permeable typically within 40 cm of the surface. These soil types are stoneless, to slightly stony.

These soils are either freely draining and belong to Wetness Class I / II or poorly-draining and belong to Wetness Class III / IV. The distinction depends on evidence of gleying and a slowly permeable lower subsoil.

3.1.3 Clayey soils

These soils are found in a thin band running south-east to north-west across the centre of the survey area. They are typically found at low lying areas across the survey area. These soils again follow a similar coverage as shown on the published soils maps of the heavier Evesham 1 soil association.

These soils have a heavy textured clay topsoil and clayey subsoil. The subsoil is poorly structured and slowly permeable immediately beneath the topsoil and as a result there is obvious evidence of seasonal waterlogging throughout the soil profile. These soils are very slightly stony or stoneless.

An example soil profile is described below from a pit at observation 44 (see Appendix 1).

0-23 cm Dark brown (10YR 3/3) silty clay; stoneless; moderately developed medium prismatic blocky structure; friable; a few fibrous roots; wavy clear boundary to:

23-35 cm Greyish brown (10YR 5/2) clay with common red (2.5YR 4/6) mottles; stoneless; weakly developed blocky medium prismatic structure; friable; a few very fine fibrous roots; 0.1% macropores; wavy clear boundary to:

35-100+ cm Dark greyish brown (10YR 4/2) clay with common red (2.5YR 4/6) mottles; stoneless; weakly developed blocky medium prismatic structure; firm; no roots; 0.1% macropores.

These soils are poorly-draining and belong to soil Wetness Class IV. They have a low capacity to absorb excess winter rainfall.

3.2 Laboratory Analysis

Samples representative of the top 25 cm of the soil profiles were taken from observation points across the site. These were for observation points 2, 20, 31, 44, 59, 72, 101 and 108. They were submitted to NRM Laboratories for particle size distribution analysis. The textures were returned respectively as heavy clay loam, clay, clay, clay, clay, organic clay, organic silty clay and organic silty clay (see Appendix 5).

4 AGRICULTURAL LAND CLASSIFICATION

The Agricultural Land Classification (ALC) system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use for food production. The limitations can operate in one or more of four principal ways; they may affect the range of crops which can be grown, the level of crop yield, the consistency of crop yield, and the cost of obtaining a crop.

The classification system gives considerable weight to flexibility of cropping, whether actual or potential, however the ability of some land to produce consistently high yields of a narrower range of crops is also taken into account.

The Agricultural Land Classification (ALC) system classifies land into five grades numbered 1 to 5, with grade 3 divided into two subgrades (3a and 3b). The system was devised and introduced by the then Ministry of Agriculture, Fisheries and Food (MAFF) in the 1960s and revised in 1988. A description of the grades used in the ALC system is attached to this report in Appendix 6.

4.1 Climate

The agricultural climate is an important factor in assessing the agricultural quality of land, and the agricultural climate of this site has been calculated using the Climatological Data for Agricultural Land Classification[4]. The relevant site data for across the site has been considered and are given below.

Table 4.1: Agro-climatic variables

Site	Crickley Tractors
Grid Reference (mid-point of site)	SO926156
Altitude	170 m AOD
Average Annual Rainfall (AAR)	787 mm
January-June Accumulated Temperature (AT0)	1328 day °C
Field Capacity Days (FCD)	174
Moisture Deficit Wheat (MDW)	87 mm
Moisture Deficit Potatoes (MWP)	73 mm
Climate (upper grade limit)	2

[4] Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

Site	Star College
Grid Reference (mid-point of site)	SO936163
Altitude	230 m AOD
Average Annual Rainfall (AAR)	834 mm
January-June Accumulated Temperature (AT0)	1260 day °C
Field Capacity Days (FCD)	182
Moisture Deficit Wheat (MDW)	77 mm
Moisture Deficit Potatoes (MWP)	60 mm
Climate (upper grade limit)	2

Site	Medlock
Grid Reference (mid-point of site)	SO939161
Altitude	261 m AOD
Average Annual Rainfall (AAR)	861 mm
January-June Accumulated Temperature (AT0)	1224 day °C
Field Capacity Days (FCD)	187
Moisture Deficit Wheat (MDW)	71 mm
Moisture Deficit Potatoes (MWP)	53 mm
Climate (upper grade limit)	2

Site	Mendel
Grid Reference (mid-point of site)	SO937151
Altitude	280 m AOD
Average Annual Rainfall (AAR)	879 mm
January-June Accumulated Temperature (AT0)	1203 day °C
Field Capacity Days (FCD)	190
Moisture Deficit Wheat (MDW)	68 mm
Moisture Deficit Potatoes (MWP)	48 mm
Climate (upper grade limit)	3a

Site	De Lisle
Grid Reference (mid-point of site)	SO940156
Altitude	275 m AOD
Average Annual Rainfall (AAR)	878 mm
January-June Accumulated Temperature (AT0)	1208 day °C
Field Capacity Days (FCD)	190
Moisture Deficit Wheat (MDW)	68 mm
Moisture Deficit Potatoes (MWP)	49 mm
Climate (upper grade limit)	3a

Site	Besterman (north)
Grid Reference (mid-point of site)	SO942147
Altitude	280 m AOD
Average Annual Rainfall (AAR)	892 mm
January-June Accumulated Temperature (AT0)	1203 day °C
Field Capacity Days (FCD)	194
Moisture Deficit Wheat (MDW)	66 mm
Moisture Deficit Potatoes (MWP)	46 mm
Climate (upper grade limit)	3a

Site	Besterman (south)
Grid Reference (mid-point of site)	SO950136
Altitude	270 m AOD
Average Annual Rainfall (AAR)	894 mm
January-June Accumulated Temperature (AT0)	1215 day °C
Field Capacity Days (FCD)	195
Moisture Deficit Wheat (MDW)	67 mm
Moisture Deficit Potatoes (MWP)	47 mm
Climate (upper grade limit)	3a

Site	Overbury
Grid Reference (mid-point of site)	SO949131
Altitude	251 m AOD
Average Annual Rainfall (AAR)	885 mm
January-June Accumulated Temperature (AT0)	1237 day °C
Field Capacity Days (FCD)	193
Moisture Deficit Wheat (MDW)	70 mm
Moisture Deficit Potatoes (MWP)	51 mm
Climate (upper grade limit)	2

The combination of the Average Annual Rainfall (AAR) and the January-June Accumulated Temperature (AT0) figures limit the site to grade 2 and subgrade 3a.

4.2 Results

The results of the soil survey described in section 3 were used in conjunction with the agro-climatic data above to classify the land according to the revised guidelines for Agricultural Land Classification issued in 1988 by the Ministry of Agriculture, Fisheries and Food (now Defra)[5].

This report has identified agricultural land of subgrade 3a, subgrade 3b and grade 4 quality. The principal limitations to agricultural use are soil wetness, soil depth, soil stoniness, land gradient and climate. The grades present at the site are described below. Some worst case scenario ALC droughtiness calculations were carried out for the shallow soils over limestone. Doughtiness would not down grade any land below that determined by other factors.

Grade 1

No land of this quality has been mapped.

Grade 2

No land of this quality has been mapped.

Subgrade 3a

There are 14.7 ha of subgrade 3a land within this survey area. This land is principally formed on freely-draining shallow and deeper soils over limestone bedrock predominately in the south of the survey area; see section 3.1.1. Some of this land is also found on silty clay loam over clayey soils in random locations across the survey area. These soils belong to Wetness Class I. They have no gleying or

[5] MAFF, (1988). *Agricultural Land Classification for England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land*.

evidence of waterlogging within the top 45 cm of the soil profile, so are often limited by their depth or the climate.

The principal limitations to agriculture on such land is soil wetness (workability), climate, and depth. On such land cultivation opportunities are could be restricted in late autumn and early spring.

Subgrade 3b

There are 65.2 ha of subgrade 3b land within this survey area. This land is formed on freely-draining soils over limestone bedrock soils found in central parts of the survey area (see section 3.1.1). These soils belong to Wetness Class I. Some of this graded land is found on poorly draining heavier soils particularly in southern parts of the survey area. These soils belong to Wetness Class III.

On the freely draining shallow soils the principal limitation to agriculture is soil depth and soil stoniness. On the poorly-draining fine loamy over clayey soils the principal limitation to agriculture is soil wetness. On such land cultivation opportunities are likely to be restricted to autumn only, due to the heavier poorly draining soils becoming sticky and plastic when wet. Grazing is generally limited to late spring, summer and early autumn due to the risk of poaching.

Grade 4

There are 25.1 ha of grade 4 land within this survey area. The majority of this graded land is formed on poorly-draining clayey soils (see section 3.1.3) particularly in central bands across the survey area. These soils are slowly permeable immediately beneath the topsoil and belong to Wetness Class IV. Soil wetness is the principal limitation to agriculture and on such land cultivation opportunities are likely to be restricted throughout the year. Such land is mainly suited to grass with occasional arable crops of which yields would be variable.

Some of this grade 4 land is formed on freely draining shallow soils over limestone. In these areas the principal limitation is soil stoniness, soil depth and gradient. These soils belong to Wetness Class I.

Grade 5

No land of this quality has been mapped.

Non-agricultural

There are 23.8 ha of non-agricultural land within this survey area. This land includes small wooded areas, buildings, hard standings associated with the site boundaries, hedgerows and open watercourses.

Urban

There are 30.2 ha of urban land within this survey area. This land includes the existing A417 dual carriageway, and other existing roads within the survey area.

No survey requested

There was 34.0 ha of land within this survey area which has not been requested to be surveyed as per ARUP drawings HE551505-ARP-VES-X_XX_XXXX_X-DR-LE-000026 [0.1] and HE551505-ARP-VES-X_XX_XXXX_X-DR-LE-000026 [0.1]. The legends in these plans suggest that this land has already been surveyed, but this data cannot be found ADAS.

4.3 Summary of grade areas

The boundaries between the different grades of land are shown in Appendix 4 attached to this report. The area occupied by each grade is shown below.

Table 4.3: Grade areas

Grade / subgrade	Area (ha)	Area (%)
Grade 1	-	-
Grade 2	-	-
Subgrade 3a	14.7	7.8%
Subgrade 3b	65.2	33.7%
Grade 4	25.1	13%
Grade 5	-	-
Non-agricultural	23.8	12.3%
Urban	30.2	15.7%
No Survey Requested	34.0	17.5%
Total	**193**	**100**

5 CONCLUSION

A soil and agricultural land classification survey has been undertaken on land east of Gloucester, as part of the A417 Missing Link, Birdlip, Scheme.

The survey has identified the majority of the survey area as shallow and deeper soils over limestone bedrock. The majority of these soils form land of subgrade 3b quality. The survey also identified a central band of poorly drained clayey soils and silty clay loam over clayey soils. The soils recorded and mapped match up with the published soils maps. The majority of these heavier soils form land of subgrade 3b and grade 4 quality.

A variety of limitations to agricultural use of this land are found across the survey area. These include soil wetness in central parts of the survey area where heavier soils are encountered, soil depth and stoniness in the majority of the survey area, and land gradient in northern and eastern parts of the survey area.

APPENDIX 1 – SOIL SURVEY DETAILS

Details of each auger boring:

Appendix 1: Soil Survey Details

Soil Profile												Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes		(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
1	24 41 41+	10YR4/2 10YR4/4	HZCL/ZC C (limestone fragments) Limestone				4	3	1				1	3a/b		3a/3b	Wetness
2	23 23+	10YR4/2	HZCL/ZC Limestone				4	3	1				1	3a/b		3a/3b	Wetness
3	20 20+	10YR4/2	HZCL/ZC Limestone				4	3	1				1	3a/b		3b	Depth
4	27 27+	10YR4/2	HZCL/ZC Limestone				8	6	2				1	3a/b		3a/b	pth / Wetne
5	39 39+	10YR4/2	HZCL/ZC Limestone				8	6	2				1	3a/b		3a/b	Wetness
6	20 20+	10YR4/2	HZCL/ZC Limestone				8	6	2				1	3a/b		3b	Depth
7	20 44 78 78+	10YR4/2 10YR5/4 2.5Y6/3	HZCL/ZC Clay Clay Limestone	Och F									1	3a/b		3a/b	Wetness
8	24 39 39+	10YR4/2 10YR5/4	HZCL/ZC C Limestone										1	3a/b		3a/b	Wetness
9	24 52	10YR4/2 2.5Y6/2	HZCL/ZC C (gritty)				7	5	2								

Appendix 1: Soil Survey Details

Soil Profile											Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
	71 71+	2.5Y6/2	C (gritty)	Och C												
10	17 59 59+	10YR3/3 10YR4/4	hzcl C Limestone			ca						1	3a		3a	Wetness
11	12 22 70 70+	10YR3/2 10YR3/2 10YR6/6	mzcl hzcl C Limestone			ca						1	2		2	Wetness Climate
12	22 39 70 70+	10YR4/3 10YR5/6 10YR5/3	hzcl C C Limestone	Grey C Grey C	yes	ca	<5					4	4		4	Wetness
13	25 25+	10YR3/4	hzcl Limestone			ca	12	0	12			1	3a		3b	Depth
14	30 70 80 80+	10YR3/4 10YR4/6 10YR4/6	hcl C C (limestone fragments) Limestone			ca	<5					1	3a		3a	Climate Wetness
15	35 35+	10YR3/4	hzcl Limestone			ca						1	3a		3a	Climate
16	30 55 120	10YR3/4 10YR4/4 10YR5/2	hzcl zc zc	Och C		ca						3	3b		3b	Wetness
17	30 34 120	10YR3/4 10YR4/6 10YR5/3	hzcl zc c	Och F Och C Och C	yes	ca						4	4		4	Wetness

Appendix 1: Soil Survey Details

Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
18	25 44 120	10YR5/2 10YR5/8 & 10YR6/2 10YR5/1	hzcl c c	Och C Och & Mang C Och & Mang C	 yes yes	ca						4	4		4	Wetness
19	25 120	10YR4/2 10YR6/2	c c	Och C Och & Mang C	 yes	ca						4	4		4	Wetness
20	32 40 120	10YR3/2 10YR5/3 10YR5/2	c c c	 Och & Mang C Och & Mang C	 yes yes	ca						3	4		4	Wetness
21	25 65 120	10YR4/2 10YR5/3 10YR5/2	c c c	Och F Och & Mang C Och & Mang C	 yes yes	ca						4	4		4	Wetness
22	NOT DONE - OUTSIDE RED LINE BOUNDARY															
23	30 73 73+	10YR4/2 10YR5/3	hzcl/zc c Limestone	 Och & Mang F		ca				Micorelief extreme to south of auger		1	3a/3b		4	Slope
24	25 25+	7.5YR2.5/2	hzcl Limestone			ca	65	45	20			1	3a		4	Stone
25	21 21+	10YR3/4	hzcl Limestone			ca	53	45	8			1	3a		4	Stone
26	31	10YR3/4	hzcl			ca	16	13	3			1	3a		3a	Depth

Appendix 1: Soil Survey Details

Soil Profile											Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
	31+		Limestone													Wetness Climate
27	36 36+	10YR3/4	hzcl Limestone			ca	<5					1	3a		3a	Depth Climate
28	18 28 28+	10YR3/4 10YR4/4	hzcl/zc hzcl/zc Limestone			ca						1	3a		3b	Depth
29	28 28+	10YR3/4	hzcl/zc			ca	45	25	20			1	3a		3b	Stone Depth
30	28 28+	10YR3/4	hzcl Limestone			ca	12	12				1	3a		3b	Depth
31	15 15+	10YR3/4	hzcl/zc Limestone			ca	13	10	3			1	3a/		4	Depth
32	26 26+	10YR3/4	hzcl/zc Limestone			ca	<5					1	3a		3b	Depth
33	20 35 120	10YR3/4 10YR4/3 10YR4/3	hzcl c c			ca	16	12	4			1	3a		3a	Climate Wetness
34	29 29+	10YR5/3	hzcl Limestone			ca						1	3a		3b	Depth

Appendix 1: Soil Survey Details

Soil Profile											Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
35	25 25+	10YR3/4	hzcl Limestone			ca	22	15	7			1	3a		3b	Depth
36	15 15+	10YR5/3	hzcl Limestone			ca	25	20	5			1	3a		4	Depth Stone
37	30 120	10YR5/3 10YR4/4	c c			ca	1	1				1	3b		3b	Wetness
38	24 120	10YR5/3 10YR4/3	c c			ca	1	1				1	3b		3b	Wetness
39	25 31 120	10YR3/4 10YR4/3 10YR4/3	hzcl zc c			ca	14	9	5			1	3a		3a	Climate Wetness
40	20 50 50+	10YR4/3 10YR4/2	c c Limestone			ca	7	5	2			1	3b		3b	Wetness
41	29 29+	10YR4/4	zc Limestone			ca	15	10	5			1	3a		3b	Depth
42	20 69 120	10YR4/4 10YR5/2 10YR6/1	c c c	Och C Och C Och C	 yes yes	ca						4	4		4	Wetness

Appendix 1: Soil Survey Details

Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
43	26	10YR4/4	zc			ca						4	4		4	Wetness
	70	10YR5/2	c	Och & Mang C	yes											
	120	10YR5/1	c	Och & Mang C	yes											
44	25	10YR4/4	c			ca						4	4		4	Wetness
	75	10YR5/2	c	Och & Mang C	yes											
	120	10YR5/1	c	Och & Mang C	yes											
45	26	10YR3/4	c			ca						1	3b		3b	Wetness
	42	10YR5/6	c													
	42+		Limestone													
46	NON-AGRICULTURAL															
47	37	10YR4/2	c			ca						1	3b		3b	Wetness
	120	10YR5/3	c													
48	20	10YR4/2	c			ca						4	4		4	Wetness
	40	10YR5/3	c	Och F	yes											
	120	10YR5/3	c	Och C	yes											
49	20	10YR3/2	c	Och & Mang C		ca						4	4		4	Wetness
	120	10YR6/3	c	Och C	yes											
50	24	10YR4/2	c			ca						4	4		4	Wetness
	42	10YR5/3	c	Och C	yes											
	120	10YR6/2	c	Och & Mang C	yes											
51	30	10YR3/3	mzcl			ca	32	25	7			1	2		3b	Stone
	30+		Limestone													

Appendix 1: Soil Survey Details

Soil Profile											Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
52	25 25+	10YR3/3	mzcl Limestone			ca	5					1	2		4	Slope
53	40 120	10YR3/3 10YR4/4	mzcl c			ca	5			Slope was over 11 degrees 20m further upslope		1	2		3b	Slope
54	20 75 75+	10YR3/3 10YR6/4	mzcl zc Limestone			ca	5					1	2		4	Slope
55	25 120	10YR4/4 10YR5/3	mzcl c	Och C		ca	5					2	3a		4	Slope
56	28 120	10YR3/3 10YR4/6	zc c			ca	5			Limiting slope sarts 10m south from auger		1	3b		4	Slope
57	18 30 55 5+	10YR3/3 10YR3/4 10YR3/3	mzcl c zc Limestone			ca	5 20	15	5			1	2		3a	Climate
58	23 35 35+	10YR4/3 10YR4/4	zc c Limestone			ca	5			20m of flat until 16 degree gradient		1	3b		3b	Wetness
59	20 26 45 80	10YR4/3 10YR4/3 10YR5/6 10YR6/3	c c c c	 Och F Och & Mang C Och & Mang C	 yes	ca						4	4		4	Wetness

Appendix 1: Soil Survey Details

Soil Profile											Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
	120	10YR6/2 & 10YR6/6	c													
60	30	10YR4/2	hzcl			ca						3	3b		3b	Wetness
	55	10YR5/3	c	Och F												
	120	10YR6/1 & 10YR5/3	c	Och C	yes											
61	25	10YR3/3	hzcl			ca						4	4		4	Wetness
	32	10YR5/6	c	Och M												
	120	10YR5/2	c	Och M	yes											
62	25	10YR3/3	hzcl			ca	22	21	1			1	3a		3b	Stone
	25+		Limestone													Depth
63	25	10YR3/4	hzcl			ca	26	20	6			1	3a		3b	Stone
	55	10YR5/4	c													
	55+		Limestone													
64	20	10YR3/3	mzcl			ca	23	20	3			1	2		3b	Stone
	20+		Limestone													Depth
65	20	10YR4/3	hzcl			ca	37	25	12			1	3a		3b	Slope
	22	10YR4/4	zc													Depth
	22+		Limestone													Stone
66	23	10YR3/3	mzcl			ca	35	25	10			1	2		3b	Stone
	23+		Limestone													Depth
67	28	10YR3/4	zc			ca	12	10	2			1	3b		3b	Wetness
	28+		Limestone													Depth
68	27	10YR3/3	mzcl			ca	45	10	35			1	2		4	Stone

Appendix 1: Soil Survey Details

Soil Profile											Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
	27+		Limestone													
69	16 29 120	10YR3/3 10YR4/4 10YR6/3	c c zc	Och C	yes	ca	5					4	4		4	Wetness
70	28 28+	10YR3/3	hzcl Limestone			ca	50	5	45			1	3a		4	Stone
71	20 25 40 40+	10YR3/3 10YR4/4 10YR5/6	hzcl c c Limestone			ca	5					1	3a		3a	Wetness Climate
72	18 26 33 33+	10YR3/2 10YR4/4 10YR5/6	hzcl c c Limestone			ca	5					1	3a		3a	Wetness Climate
73	WOODLAND															
74	25 30 30+	10YR3/3 10YR3/4	mzcl c Limestone			ca						1	2		3a	Depth Climate
75	23 34 34+	10YR3/4 10YR4/4	mzcl c Limestone			ca						1	2		3a	Climate Depth
76	18 27 50	10YR3/3 10YR4/4 10YR4/4	mzcl hzcl c			ca	5					1	2		3a	Climate

Appendix 1: Soil Survey Details

Soil Profile												Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes		(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
	50+		Limestone														
77	21 24 24+	10YR4/3 10YR4/4	C ZC Limestone			ca				LS fragments LS fragments CO-ORDINATE IN HEDGE SO MOVED INTO FIELD			1	3b		3b	Wetness Soil Depth
78	21 21+	10YR4/3	C Limestone			ca				LS fragments LS fragments CO-ORDINATE IN HEDGE SO MOVED INTO FIELD			1	3b		3b	Wetness Soil Depth
79	15 29 29+	10YR3/4 10YR5/6	c c Limestone			ca				CO-ORDINATE IN HEDGE SO MOVED INTO FIELD - NEAR GATE ENTRANCE			1	3b		3b	Depth Wetness
80	26 62 62+	10YR3/4 10YR6/6	hzcl c Limestone			ca	5						1	3a		3a	Wetness Climate
81	30 70 70+	10YR3/4 10YR4/4	hzcl c Limestone			ca							1	3a		3a	Wetness Climate
82	21 35 51 51+	10YR3/3 10YR3/6 10YR4/4	hzcl zc c Limestone			ca	5						1	3a		3a	Wetness Climate
83	20 30 30+	10YR3/3 10YR3/6	mzcl zc Limestone			ca	5						1	2		3b	Slope
84	29 24 34+	10YR4/3 10YR5/6	C ZC Limestone			ca				Occ. LS fragments LS fragments			1	3b		3b	Wetness

Appendix 1: Soil Survey Details

Soil Profile											Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
85	26 30 30+	7.5YR4/4 10YR5/6	C ZC Limestone			ca				LS fragments LS fragments		1	3b		3b	Wetness
86a	24 27 27+	10YR4/4 10YR5/4	C C Limestone			ca				LS fragments LS fragments		1	3b		3b	Wetness Soil Depth
86b	20 30 30+	10YR4/3 10YR4/4	C C Limestone			ca				LS fragments LS fragments		1	3b		3b	Wetness
87	21 73 73+	10YR4/3 10YR5/6	C C Limestone			ca				LS fragments LS fragments		1	3b		3b	Wetness
88	23 23+	10YR4/3	C Limestone			ca				LS fragments		1	3b		3b	Wetness Soil Depth
89	25 25+	10YR4/3	C Limestone			ca				LS fragments		1	3b		3b	Wetness Soil Depth
90	25 30 30+	10YR4/3 10YR4/4	C C Limestone			ca				LS fragments		1	3b		3b	Wetness
91	20 20+	10YR4/3	C Limestone			ca						1	3b		3b	Wetness Soil Depth
92	30 30+	10YR4/3	C Limestone			ca				LS fragments		1	3b		3b	Wetness

Appendix 1: Soil Survey Details

Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
93	25 42 42+	10YR5/3 10YR4/3	C C Limestone			ca				LS fragments LS fragments		1	3b		3b	Wetness
94	20 20+	10YR4/3	C Limestone			ca				LS fragments		1	3b		3b	Wetness Soil Depth
95	20 20+	10YR4/3	C Limestone			ca				LS fragments		1	3b		3b	Wetness Soil Depth
96	20 20+	10YR4/3	C Limestone			ca				LS fragments		1	3b		3b	Wetness Soil Depth
97	26 26+	10YR4/3	C Limestone			ca				LS fragments		1	3b		3b	Wetness Soil Depth
98	28 28+	10YR4/3	C Limestone			ca				LS fragments		1	3b		3b	Wetness Soil Depth
99	20 40 50 70 70+	10YR3/3 10YR4/4 10YR4/2 10YR5/4	mzcl hzcl C C Limestone	Och & Mang C Grey C	yes							4	3b		3b	Wetness
100	22 33 33+	10YR3/3 10YR4/3	mzcl hzcl Limestone			ca						1	2		3b	Slope

Appendix 1: Soil Survey Details

Soil Profile											Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
101	25	10YR3/3	mzcl									1	2		2	Wetness
	33	10YR4/4	hzcl													Climate
	64	10YR4/4	gritty ZC			ca										
	64+		Limestone													
102	17	10YR3/6	hzcl									1	3a		3a	Wetness
	24	10YR3/6	hzcl	Mang C												
	120	10YR4/4	C													
103	10	10YR3/3	mzcl									4	3b		4	Microrelief
	19	10YR3/4	mzcl													
	39	10YR4/4	C													
	120	10YR6/1	C	Och C	yes	ü										
104	10		mzcl									1	2		4	Slope
	27		mzcl													
	37		gritty hcl			ca										
	37+		Limestone													
105	17	10YR3/2	mzcl			ca						1	2		4	Slope
	30	10YR4/4	C													
	30+		Limestone													
106	9	10YR3/6	mzcl									1	2		2	Wetness
	21	10YR4/4	mzcl													Climate
	45	10YR3/6	C			ca										
	60	10YR5/6	gritty C													
	60+		Limestone													
107	9	10YR3/3	ZL									4	3b		3b	Wetness
	18	10YR4/4	ZL													
	30	10YR5/4	ZC													
	120	10RYR6/2 & 10YR5/4	C	Gleyed	yes											
108	20	10YR5/2	MZCL/HZCL									3	3a/b		4	Slope
	55	10YR5/4	MZCL	Och C												
	115+	10YR7/2	C	Och M	yes											
109	15	10YR4/2	MZCL/HZCL									1	2		3b	Slope

Appendix 1: Soil Survey Details

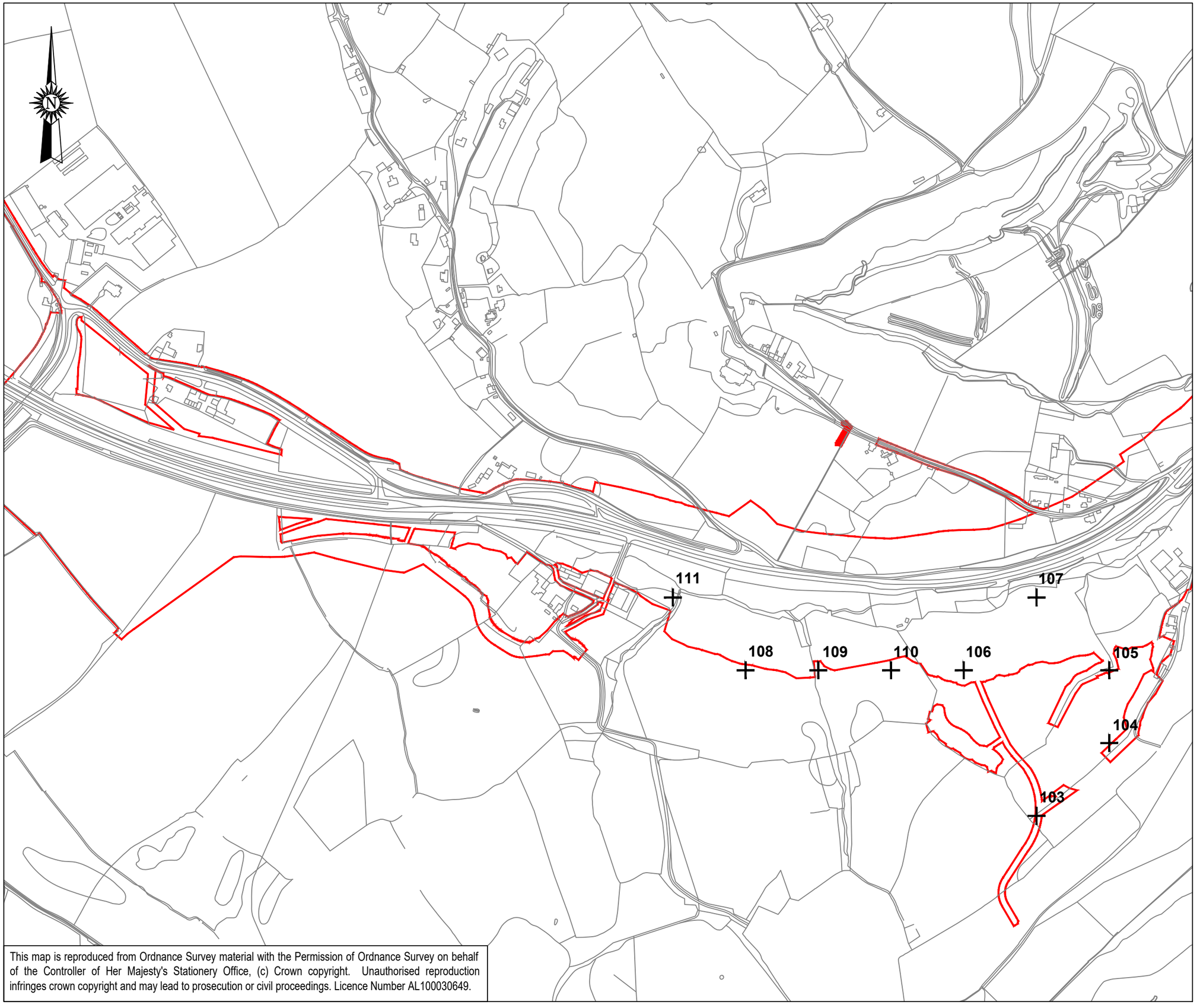
Soil Profile												Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	$CaCO_3$	Stones (%) Total	>2cm	>6cm	Notes		(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
	47	10YR4/4	MZCL	Och F													
	115+	10YR5/4	C	Och F													
110	10	10YR4/2	MZCL/HZCL										1	2		3b	Slope
	22	10YR5/2	MZCL	Och C													
	74	10YR5/4	C	Och C													
	115+	10YR5/4	C														
111		Not accessible															

Key to auger records:

Colour	Texture	Texture suffixes	Mottle intensity	Limitations
Bl - black Br - brown Dk - dark Gr - grey Li - light Ol - olive Pi - pink Pl - pale Rd - red St - strong V - very Wk - weak Yl - yellow	C - clay ZC - silty clay SC - sandy clay CL - clay loam (H-heavy, M-medium) ZCL - silty clay loam (H-heavy, M-medium) SCL - sandy clay loam SZL - sandy silt loam (F-fine, M-medium, C-coarse) ZL - silt loam SL - sandy loam (F-fine, M-medium, C-coarse) LS - loamy sand (F-fine, M-medium, C-coarse) S - sand (F-fine, M-medium, C-coarse) ORG - organic (S-sand, L-loam, C-clay) PTY - peaty (S-sand, L-loam) PT - peat (S-sandy, L-loamy, H-humified, SF-semi-fibrous, F-fibrous) R - bedrock	Calcareous: v sl ca - very slightly calcareous sl ca - slightly calcareous ca - calcareous v ca - calcareous Stoniness (by volume): v sl st – very slightly stony (1-5%) sl st - slightly stony (6-15%) m st - moderately stony (16-35%) v st - very stony (36-70%) ex st - extremely stony (>70%) Other: fm – ferrimanganiferous concentrations	o – unmottled. x – a few to common rusty root channel mottles (topsoil) or a few ochreous mottles (subsoil). xx – common to many ochreous mottles and/or dull structure faces. xxx – greyish or pale colours dominant in matrix or ped faces and common to many ochreous mottles (gleyed horizon). xxxx – dominantly grey, often with some ochreous mottles (gleyed horizon).	CL - climate DE - depth DR - droughtiness ER - erosion FL - flooding GR - gradient MR - microrelief ST - stoniness TX - texture WE - wetness/workability

APPENDIX 2 – LOCATION OF OBSERVATIONS

(See following page)



** Auger survey location

Red Line Boundary

Soil description pit location

DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AUGER LOCATIONS

A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - AUGER LOCATIONS

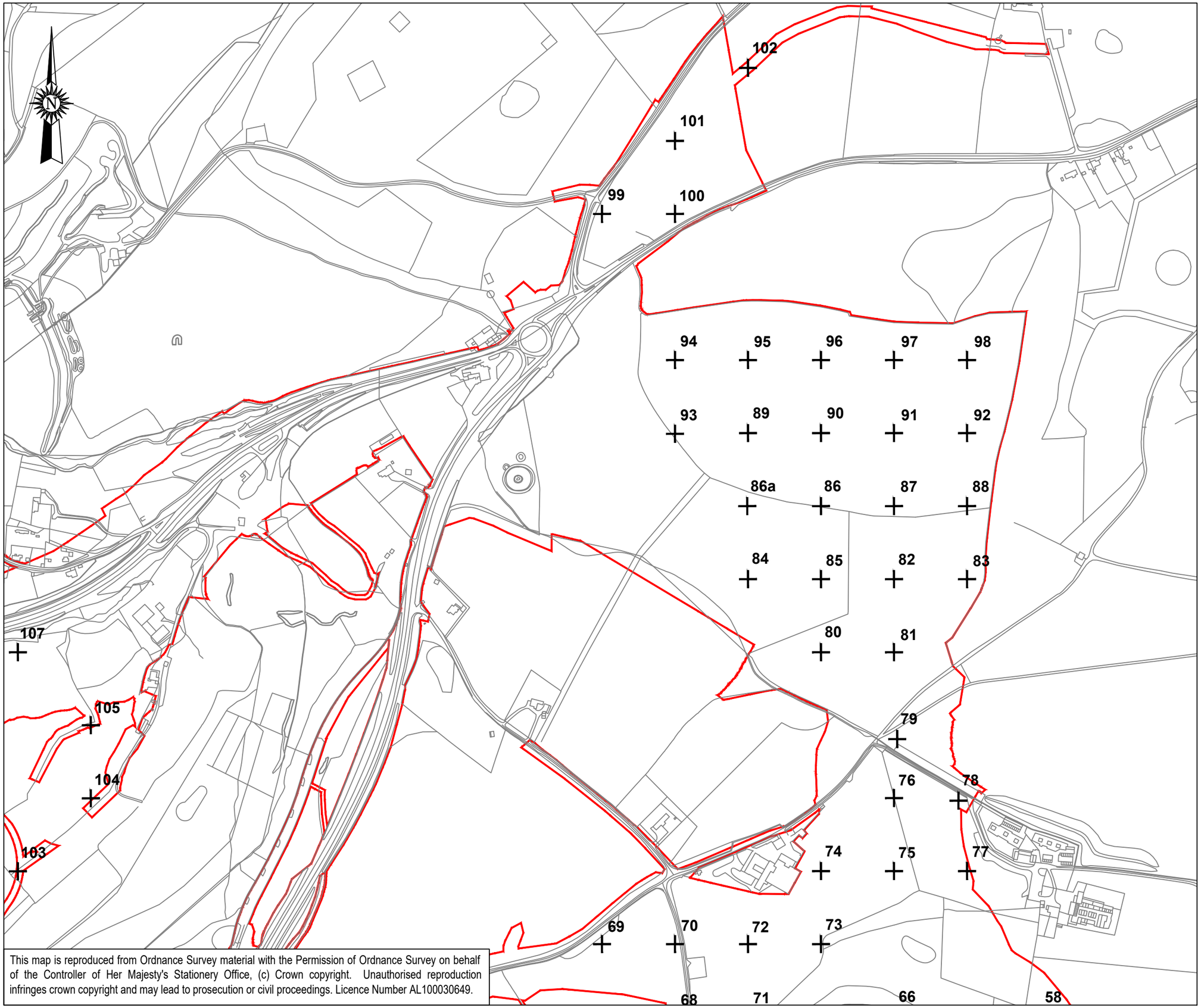
SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 01-1	ISSUE A

CLIENT.

OSBORNE

ADAS

Rosemaund, Preston Wynne, Hereford, HR1 3PG
Tel. 01432 820444 Fax. 01432 820121



** Auger survey location

Red Line Boundary

Soil description pit location

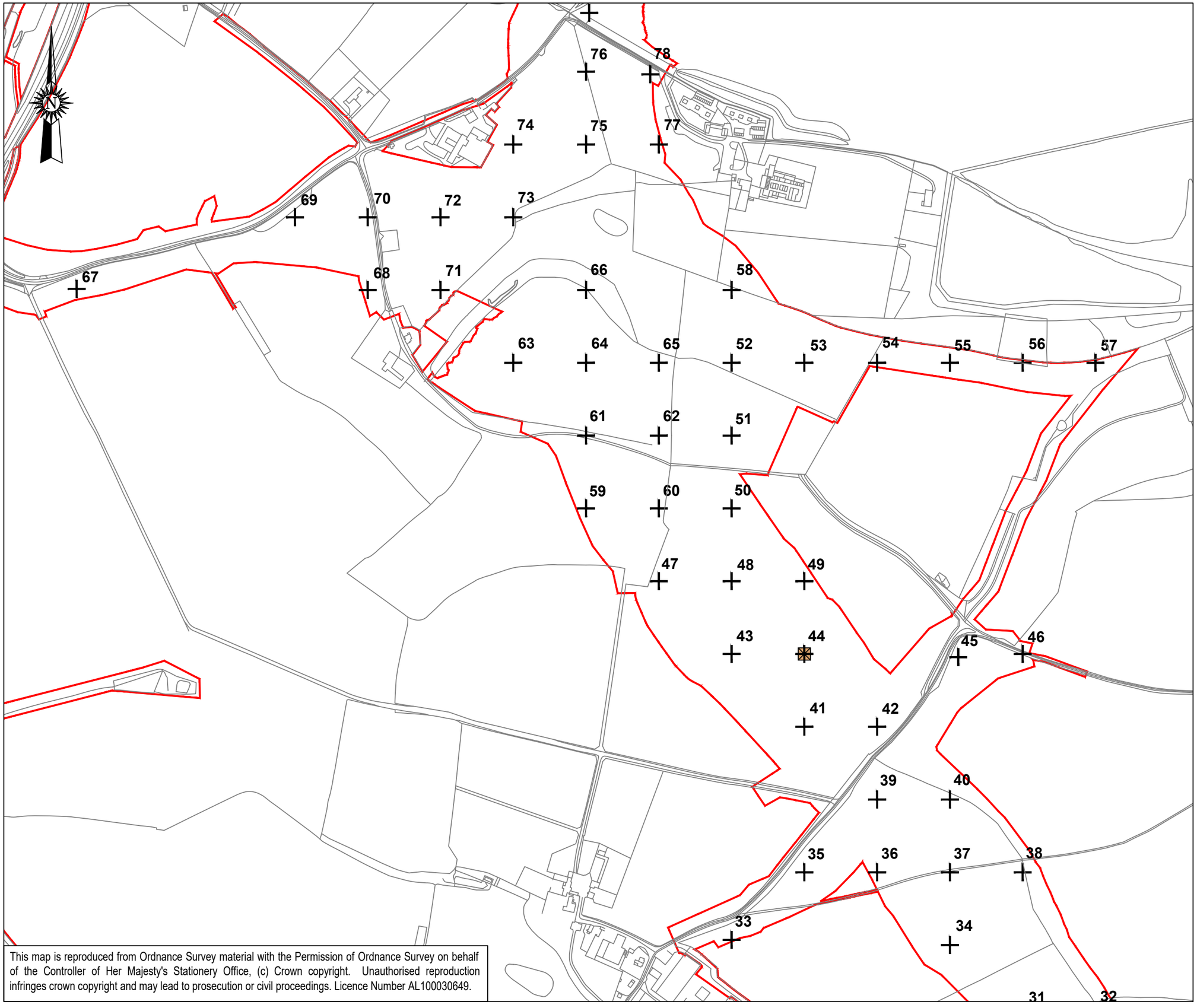
DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AUGER LOCATIONS

A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - AUGER LOCATIONS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 01-2	ISSUE A

CLIENT. OSBORNE

ADAS
Rosemaund, Preston Wynne, Hereford, HR1 3PG
Tel. 01432 820444 Fax. 01432 820121



** Auger survey location

Red Line Boundary

Soil description pit location

DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AUGER LOCATIONS

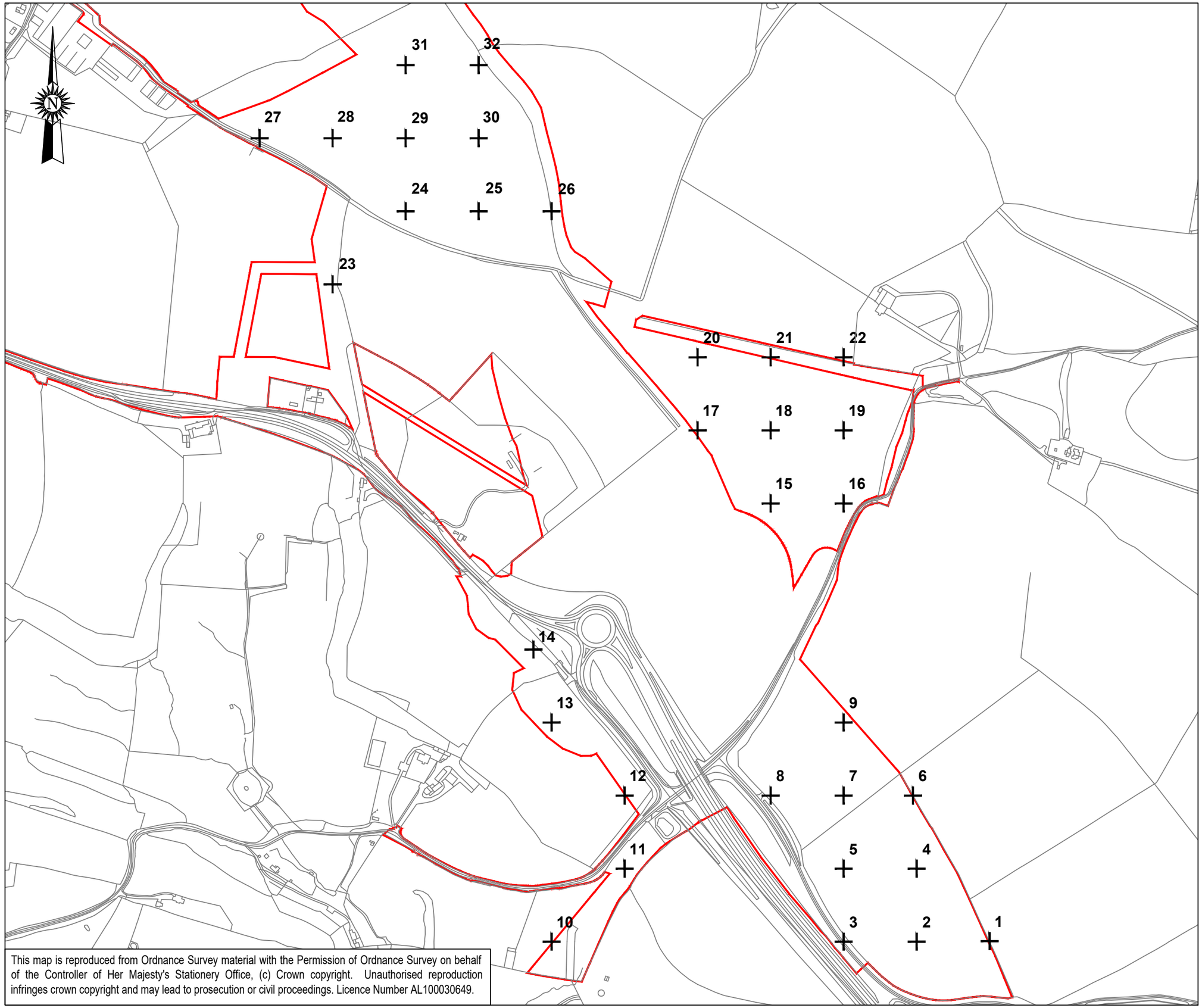
A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - AUGER LOCATIONS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 01-3	ISSUE A

CLIENT.

OSBORNE

ADAS
Rosemaund, Preston Wynne, Hereford, HR1 3PG
Tel. 01432 820444 Fax. 01432 820121



** Auger survey location

Red Line Boundary

Soil description pit location

DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AUGER LOCATIONS

A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - AUGER LOCATIONS

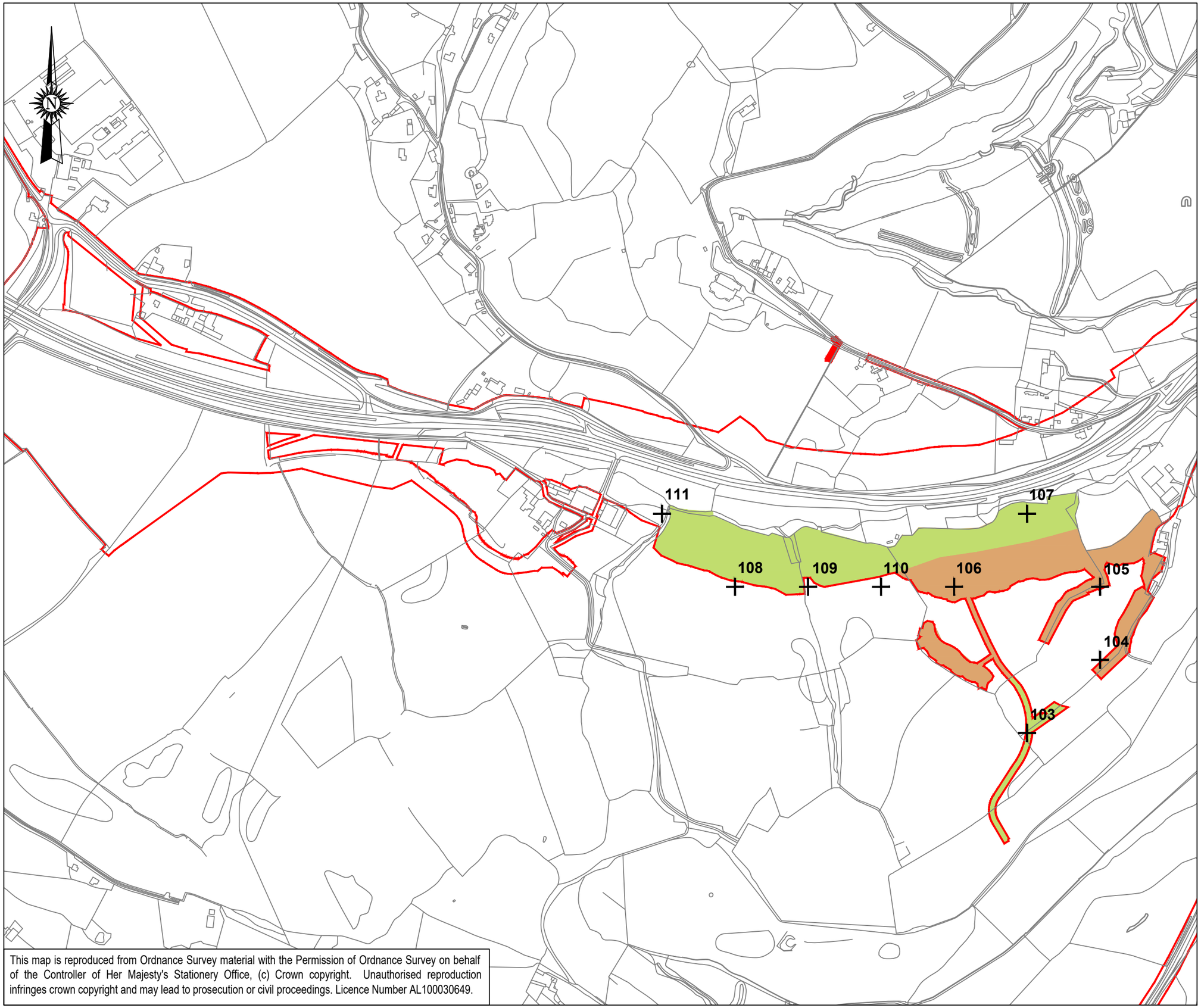
SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 01-4	ISSUE A

CLIENT. OSBORNE

ADAS
Rosemaund, Preston Wynne, Hereford, HR1 3PG
Tel. 01432 820444 Fax. 01432 820121

APPENDIX 3 – SOIL TYPES

(See following page)



Auger survey location

Red Line Boundary

Soil description pit location

Shallow & deeper soils over limestone

Silty clay loam over clayey soils

Clayey soils

DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AUGER LOCATIONS

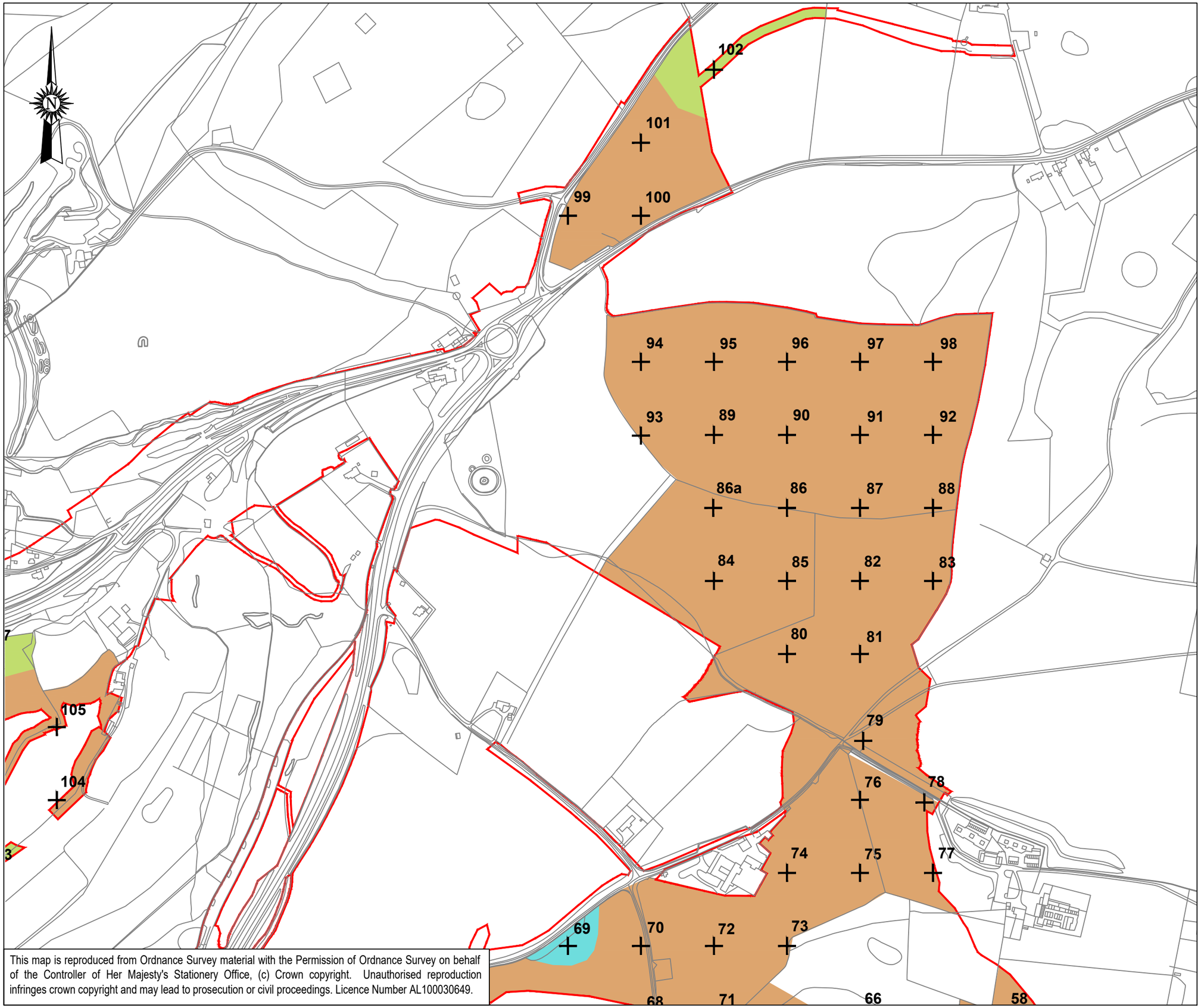
A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - SOIL TYPE OBSERVATIONS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 03-1	ISSUE A

CLIENT.

OSBORNE

ADAS
Rosemaund, Preston Wynne, Hereford, HR1 3PG
Tel. 01432 820444 Fax. 01432 820121



** Auger survey location

Red Line Boundary

Soil description pit location

Shallow & deeper soils over limestone

Silty clay loam over clayey soils

Clayey soils

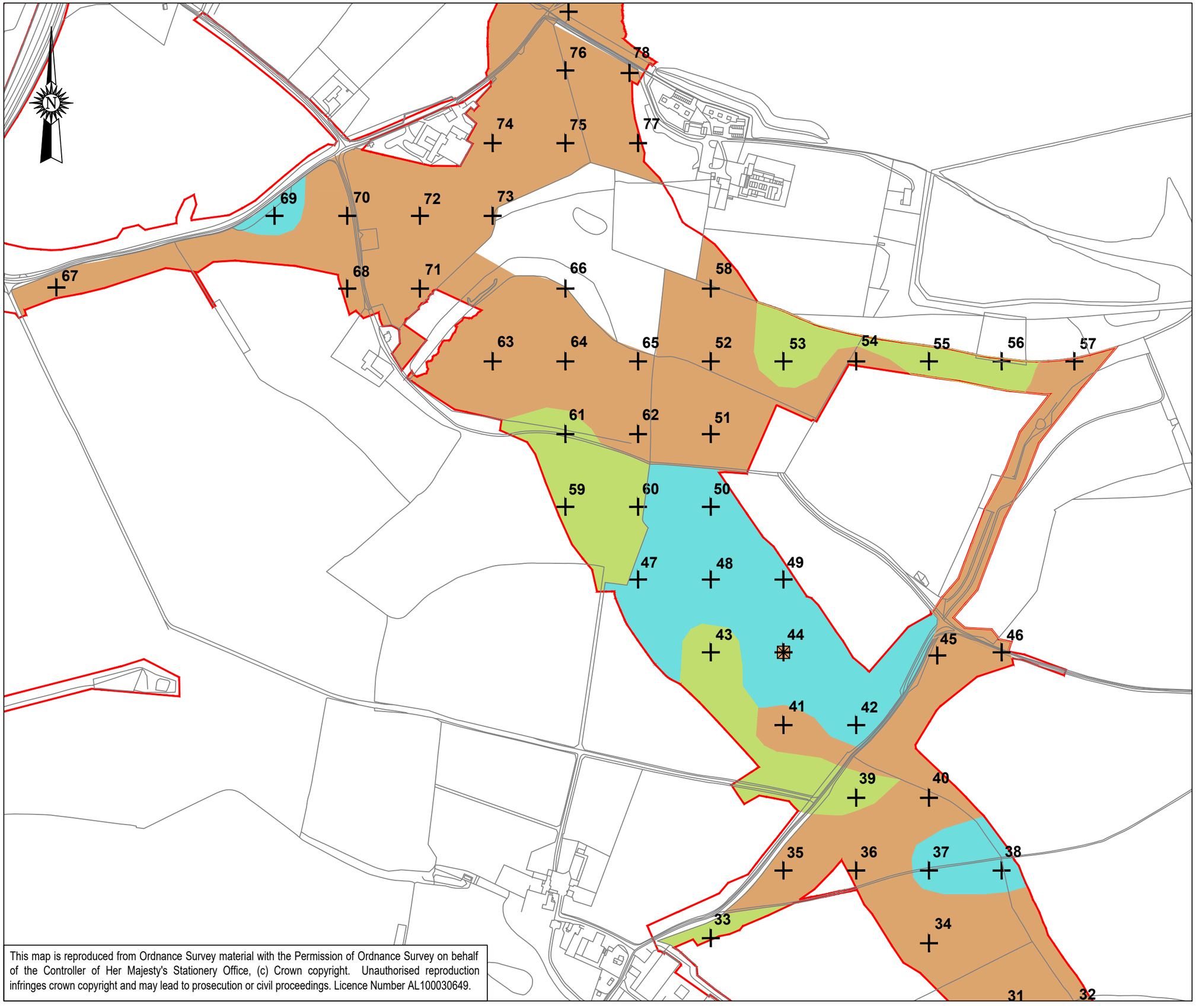
DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AUGER LOCATIONS

A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - SOIL TYPE OBSERVATIONS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 03-2	ISSUE A

CLIENT.

ADAS
Rosemaund, Preston Wynne, Hereford, HR1 3PG
Tel. 01432 820444 Fax. 01432 820121



Auger survey location

Red Line Boundary

Soil description pit location

Shallow & deeper soils over limestone

Silty clay loam over clayey soils

Clayey soils

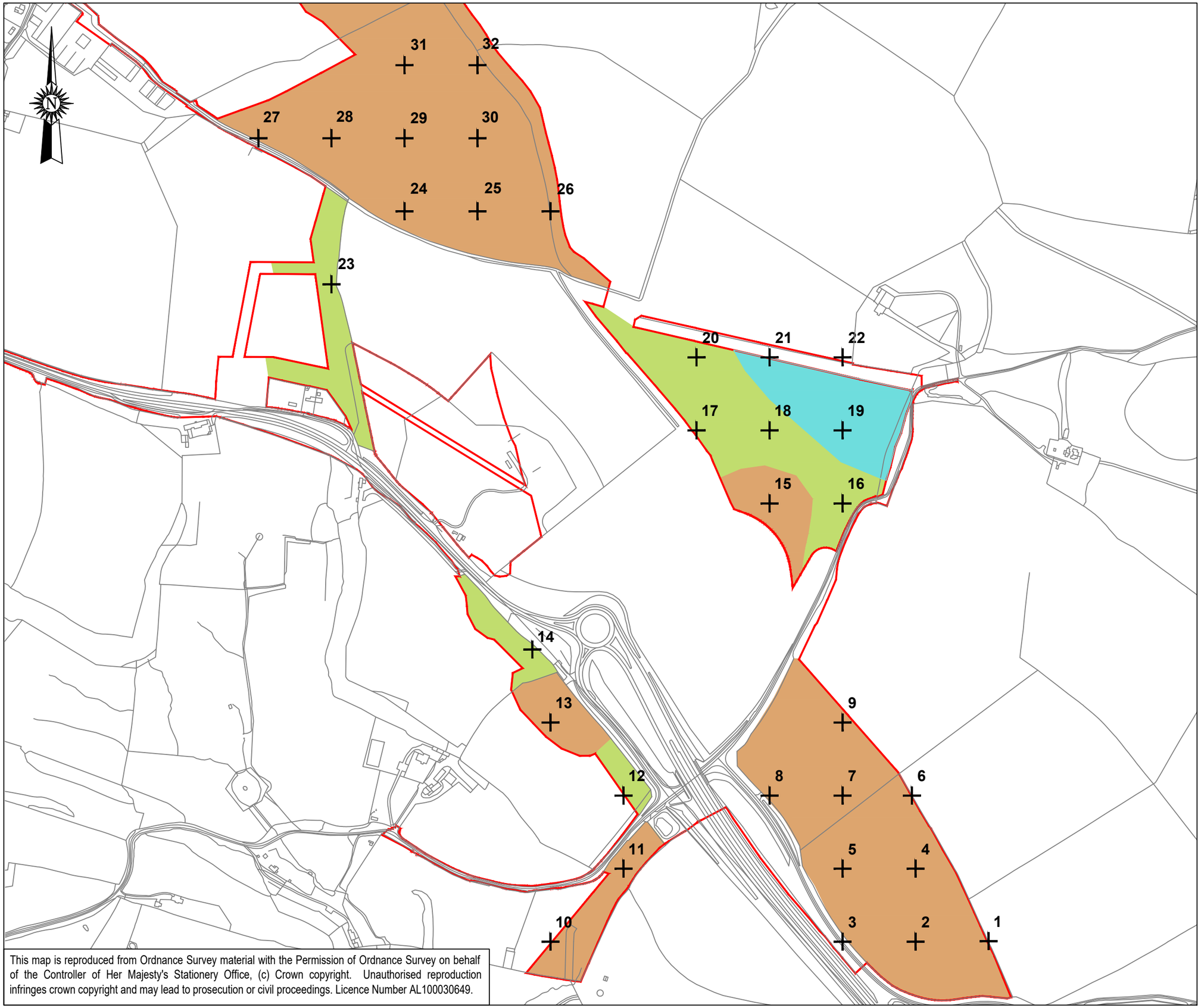
DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AUGER LOCATIONS

A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - SOIL TYPE OBSERVATIONS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 03-3	ISSUE A

CLIENT.

ADAS
Rosemaund, Preston Wynne, Hereford, HR1 3PG
Tel. 01432 820444 Fax. 01432 820121



** Auger survey location

Red Line Boundary

Soil description pit location

Shallow & deeper soils over limestone

Silty clay loam over clayey soils

Clayey soils

DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AUGER LOCATIONS

A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - SOIL TYPE OBSERVATIONS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 03-4	ISSUE A

CLIENT. OSBORNE

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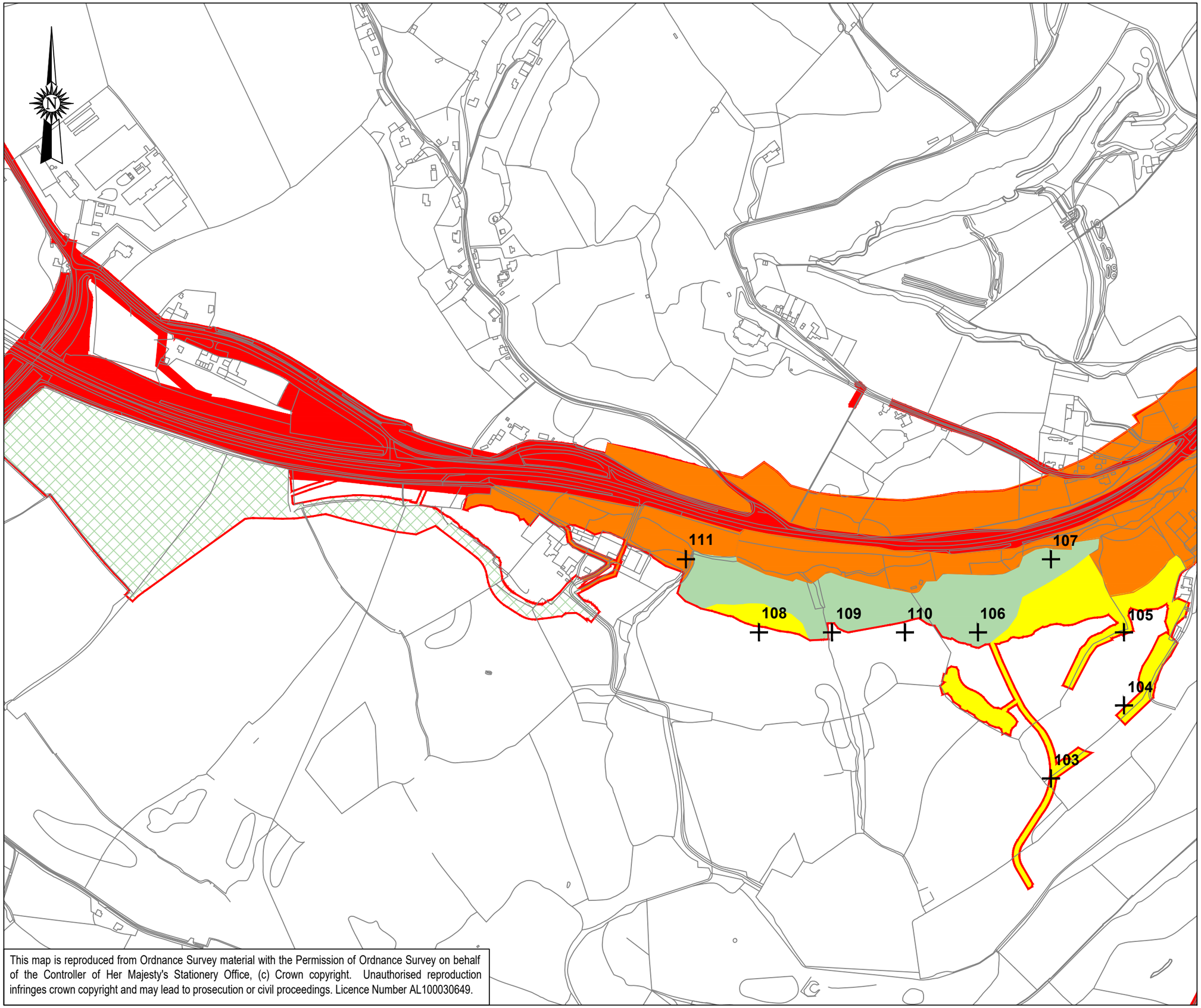
APPENDIX 4 – AGRICULTURAL LAND CLASSIFICATION

(See following page)



AGRICULTURAL LAND CLASSIFICATION

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Land predominantly in urban use
- Other land primarily in non-agricultural use
- Not requested to be surveyed
- No access
- ** Auger survey location
- Red Line Boundary
- Soil description pit location

DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AGRICULTURAL LAND CLASSIFICATION

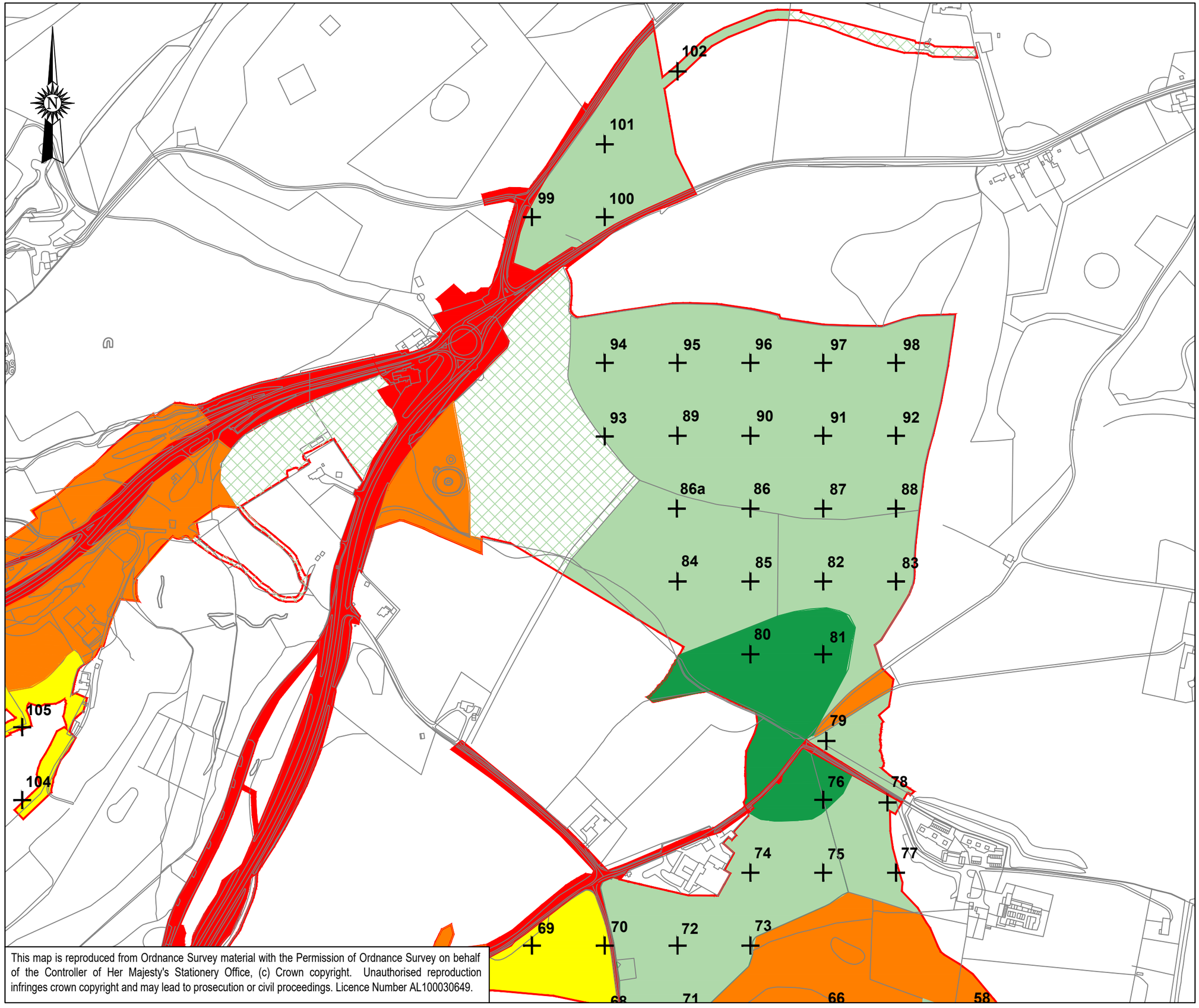
A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - SURVEY FINDINGS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 02-1	ISSUE A

CLIENT.

OSBORNE

ADAS
Rosemaund, Preston Wynne, Hereford, HR1 3PG
Tel. 01432 820444 Fax. 01432 820121



AGRICULTURAL LAND CLASSIFICATION

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Land predominantly in urban use
- Other land primarily in non-agricultural use
- Not surveyed
- No access
- ** Auger survey location
- Red Line Boundary
- Soil description pit location

DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AGRICULTURAL LAND CLASSIFICATION

A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - SURVEY FINDINGS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 02-2	ISSUE A

CLIENT.

OSBORNE

ADAS
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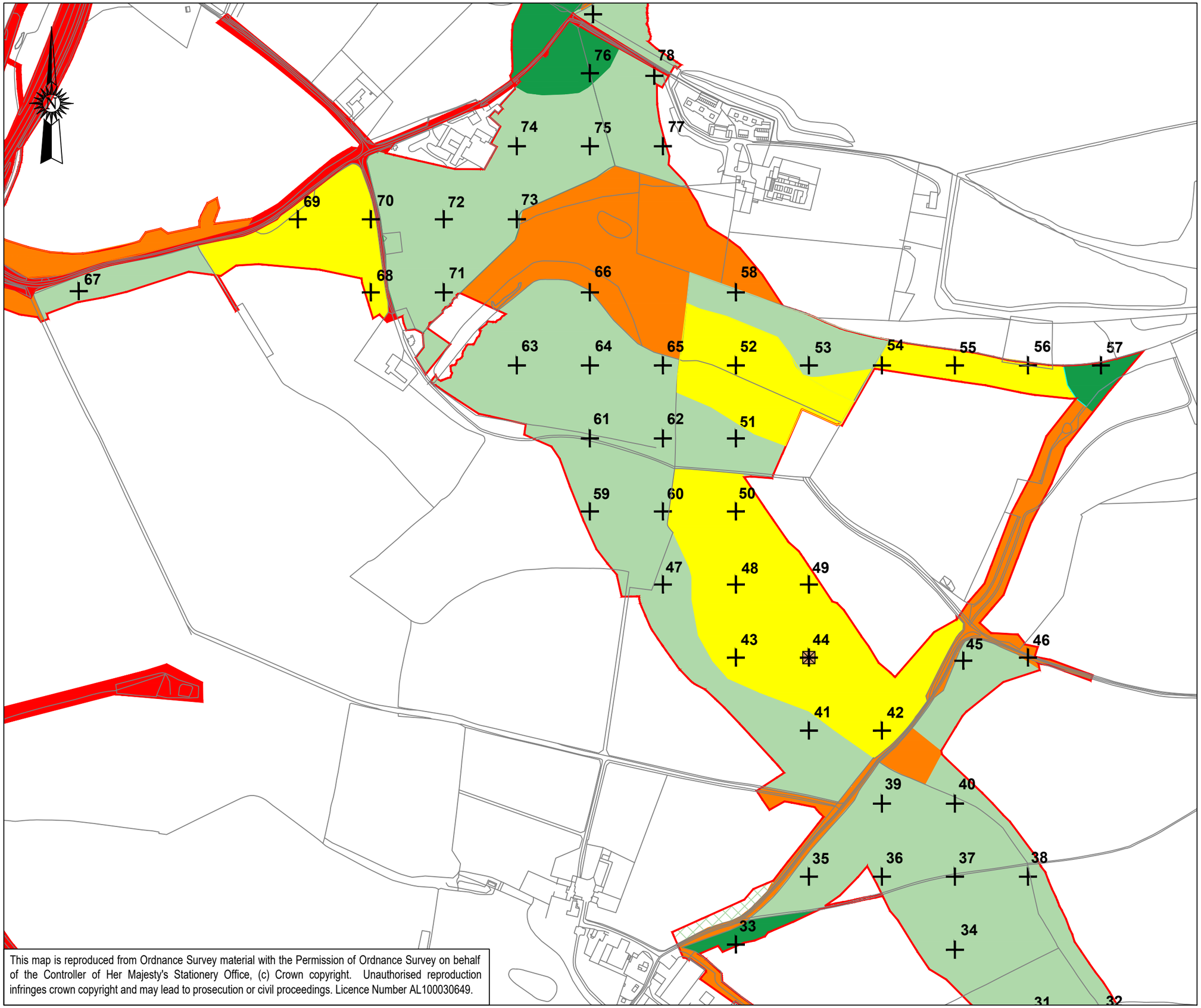
Tel. 01432 820444 Fax. 01432 820121



AGRICULTURAL LAND CLASSIFICATION

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Land predominantly in urban use
- Other land primarily in non-agricultural use
- Not surveyed
- No access
- ** Auger survey location
- Red Line Boundary
- Soil description pit location

DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AGRICULTURAL LAND CLASSIFICATION

A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - SURVEY FINDINGS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 02-3	ISSUE A

CLIENT.

OSBORNE

ADAS
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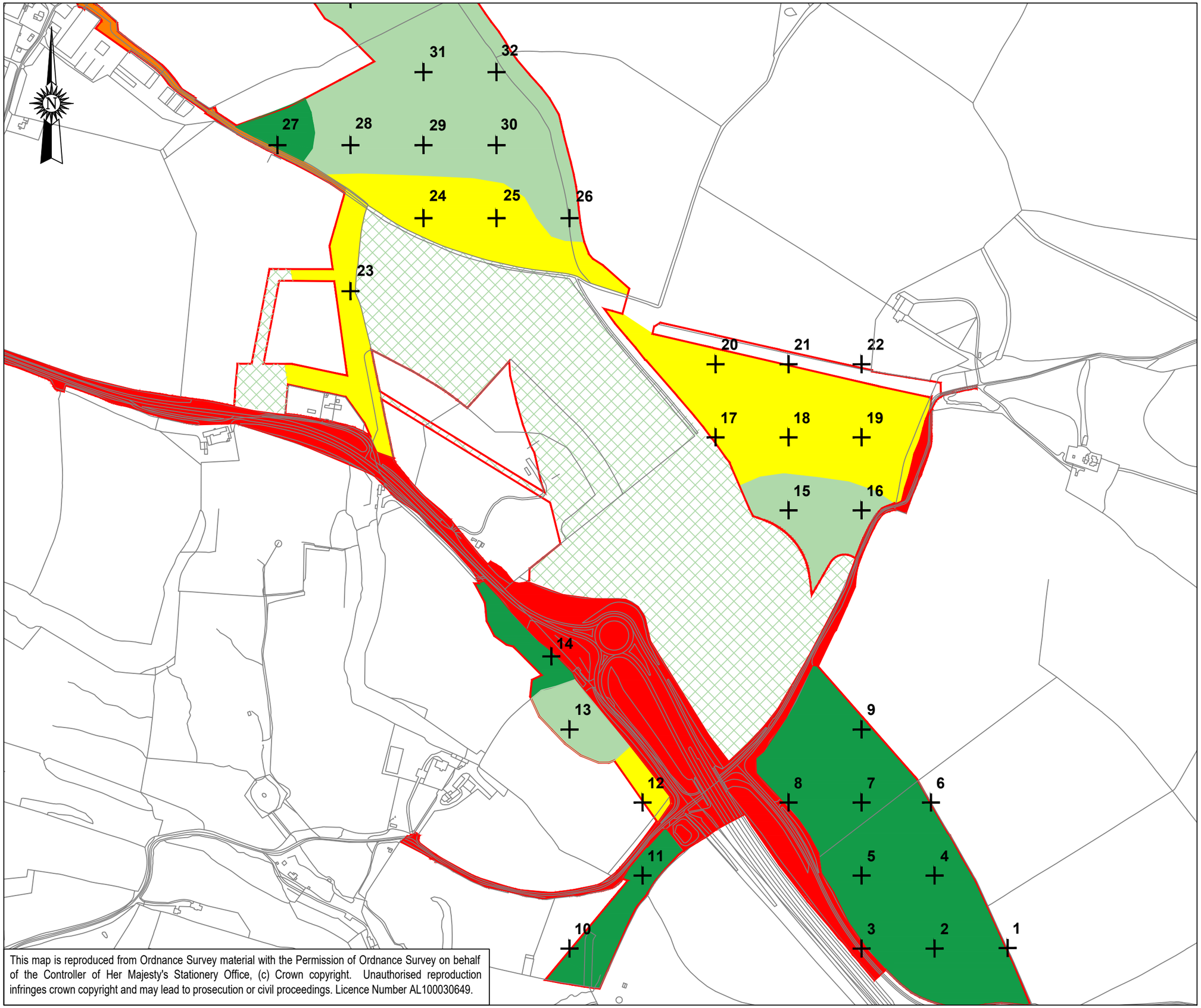

AGRICULTURAL LAND CLASSIFICATION

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Land predominantly in urban use
- Other land primarily in non-agricultural use
- Not surveyed
- No access
- Auger survey location **
- Red Line Boundary
- Soil description pit location

DATE	DRWN	CHKD	REVD	ISSUE	
25.01.21	TF	JG		A	AGRICULTURAL LAND CLASSIFICATION

A417 Missing Link, Bodmin, Gloucestershire
AGRICULTURAL LAND CLASSIFICATION - SURVEY FINDINGS

SCALE	MASTER SIZE
1/5000	A3
DRAWING NO. 1010598/ALC 02-4	ISSUE A

CLIENT.

OSBORNE

ADAS
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APPENDIX 5 – PSD TEXTURE ANALYSIS

(See following page)

ANALYTICAL REPORT

Report Number	**28783-20**	**K740**	**DARREN INGRAM**	**Client**	**1010598**
Date Received	**30-OCT-2020**		**RSK ADAS LTD**		**16 10 20**
Date Reported	**05-NOV-2020**		**PRESTON WYNNE**		
Project	**1010598 SOIL 16 10 20**		**HEREFORD**		
Reference	**DARREN INGRAM**		**HR1 3PG**		
Order Number	**P69102D12810**				

Laboratory Reference		**SOIL495472**	**SOIL495473**	**SOIL495474**	**SOIL495475**
Sample Reference		**20 TS**	**31 TS**	**44 TS**	**59 TS**
Determinand	**Unit**	**SOIL**	**SOIL**	**SOIL**	**SOIL**
pH water [1:2.5]		7.3	8.3	6.7	7.1
Available Phosphorus (Index)	mg/l	7.6 (0)	11.0 (1)	19.8 (2)	5.0 (0)
Available Potassium (Index)	mg/l	116 (1)	228 (2+)	238 (2+)	110 (1)
Available Magnesium (Index)	mg/l	101 (3)	60.3 (2)	171 (3)	118 (3)
Sand 2.00-0.063mm	% w/w	18	30	24	18
Silt 0.063-0.002mm	% w/w	36	33	29	35
Clay <0.002mm	% w/w	46	37	47	47
Organic Matter LOI	% w/w	8.8	12.2	10.1	11.5
Textural Class **		C	C	C	C

Notes

Analysis Notes

The sample submitted was of adequate size to complete all analysis requested.
The results as reported relate only to the item(s) submitted for testing.
The results are presented on a dry matter basis unless otherwise stipulated.

Document Control

** Please see the attached document for the definition of textural classes.

Reported by

Katie Dunn

Natural Resource Management, a trading division of Cawood Scientific Ltd.
Coopers Bridge, Braziers Lane, Bracknell, Berkshire, RG42 6NS
Tel: 01344 886338
Fax: 01344 890972
email: enquiries@nrm.uk.com

ANALYTICAL REPORT

Report Number	**36088-21**	**K957**	**CARLA RICHMOND**
Date Received	**08-JAN-2021**		**RSK ADAS LTD**
Date Reported	**14-JAN-2021**		**DRAYTON**
Project	**22 12 2020 SOIL**		**ALCESTER ROAD**
Reference	**CARLA RICHMOND**		**STRATFORD UPON AVON**
Order Number			**CV37 9RQ**

Laboratory Reference		**SOIL500919**	**SOIL500920**	**SOIL500921**	**SOIL500922**						
Sample Reference		**2 TS**	**72 TS**	**101 TS**	**108 TS**						
Determinand	**Unit**	**SOIL**	**SOIL**	**SOIL**	**SOIL**						
Sand 2.00-0.063mm	% w/w	27	15	9	8						
Silt 0.063-0.002mm	% w/w	39	33	51	52						
Clay <0.002mm	% w/w	34	52	40	40						
Organic Matter LOI	% w/w	9.3	18.5	12.0	12.2						
Textural Class **		HCL	O-C	O-ZC	O-ZC						

Notes

Analysis Notes

The sample submitted was of adequate size to complete all analysis requested.
The results as reported relate only to the item(s) submitted for testing.
The results are presented on a dry matter basis unless otherwise stipulated.

Document Control

** Please see the attached document for the definition of textural classes.

Reported by

J Doyle

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email: enquiries@nrm.uk.com

ANALYTICAL REPORT

Report Number	**37889-21**	**K957**	**CARLA RICHMOND**
Date Received	**25-JAN-2021**		**RSK ADAS LTD**
Date Reported	**01-FEB-2021**		**DRAYTON**
Project	**20 01 2021 1010598 SOIL**		**ALCESTER ROAD**
Reference	**CARLA RICHMOND**		**STRATFORD UPON AVON**
Order Number			**CV37 9RQ**

Laboratory Reference		**SOIL502316**	**SOIL502317**	**SOIL502318**							
Sample Reference		**78 TS**	**84 TS**	**91 TS**							
Determinand	**Unit**	**SOIL**	**SOIL**	**SOIL**							
Sand 2.00-0.063mm	% w/w	18	10	34							
Silt 0.063-0.002mm	% w/w	41	41	27							
Clay <0.002mm	% w/w	41	49	39							
Organic Matter LOI	% w/w	12.8	9.7	11.4							
Textural Class **		O-C	C	O-C							

Notes

Analysis Notes

The sample submitted was of adequate size to complete all analysis requested.
The results as reported relate only to the item(s) submitted for testing.
The results are presented on a dry matter basis unless otherwise stipulated.

Document Control

** Please see the attached document for the definition of textural classes.

Reported by

Myles Nicholson

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ADAS (UK) Textural Class Abbreviations

The texture classes are denoted by the following abbreviations:

Class	Code
Sand	S
Loamy sand	LS
Sandy loam	SL
Sandy Silt loam	SZL
Silt loam	ZL
Sandy clay loam	SCL
Clay loam	CL
Silt clay loam	ZCL
Clay	C
Silty clay	ZC
Sandy clay	SC

For the *sand, loamy sand, sandy loam* and *sandy silt loam* classes the predominant size of sand fraction may be indicated by the use of prefixes, thus:

- vf Very Fine (more than 2/3's of sand less than 0.106 mm)
- f Fine (more than 2/3's of sand less than 0.212 mm)
- c Coarse (more than 1/3 of sand greater than 0.6 mm)
- m Medium (less than 2/3's fine sand and less than 1/3 coarse sand).

The subdivisions of *clay loam* and *silty clay loam classes* according to clay content are indicated as follows:

- M medium (less than 27% clay)
- H heavy (27-35% clay)

Organic soils i.e. those with an organic matter greater than 10% will be preceded with a letter O.

Peaty soils i.e. those with an organic matter greater than 20% will be preceded with a letter P.

APPENDIX 6 – DESCRIPTION OF ALC GRADES & SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. The '*best and most versatile agricultural land*' falls into grades 1, 2 and subgrade 3a – which collectively comprises about one-third of the agricultural land in England and Wales. About half the land in England and Wales is either of moderate quality (subgrade 3b) or poor quality (grade 4). Although less significant on a national scale, such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in grade 5, which mostly occurs in the uplands.

Grade 1 - excellent quality agricultural land

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 - very good quality agricultural land

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.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

> ***Subgrade 3a - good quality agricultural land***
>
> 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.
>
> ***Subgrade 3b - moderate quality agricultural land***
>
> 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 - poor quality agricultural land

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 - very poor quality agriculture land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.