BOURN AIRFIELD
AGRICULTURAL CHARACTERISTICS
RESPONSE TO SOUTH CAMBRIDGESHIRE LOCAL PLAN SPECIFIC ISSUES

Date: February 2017

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Date:	**Final February 2017**
Project Number/Document Reference:	**OXF 10184**

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1 INTRODUCTION

1.1 This report considers the matters and issues raised in relation to agricultural matters to be considered at the South Cambridgeshire Local Plan specific issue hearings.

1.2 The two issues identified include:

- "what proportion of the site as a whole can be classified as previously developed land"; and
- "would the proposed village result in an unacceptably loss of good quality agricultural land"?

1.3 Section 2 of this report considers the history of the site and the former use of the entire site as a military airfield and the distribution of current uses within the curtilage of the remaining airfield facilities. Section 3 considers the quality of the land on the site and how this would be affected by the proposal. The loss of the quality of the land on the site arising from the proposal is then discussed in the context of the quality of the surrounding agricultural land and land in the wider district.

1.4 In addition, Section 3 also considers the potential impact on the agricultural productivity and the structure of farming both on the site and in the wider context. Whilst the quality of the land is a key factor to the maintenance of food production, the continuation of farming on remaining adjoining areas of land and the potential loss of any farm holdings affected is also an important consideration in ensuring that proposals would not affect the continued productive use of high quality land and the robust rural economy in the local area.

2 PREVIOUSLY DEVELOPED LAND

2.1 The glossary to the National Planning Policy Framework (NPPF) 2012 defines previously developed land as follows:

"Land which is or was occupied by a permanent structure, including the curtilage of the developed land (although it should not be assumed that the whole of the curtilage should be developed) and any associated fixed surface infrastructure. This excludes: land that is or has been occupied by agricultural or forestry buildings; land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures; land in built-up areas such as private residential gardens, parks, recreation grounds and allotments; and land that was previously-developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time."

2.2 In the case of the Bourn Airfield site, the whole area of the proposed development site lies within the curtilage of the former military airfield and is therefore considered to be "previously developed land" based on the definition provided in the NPPF.

2.3 In terms of the different land uses within the curtilage of the airfield, detailed survey work carried out by Cobham Resource Consultants and the Ministry of Agriculture Fisheries and Food (MAFF) in 1989 both identify the distribution of land uses within the area and note the considerable areas of disturbance within the areas of agricultural use associated with the built structures that formed part of the former airfield development. The results of these surveys are contained in Appendix 1.

2.4 The extent of the proposed airfield development area comprises approximately 172.59 ha. Within the proposed development area, approximately 38.1 ha (22 %) of the site currently comprises runways, roadways, hardstandings and current development. In addition to this, a further total of approximately 24.4 ha (11%) of the site formerly comprised runways, roads, houses and buildings. These former runways, roads, houses and building areas have since been restored, as far as possible, for agricultural use. However, the quality of the agricultural land has notably been affected by the:

- Inclusion of large volumes of concrete/tarmac/brick which limit cultivation implements
- Presence of concrete drainage features which limit cultivations and the installation of underdrainage in areas close to the runways
- Soil mixing in areas where restoration has taken place.

2.5 The plan at Figure 1 shows the extent of the RAF airfield development in 1944.

2.6 The photo below illustrates the type of disturbance identified across significant areas of the site largely graded as Grade 3b, lower quality agricultural land.

3 ACCEPTABILITY OF LOSS OF AGRICULTURAL LAND ON BOURN AIRFIELD

3.1 The dominance of high quality agricultural land in Cambridgeshire is widely acknowledged, with the availability of lower quality Grade 3b and 4 land present in only small proportions. Historic figures for the distribution of Grades of land within the County, based on MAFF figures taken from the original published 1 inch ALC maps, suggest that Cambridgeshire comprises approximately 71% Grades 1 and 2 land compared to a national average of 17.4%. Whilst the ALC system has since been revised, these maps provide a helpful guide to the relative gradings of land within districts, with a very high proportion of land within Cambridgeshire likely to be identified as the "best and most versatile" Grades 1, 2 and 3a land.

3.2 Consideration of detailed survey work on and in the vicinity of the site, illustrates just such a pattern of predominantly "best and most versatile" land. In 1989, MAFF carried out agricultural land quality (ALC) surveys of extensive areas of agricultural land including the site and surrounding areas to the east and west. The results of this survey work are shown on Figure 2.

3.3 The distribution of grades of land identified by this survey work enables a direct comparison of the nature of the soils and agricultural land quality across the airfield, compared to large swathes of surrounding land. Table 2 below:

Table 2: Comparison of Agricultural Land Quality on Bourn Airfield Site with Surrounding Land.

Bourn Airfield Site ALC Areas			ALC Survey of Surrounding Land	
ALC Grade	**Area (ha)**	**%**	**Area (ha)**	**%**
2	14.85	9	294.7	16.5
3a	49.70	28	1335.6	74.5
3b	69.94	41	57.3	3
Non Agricultural	38.10	22	108.8	6
Total	172.59	100	1796.4	100

3.4 What is striking about these figures is the high proportion of lower quality Grade 3b and non-agricultural land on the Bourn Airfield site compared to the wider area. This site includes a total of approximately 63% of the total area of the site (41% Grade 3b land and 22% non-agricultural land), compared to a total of only 3% Grade 3b land and 6% non-agricultural land within the survey of the surrounding land. The agricultural land on this site is therefore of

significantly lower quality than that of a large swathe of surrounding land, where 81% of the land is classified as “best and most versatile” land and only 3% of the land surveyed comprises lower quality Grade 3b land.

3.5 It is also notable that areas comprising Grades 2 and 3a land have now been developed as part of the Cambourne development, where the loss of Grades 2 and 3a has not been considered as unacceptable. Within this context, the loss of the agricultural land on this site, where the majority of the land is Grade 3b, or comprises non-agricultural developed land should be considered acceptable.

3.6 In addition, it is relevant in considering the potential loss of agricultural land to assess any likely additional effects on agricultural productivity arising from the proposal including potential effects on individual farm holdings and the wider framework of agricultural production in the local and wider area.

3.7 The proposed site forms part of a large, family run arable agricultural holding. In total, the holding comprises approximately 375 hectares (930 acres) of agricultural land of which approximately 134.5ha are located on the Bourn Airfield site. The remaining 240ha of this holding comprises a large area of land to the south of Bourn Airfield and the set of farm buildings at the Grange, together with a further block of land at Elsworth located approximately 5km north of the Airfield. There are areas of cover within the holding (approximately 5-6ha) used to support a shoot that currently operates 5-6 shoots/year and is run by a family member and a part-time gamekeeper.

3.8 The potential development of this site would not affect the continued operation of the remaining 240ha of this large arable holding. The buildings at Grange Farm would be maintained and the arable cultivation of the land to the south of the Grange and at Elsworth would continue as before, operated by family members. The shoot can also be operated on the land to the south of Grange Farm and it is the intention of the family to increase the number of shoots across the holding.

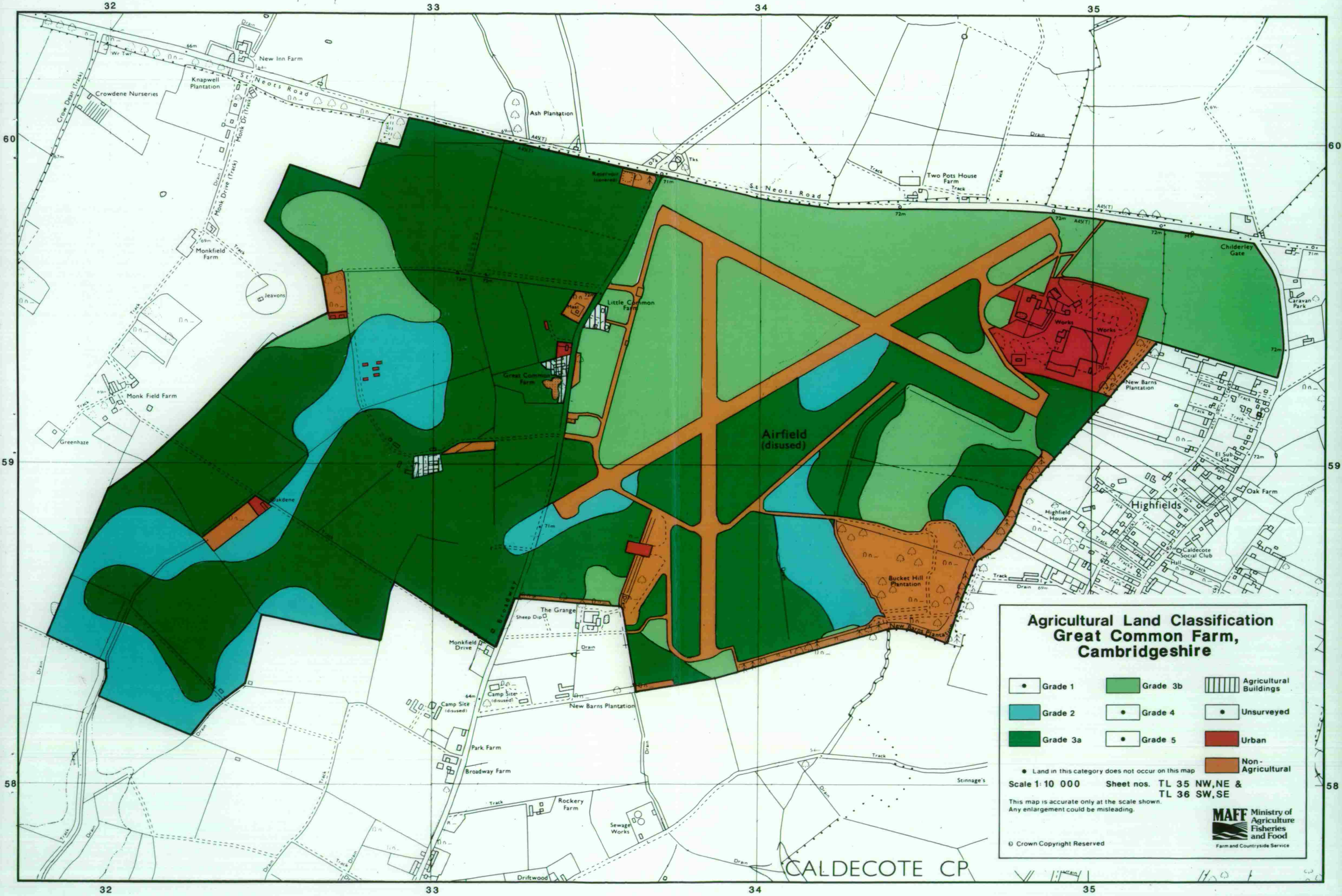
3.9 Whilst there would be a direct loss of a proportion of arable land associated with the proposed development, this loss would not further affect the continuing highly productive cultivation of adjoining arable areas, or the operation of this family farming enterprise. The loss of this land would therefore not only affect land with a high proportion of lower quality Grade 3b agricultural land, but would have no effect on the wider rural economy which the National Planning Policy framework identifies should be supported.

3.10 The loss of a small proportion of mainly Grade 3a land, the lowest quality within the definition of the “best and most versatile” land on the Bourn Airfield site should therefore be considered as acceptable in the context of the wider distribution of high quality land in the vicinity and in view of the fact that large areas of higher quality land have already been developed to the west of the site. In addition, the loss of this area of land would not lead to any additional impacts on the productivity of adjacent land which would remain part of a highly productive family run farming enterprise and would continue to contribute to a robust rural economy in the local area.

APPENDICES

APPENDIX 1

CHOBHAM RESOURCE CONSULTANTS AND MAFF ALC SURVEYS OF BOURN AIRFIELD



Agricultural Land Classification
Great Common Farm, Cambridgeshire

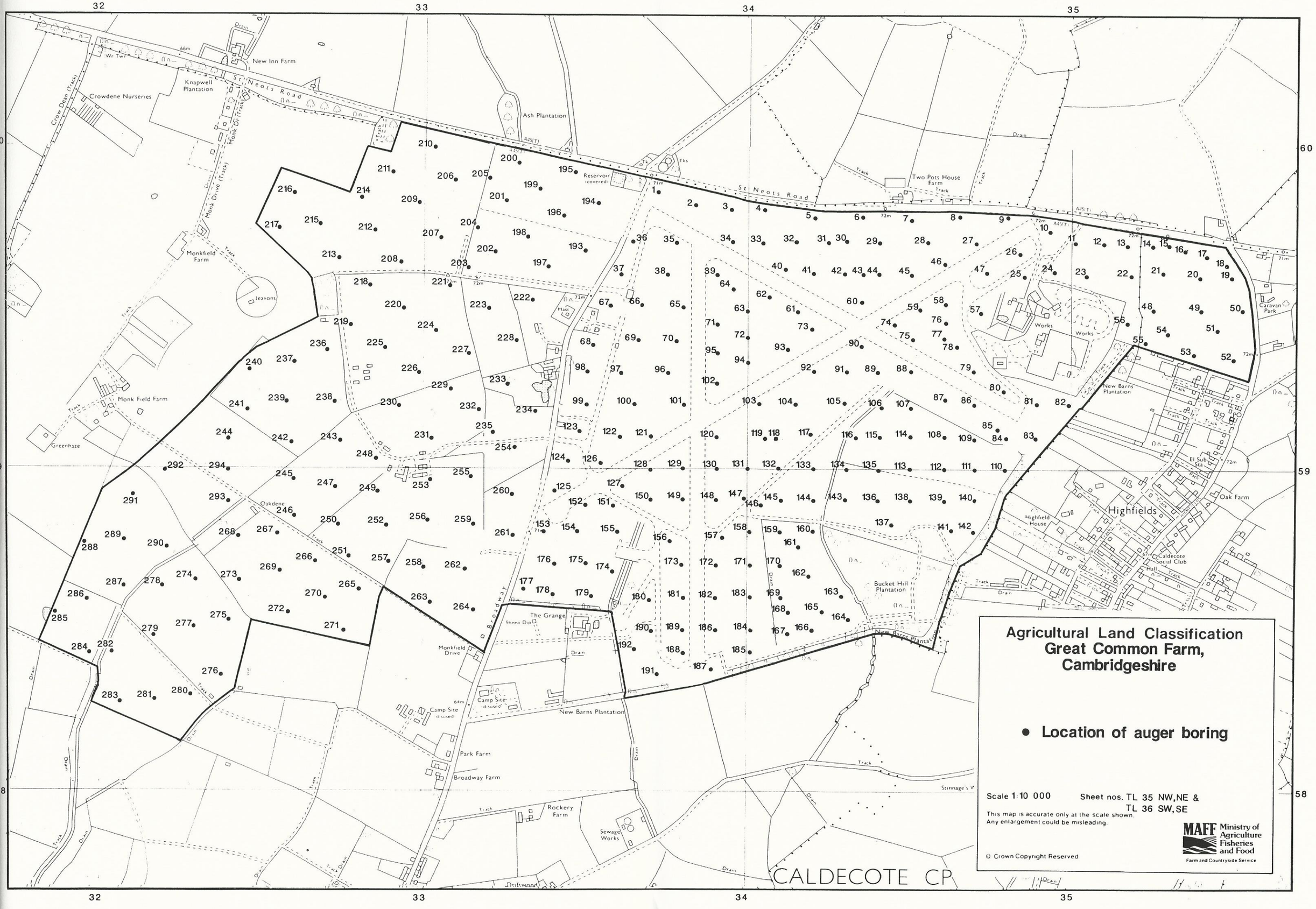
Grade 1	Grade 3b	Agricultural Buildings
Grade 2	Grade 4	Unsurveyed
Grade 3a	Grade 5	Urban
		Non-Agricultural

* Land in this category does not occur on this map

Scale 1:10 000 Sheet nos. TL 35 NW,NE & TL 36 SW,SE

This map is accurate only at the scale shown.
Any enlargement could be misleading.

MAFF Ministry of Agriculture Fisheries and Food
Farm and Countryside Service


32
33
34
35
60
59
58
St Neots Road
New Inn Farm
Knapwell Plantation
Crowdene Nurseries
Crow Dean (Track)
Monk Drive (Track)
Monkfield Farm
Jeavons
Monk Field Farm
Greenhaze
Oakdene
Ash Plantation
Reservoir (covered)
Two Pots House Farm
Drain
Track
Works
Caravan Park
New Barns Plantation
Highfields
Highfield House
Oak Farm
Caldecote Social Club Hall
El Sub Sta
Bucket Hill Plantation
The Grange
Sheep Dip
Monkfield Drive
Broadway
Camp Site (disused)
Park Farm
Broadway Farm
Rockery Farm
Sewage Works
Stinnage's Y
CALDECOTE CP
Agricultural Land Classification
Great Common Farm,
Cambridgeshire
• Location of auger boring
Scale 1:10 000
Sheet nos. TL 35 NW,NE &
TL 36 SW,SE
This map is accurate only at the scale shown.
Any enlargement could be misleading.
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MAFF Ministry of Agriculture Fisheries and Food
Farm and Countryside Service

32 33 34 35

60 59 58

New Inn Farm
Knapwell Plantation
Crowdene Nurseries
Crow Drain (Track)
Monk Dr Track
Monk Drive (Track)
St Neots Road
Ash Plantation
A45(T)
Reservoir (covered)
Two Pots House Farm
Track
Drain
Monkfield Farm
Jeavons
Monk Field Farm
Greenhaze
Oakdene
Great Common Farm
The Grange
Sheep Dip
Monkfield Drive
Broadway
Camp Site (disused)
Park Farm
Broadway Farm
Rockery Farm
Sewage Works
Driftwood
New Barns Plantation
Bucket Hill Plantation
Works
Caravan Park
Highfields
Highfield House
Oak Farm
Caldecote Social Club Hall
El Sub Sta
Stinnage's W
CALDECOTE CP

1 2 3 4 5 6 7 8 9 10 11

Agricultural Land Classification Great Common Farm, Cambridgeshire

◉ Location of soil pit

Scale 1:10000 Sheet nos. TL 35 NW,NE & TL 36 SW,SE

This map is accurate only at the scale shown. Any enlargement could be misleading.

MAFF Ministry of Agriculture Fisheries and Food
Farm and Countryside Service

Cambs 21/89

[redacted]

MAFF Ministry of Agriculture Fisheries and Food

A45 New Settlements Inquiry

Great Common Farm
Proof of Evidence
Agricultural Land Classification

AGRICULTURAL LAND CLASSIFICATION
GREAT COMMON FARM, CAMBRIDGESHIRE

1.0 THE AGRICULTURAL LAND CLASSIFICATION SYSTEM

1.1 Agricultural Land Classification (ALC) assesses land quality based on its long term physical potential. The ALC system grades land according to the degree to which its inherent physical characteristics impose long term limitations on agricultural use.

1.2 The main physical factors which are taken into account in assessing ALC grade are climate, site and soil. These may act singly, or in combination to result in varying degrees of constraint on agricultural use. The ALC grade is determined by the most limiting factor present.

1.3 Five main grades of land are recognized ranging from grade 1 land of excellent quality to grade 5 land of very poor quality. Other issues, such as the location of farms, the standard of fixed equipment and the accessibility of land do not affect grading although they may influence land use decisions.

2. BACKGROUND

2.1 This 401.6 ha site was inspected in autumn 1986 and summer 1989 in connection with proposals to develop a new residential settlement with supporting amenities. The land surveyed lies adjacent to the A45 road at Bourn Airfield and Great Common Farm.

2.2 On the published 1:63,360 (Provisional) Agricultural Land Classification map (Sheet 134; MAFF 1969) the majority of the survey area is graded 2 with land in the south and east of the site graded 3. The current survey was undertaken to provide a more detailed ALC of the area.

2.3 At the time of the survey the majority of the land was in arable use. Typical crops include wheat, barley and oil seed rape. A small area of land adjacent to Great Common Farm was under grass.

3. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

3.1 Climate data for the site was obtained from the published agricultural climatic dataset (Met Office, 1989). This indicates that for the site's median altitude of 70m AOD, the annual average rainfall is 558mm. This is relatively evenly distributed throughout the year, although a slight spring minimum occurs during the months of February to April. Soils are at field capacity for a relatively short period of 95 days, and moisture deficits are 114 mm for wheat and 108 mm for potatoes. Climatic factors do not constitute a limitation to the ALC grading of the survey site.

Altitude and Relief

3.2 The site is generally level in the north and lies at approximately 70m AOD on a plateau adjacent to the A45 road. The land falls gently to the south west to 50m AOD in a dry valley feature and in the south east to a minimum altitude of 60m AOD. Gradient and altitude do not constitute limitations to the ALC grade.

4. GEOLOGY AND SOILS

4.1 The published 1:50,000 scale drift edition geology map for the Huntingdon area (Sheet 187; Geological survey of Great Britain, 1975) shows the survey area to comprise glacial boulder clay deposits.

4.2 The Soil Survey of England and Wales have mapped the "Soils of Eastern England" at a reconnaissance scale of 1:250,000, this map shows the occurrence of the Hanslope Association* over this boulder clay area.

* Hanslope Association: Slowly permeable calcareous clayey soils. Some slowly permeable non-calcareous clayey soils.

During the current survey a more detailed inspection of the soils confirmed the predominance of these boulder clay soils. Three main soil types were identified.

4.2.1a) Soils over the majority of the site typically comprise heavy clay loam or clay topsoils which occasionally directly overlie chalky boulder clay or, more commonly, overlie an upper subsoil of slightly calcareous or calcareous clay passing into chalky boulder clay at varying depths. Topsoils are typically slightly calcareous west of Broadway road and south of the main runway which traverses the site in a north easterly/south westerly direction. To the north of this runway, and in the far north west (adjacent to the woodland, Grid Ref TL 327 595) topsoils tend to be only very slightly or non-calcareous. In the extreme north eastern corner of the site adjacent to Childerley Gate topsoils and upper subsoils are only very slightly calcareous.

4.2.1b) Variants of this soil type may occur, on the airfield, where soils have been affected by runway and/or building removal.

4.2.2 In the valley feature in the south western part of the site deeper "head deposit" soils were noted. These typically comprise slightly calcareous heavy clay loam or clay topsoils with similarly textured upper subsoils overlying boulder clay at 60/120 cm depth.

4.2.3 A small area of decalcified soils occur in the vicinity of Bucket Hill Plantation. These soils typically comprise non-calcareous heavy clay loam topsoils over non calcareous heavy clay loam subsoils which may overlie chalky boulder clay at depth.

5. AGRICULTURAL LAND CLASSIFICATION

5.1 The definitions of the Agricultural Land Classification (ALC) grades are included in Appendix 1.

5.2 The table below shows the breakdown of the ALC grades for the land at Great Common Farm.

	AGRICULTURAL LAND CLASSIFICATION	
Grade	ha	%
2	50.3	12.5
3a	188.7	47.0
3b	101.0	25.1
Non-Agricultural	47.8	11.9
Urban	12.3	3.1
Agricultural Buildings	1.5	0.4
Total	401.6	100

6. GRADE 2

Land graded 2 occurs in three main situations.

6.1 Adjacent to the main north east/south west runway and adjacent to Bucket Hill Plantation the land graded 2 is associated with better drained calcareous variants of the soils described in paragraph 4.2.1a). Soil profile pit observations indicate that these soils have slowly permeable horizons present at depth in the subsoil (40/55 cm+, ie. wetness class II). The land is consequently limited by minor wetness and workability imperfections caused by the reduced subsoil permeability at depth combined with relatively heavy topsoil textures. This, together with the slight risk of drought in this low rainfall area, excludes the land from grade 1.

6.2 Land of this quality is also found in the west and south west of the site. Better drained variants of the boulder clay soils described in paragraphs 4.2.1a) and 6.1 above, are found together with the deeper "head deposit" soils (paragraph 4.2.2), and occur on or near the gently sloping sides of the shallow south-west orientated valley. Soil profile pit observations indicate the presence of a slowly permeable subsoil horizon (45/55 cms+ ie. wetness class II). The land is limited to grade 2 because of the minor wetness and workability problems outlined previously in paragraph 6.1 above.

6.3 Finally, west of Bucket Hill Plantation, the decalcified fine loamy

soils described in paragraph 4.2.3 predominate. The soils are typically freely drained and overlie boulder clay at depths greater than 80 cms. Slight summer droughtiness and topsoil texture limitations combine to restrict this land to grade 2.

7. SUBGRADE 3a

The majority of the land west of Broadway road and south of the main north east/south west runway has been graded 3a.

7.1 Land of this quality is associated with the less well-drained variants of the calcareous soils described in paragraph 4.2.1a). Subsoils are slowly permeable and soil profile pit observations indicate the presence of features associated with reduced permeability at shallow depths within the profile, thus limiting the soils to wetness class III. Reduced subsoil permeability and heavy topsoil textures combine to impose moderate wetness and workability limitations on the agricultural potential of this land; thus the land is restricted to subgrade 3a.

7.2 Slight soil variations occur where aerodrome building removal and runway clearance operations have been carried out. As a result, these clayey soils may be flinty and/or rubbly (5-10%, small and medium in size) with a mixed appearance. However, these variations are minor so the moderate drainage imperfection remains the overriding limitation to the ALC grade.

7.2 Some better drained (wetness class II) profiles of the soils described in paragraph 4.2.1a), have been graded 3a where topsoils were found to be non or very slightly calcareous.

8. SUBGRADE 3b

Approximately $\frac{1}{4}$ of the site has been graded 3b. Land of this quality is found to the north of the main north-east/south-west runway; in the extreme north-east of the site; and in the north west of the site around the woodland at Grid Ref. TL327595.

8.1 Land graded 3b is associated with the less well-drained (wetness class III), non-calcareous variants of the soils described in paragraph

4.2.1a). North of the main north east/south west runway and east of the wood at Grid Ref. TL 327595, topsoils are typically non-calcareous or only very slightly calcareous whilst adjacent to Childerley Gate both topsoils and upper subsoils are only very slightly calcareous. The slowly permeable subsoils and heavy topsoil textures combine to impose a significant limitation on the agricultural potential of this land. Thus the land is excluded from subgrade 3a.

8.2 In addition, where land has been affected by building and runway removal to the east of Broadway Road, soils typically comprise calcareous "mixed-looking" and gritty (5-10% flints and rubble fragments) clays over gritty (clinker* and flints) clays which are often chalky. The subsoils are slowly permeable (wetness class III) and topsoils are shallow, ranging from 15-20 cms thick. However, the more severe limitation is the sporadic occurrence, every season, of large buried concrete lumps within the cultivation zone. These represent remnants of the original runways and hardstanding areas and have the potential to do considerable damage to cultivation and harvesting machinery. Costs of production, therefore, are likely to be increased, and flexibility in the use of the land is reduced. For these reasons the land is restricted to subgrade 3b.

8.3 At "The Grange", land is excluded from subgrade 3a because of the density of large pieces of rubble throughout the topsoil (10-15% by volume).

9. *NON-AGRICULTURAL*

Areas of woodland, an enclosure with a covered reservoir, an enclosure with a radio mast, an area of open water, a piece of unused land believed to be in the ownership of Oakdene and airfield runways have been mapped as non-agricultural.

* Clinker: ironstone hoggin, related to ironstone "firing" in situ.

10. URBAN

Airfield and residential buildings together with the large factory area have been mapped as urban.

MINISTRY OF AGRICULTURE,
FISHERIES & FOOD
Resource Planning Group
Cambridge RO

November 1989

Appendix 1

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. When 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 (eg cereals and forage crops) the yields of which are variable. In most 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 agricultural land

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

REFERENCES

GEOLOGICAL SURVEY OF GREAT BRITAIN, 1975 : Drift Edition Geology Map No. 187; scale 1:50,000.

MAFF, 1969 : Agricultural Land Classification Map No 134, scale 1:63,360.

MAFF, 1988 : Agricultural Land Classification of England & Wales - Revised guidelines and criteria for grading the quality of agricultural land. Alnwick.

METEOROLOGICAL OFFICE, 1989 : Climatic Data extracted from the published climatic dataset.

SOIL SURVEY OF ENGLAND AND WALES, 1984 : Soils of Eastern England - Sheet No. 4; scale 1:250,000.

BBI 6.1

A G R I C U L T U R E

APPENDICES AND PLANS

'A special opportunity to transform degraded land into a living community'

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CONTENTS

DOCUMENT.

PLANS

PIT I

Slope. Level
Crop. Plough.
ALC. Grade 3a.

0-28cm Ap horizon. 10YR-2.5Y4/2 calcareous clay with few to common (5%) small hard stones. Slightly moist.

28-38cm Bg horizon. 2.5Y6/3-4 calcareous clay with common distinct 10YR5/6 mottles. Common (7%) small soft chalk and hard stones. Moderate coarse blocky structure. Dry. Extremely hard consistence. 0.1% fine and larger macropores. No Fe/Mn concs.

38-60cm BCg horizon. 2.5Y6/2-3 very calcareous clay with many 2.5Y7/1 and common 10YR5/6 mottles. Common (12%) small soft chalk and hard stones. Strong medium prismatic structure. Dry. Extremely hard consistence. 0.1% fine and larger macropores. No Fe/Mn concs. Slowly Permeable.

60-100cm Cg horizon. 2.5Y6/1-N/6 very calcareous clay with common to many 10YR5/6 mottles. Many small soft chalk stones. Moderate coarse prismatic structure. Dry. Extremely hard consistence. 0.1% fine and larger macropores. No Fe/Mn concentrations. Roots still common to 1m depth. Slowly Permeable.

Profile Available Water

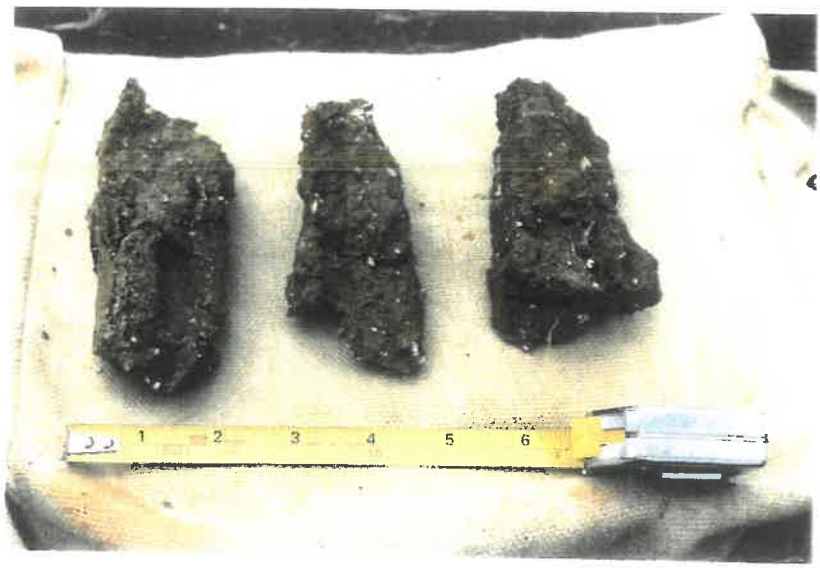
Horizon	For Winter Wheat	For Potatoes
1	453.6	453.6
2	155.5	155.5
3	147.4	332.2
	66.4	
4+	420.0	125.5
	1243	1067
Divided by 10	124	107
Balance v. MD	+11	0

PIT 1 Grade 3a

Slowly Permeable in BCg
Wetness Class III
Calcareous

PIT 1 Soil Structure

30-38cm. Bg Horizon
Moderate coarse
subangular blocky



38-60cm. BCg Horizon
Strong medium prismatic

60-110cm. Cg Horizon
Moderate coarse and
medium prismatic

PIT 2

Slope. 1° East
Crop. Plough
ALC Grade 2

0-25cm Ap horizon. 10YR4/2 non-calcareous medium clay loam. Few small hard stones.

25-65cm Bw1 and Bw2 horizons. 7.5YR5/6 medium clay loam becoming heavy clay loam; colour becomes 7.5YR6/6 with 5/4 ped faces and crushed overall colour 7.5YR5/8. Non-calcareous. Not mottled. Few small hard stones. Moderate to weak medium prismatic and very coarse angular blocky structure becoming coarse prismatic. Slightly moist. Firm consistence. c0.2% macropores of fine or larger size. Few Fe/Mn concs toward base of horizon.

65-82cm BC horizon. 7.5YR5-6/8 non-calcareous (?) sandy clay loam. Common small soft chalk stones. Weak coarse subangular blocky structure. Dry. Hard to very hard consistence. 0.1-0.2% macropores of fine or larger size.
Note: This horizon is absent from one section of the pit. Here the overlying Bt horizon extends deeper.

82-120cm 2Cg horizon. 2.5Y6/1 very calcareous clay with common 2.5Y6/2 matrix colours and 10YR5/4 mottles. Moderate coarse prismatic structure. Dry. Very hard consistence. c0.2% macropores of fine or larger size. Common to many small soft chalk stones. Few roots at 120cm depth. Slowly Permeable.
Note: A 10cm thick lens of mottled silt loam occurs in one part of the pit in this horizon.

Profile Available Water

Horizon	For Winter Wheat	For Potatoes.
1	450.0	450.0
2	400.0	640.0
	150.0	
3	130.9	65.0
4	266.0	
	1397	1130
Divided by 10	140	113
Balance v. MD	+27	+6

PIT 2 Grade 2

Slowly Permeable in 2Cg
Wetness Class I
Non-calcareous above 2Cg

PIT 2 Soil Structure

25-40cm. Bwl Horizon
Moderage to weak, medium prismatic and very coarse angular blocky

40-65cm. Bw2 Horizon
Moderate to weak coarse prismatic

82-120cm. 2Cg Horizon
Moderate coarse prismatic

PIT 3

Slope. 1½° west.
Crop. Rough plough
ALC. Grade 3b.

0-c30cm Ap horizon. 2.5Y5/2 calcareous clay with inclusions of colour from horizon below. Common (12%) small hard and soft chalk stones.

30-55cm BCg horizon. 2.5Y6/1 very calcareous clay with common to many 10YR-7.5YR5/6 mottles. Many small chalk stones. Moderate to strong medium and coarse prismatic structure. Very slightly moist. Extremely firm to very hard consistence. <0.1% macropores of fine or larger size. Slowly Permeable.

55-100cm Cg horizon. N/6 very calcareous clay with common 10YR5/8 mottles. Many small chalk stones. Moderate to strong coarse and medium prismatic structure. Dry. Extremely hard consistence. c0.2% macropores of fine or larger size. Few roots throughout. Slowly Permeable.

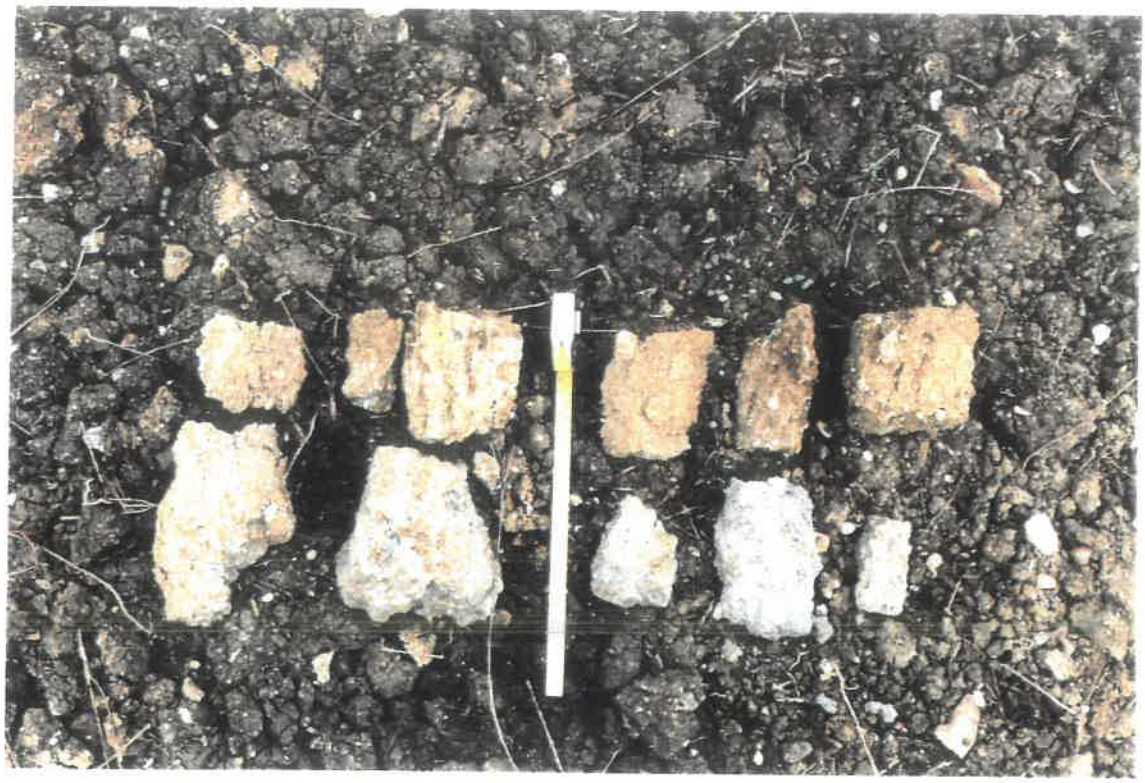
Notes: A perfectly preserved mole channel (see photograph) passes through the pit. Made approximately 16 years ago, it should by now have deformed or filled. The fact that it has not probably means that it rarely transmits water at all. The reasons for this could be a blockage not far upslope, or water never reaching it from above. Just here there is some evidence (colour changes - soil browning - photograph) that it is having an effect, but the 'zone of influence' is limited to the soil immediately above the channel. The implication must be that moling as a secondary drainage treatment in these soils must either be very intensive, or otherwise not particularly effective.

Profile available water

Horizon	For Winter Wheat	For Potatoes
1	468.6	468.6
2	245.0	490.0 (with hor 3)
	35.5	
3	490.0	
	1247	959
Divided by 10	125	96
Balance v. MD	+12	-11

PIT 3 Grade 3b

Slowly Permeable in BCg
Strongly Gleyed in BCg
Wetness Class III
Calcareous



PIT 3 Soil Stucture

Upper Structures. BCg Horizon: Lower Structures. Cg Horizon

Both moderate to strong medium and coarse prismatic

To right of tape measure - from above mole channel

To left of tape measure - from pit face area as Photo

Note both the browner colours in the more disturbed zone above the mole channel, and the greyer colours below. Why the latter should be so is unclear.

PIT 4

Slope. Level
Crop. Rough plough
ALC. Grade 3a

0-30cm Ap horizon. 10YR4/2 non-calcareous clay. Few small hard stones.

30-55cm EB horizon. 10YR-2.5Y5/4 non-calcareous clay. Few small hard stones. Moderate coarse and medium prismatic structure breaking to strong fine prismatic and medium angular blocky. Moisture state and consistence not recorded. 0.1-0.2% macropores of fine and larger size. Few Fe/Mn concentrations.

55-70cm Bg horizon. 2.5Y6/3-2 calcareous clay with common 7.5YR and 5YR5/6 mottles. Few small hard stones. Strong medium prismatic structure breaking to strong medium angular blocky. Moisture state and consistence not recorded. c0.4% macropores of fine and larger size. No Fe/Mn concs. Slowly Permeable.

70-90cm Btg horizon. 2.5Y6/1 calcareous clay with many 7.5YR5/6 and common 5YR5/8 mottles. Moderate very coarse subangular blocky structure. Moisture state and consistence not recorded. c0.3% macropores of fine and larger size. No Fe/Mn concs. Slowly Permeable.

90-115cm BCg horizon. 2.5Y6/2 calcareous clay with many 7.5YR5/4 mottles. common small hard stones. Weak coarse subangular blocky structure. Moisture state and consistence not recorded. c0.3% macropores of fine and larger size (some areas though >0.5%). Few Fe/Mn concs. Horizon considered Permeable. Few live roots seen to base of this horizon.
Note: Horizon thins to 10cm thickness in parts of the pit.

115-130cm Cg horizon. 10YR6/3 very calcareous clay with common 7.5YR6/6 and 10YR6/8 mottles. Common small chalk and hard stones. Structural elements not recorded. >0.5% macropores of fine and larger size. No Fe/Mn concs. Permeable.

Notes: A few decayed woody roots throughout the profile probably indicate that the soil was once covered by woodland.

Profile available water (assuming moderate structural condition)

For Winter Wheat	128mm	Deficit v. MD	+15mm
For Potatoes	110mm	Deficit v. MD	+3mm.

PIT 4 Grade 3a

Slowly Permeable in Bg
Wetness Class II
Non-calcareous above Bg

PIT 4 Soil Structure

30-55cm. EB Horizon
Moderage fine prismatic and medium angular blocky

55-70cm. Bg Horizon
Strong medium angular blocky

70-90cm. Btg Horizon
Moderate very coarse subangular blocky

PIT 5

Slope Level.
Crop Plough
ALC Grade 3b

0-30cm Ap horizon. 10YR4/2 non-calcareous clay. Few small hard stones.

30-55cm Bg horizon. 2.5Y6/4 calcareous clay (but decalcified 30-35cm) with common 7.5YR5/6 and few (bec common) 2.5Y6/2 mottles. Strong medium and coarse prismatic structure. Slightly moist. Firm consistence. 0.1% macropores of fine and larger size. Few small hard stones. Few Fe/Mn concs. Slowly Permeable.

55-75cm BCg horizon. 2.5Y6/3 calcareous clay with many 2.5Y6/1 and common 10YR5/8 mottles. Common small chalk stones. Strong to moderate coarse prismatic structure. Dry. Extremely hard consistence. c0.2% macropores of fine and larger size. Slowly Permeable.

75-105cm 2BCg horizon. 10YR6/8 very calcareous fine sandy silt loam with common to many 10YR8/2 mottles. Stoneless. Weak coarse angular blocky structure. Slightly moist. Friable. 0.1% macropores. No Fe/Mn concs. Permeable.
Notes: Horizon is discontinuous around pit. Where absent the horizon above thickens to replace it.

105-140cm 3Cg horizon. 10YR7/1 extremely calcareous clay to silty clay with rare sandy lenses, and with common 10YR5/8 mottles and many white chalky spots. Many (abundant?) small chalk stones. Structural elements not recorded. c0.3% macropores of fine or larger size. Few roots right down to base.

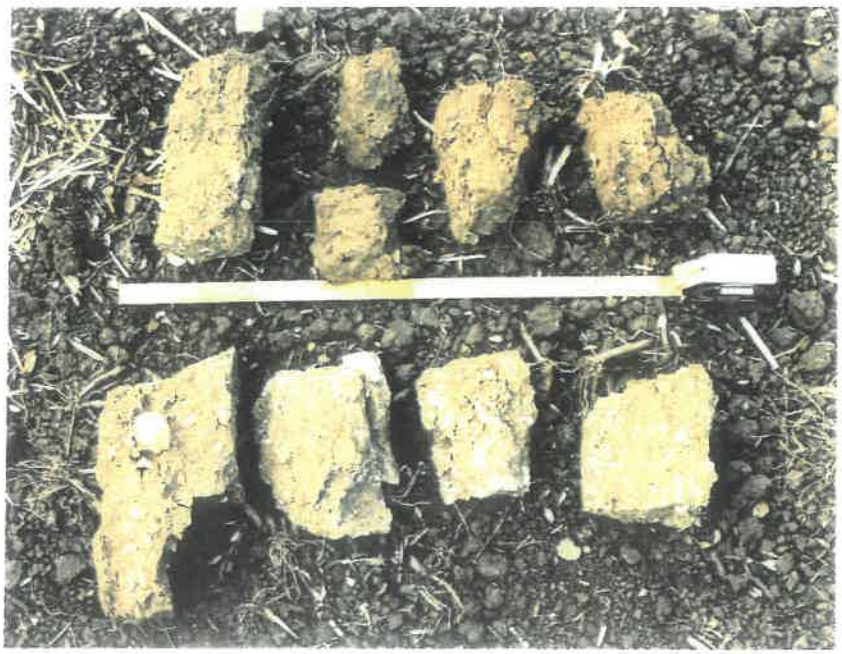
Profile Available Water.

Horizon	For Winter Wheat	For Potatoes
1	510.0	510.0
2	260.0	325.0
	35.0	
3	248.0	109.5
4	480.0	
5	105.0	
	----	----
	1638	945
Divided by 10	164	95
	----	----
Balance v. MD	+51	-12

PIT 5 Grade 3b

Slowly Permeable in Bg
Wetness Class III
Non-calcareous in Ap
and top of Bg

PIT 5 General Area



PIT 5 Soil Structure

30-55cm. Bg Horizon
Strong medium and coarse prismatic

55-70cm. BCg Horizon
Strong coarse prismatic

PIT 6

Slope. 1° south
Crop. Rough Plough
ALC. Grade 2

0-30cm Ap horizon. 10YR4/2 calcareous clay. Common (7%) medium and small stones.

30-65cm Bw horizon. 2.5Y5-6/3 calcareous clay. Not mottled. Common (12%) small chalk and hard stones. Moderate coarse and medium prismatic and very coarse subangular blocky structure. Dry. Very hard consistence. c0.2% macropores of fine and larger size. Common roots. Permeable.

65-110cm BCg horizon. 2.5Y6/1 very calcareous clay with common 10YR5/6 mottles and 2.5Y6/3 matrix colours. Many small chalk stones. Strong medium prismatic structure . Dry. Extremely hard consistence. c0.3% macropores 65-90cm but becoming 0.5% and greater below 90cm. Slowly permeable becoming permeable. Few roots.

Notes: Part of this pit overlies an old runway drainage pipe. Over this the soils are darker and include brick and concrete lumps. For the implications of this on land work see section 8.

Profile available water

Horizon	For Winter Wheat	For Potatoes
1	476.4	476.4
2	242.0	423.5
	99.2	
3	385.0	61.3
	----	----
	1203	961
Divided by 10	120	96
	----	----
Balance v. MD	+7	-11

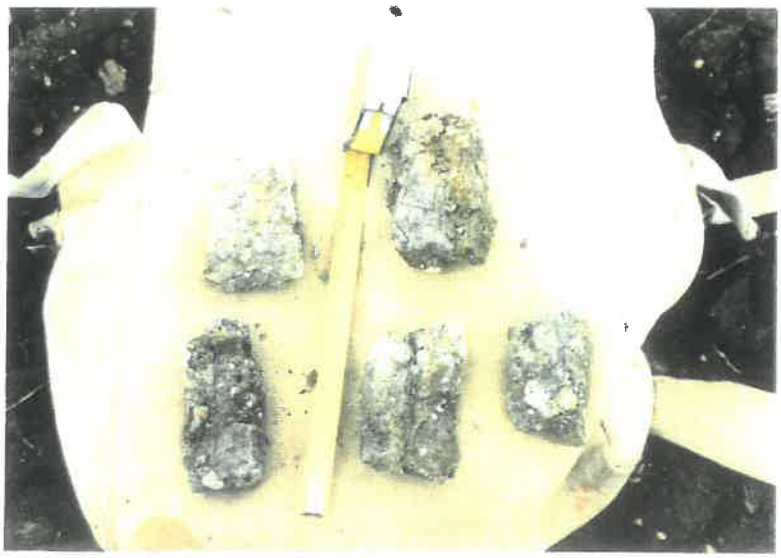
Notes: Strictly speaking this profile is Grade 3a on account of a deficit of a mere 1mm in the limit for potatoes. However since there are slightly more hard stones in the surface than is the norm, and a small proportion of these anyway are chalk, Grade 2 is considered a quite justifiable Grade for this profile.

PIT 6 Grade 2

Slowly Permeable in BCg
Wetness class II
Calcareous

PIT 6 Soil Structure

30-65cm. Bw Horizon
Moderage coarse
and medium prismatic



65-110cm. BCg Horizon
Strong medium prismatic

PIT 7

Slope 1° south-east.
Crop Rough plough
ALC Grade 3a

0-30cm Ap horizon. 2.5Y5/2-10YR6/3 calcareous clay. Common (12%) small to large chalk, hard, and other stones (concrete, brick etc).

30-55cm BCg1 and BCg2 horizons. 2.5Y5-6/2 mottled, very calcareous clay. Common small stones, mainly chalk; others rarer. Moderate coarse prismatic and very coarse angular blocky structure . Slightly moist. Very firm consistence. 0.1% macropores of fine and larger size. Slowly permeable.

55-65cm Bg horizon. 2.5Y5/3 calcareous clay with common 7.5YR5/6 mottles. Common small stones, mainly chalk. Moderate medium prismatic structure. Slightly moist. Very firm consistence. <0.5% fine and larger macropores. Slowly permeable.

65-76cm bA horizon. 2.5-10YR5/3 calcareous clay. Not mottled. Common hard stones. Moderate coarse prismatic structure. Slightly moist. Extremely firm consistence. <0.1% macropores of fine and larger size (but many very fine ones). Few Fe/Mn concs. Permeable.

76-85cm bBg horizon. As Bg above but 2.5Y4/3 matrix colour.

85-110cm bBCg horizon. 2.5Y6/3 very calcareous clay with common 2.5Y6/1 and 10YR5/8 mottles. Many small and medium chalk stones. Moderate medium prismatic structure. Dry. Extremely hard consistence. c0.2% macropores of fine and larger size; but some parts below 1m are approx 0.5% or more. Slowly permeable.

Profile available water.

	For Winter Wheat	For Potatoes
	1202	965
Divided by 10	120	97
	----	----
Balance v. MD	+7	-10

PIT 7 Grade 3a

Slowly Permeable in BCg1
Wetness Class III
Calcareous

Inversion shown by larger arrows on the right. Note the brownish colours at depth with the greys above and below. This is the most obvious sign of the inversion.

PIT 7 Soil Structure

Top four Structures from BCgl and BCg2 Horizons
Moderate coarse prismatic and very coarse angular blocky

Middle two Structures from Bg Horizon
Moderate medium prismatic

Bottom four Structures from bBCg Horizon
Moderate medium prismatic and coarse angular blocky

PIT 8

Slope. Level
Crop. Rough plough
ALC. Grade 3b

0-30cm Ap horizon. 2.5-10YR4/2 non-calcareous clay. Few medium hard stones.

30-40cm Bg horizon. 2.5Y5/3 calcareous (but decaclified in upper part) clay with common 7.5YR5/6 and few 2.5Y6/2 mottles. Few medium hard stones. Moderate coarse prismatic and very coarse angular blocky structure. Slightly moist. Extremely firm consistence. Few to common Fe/Mn concs.
Notes: Horizon deepens to 50cm in places. Considered slowly permeable but macropores not noted. Unlikely on general evidence to be in excess of 0.5%.

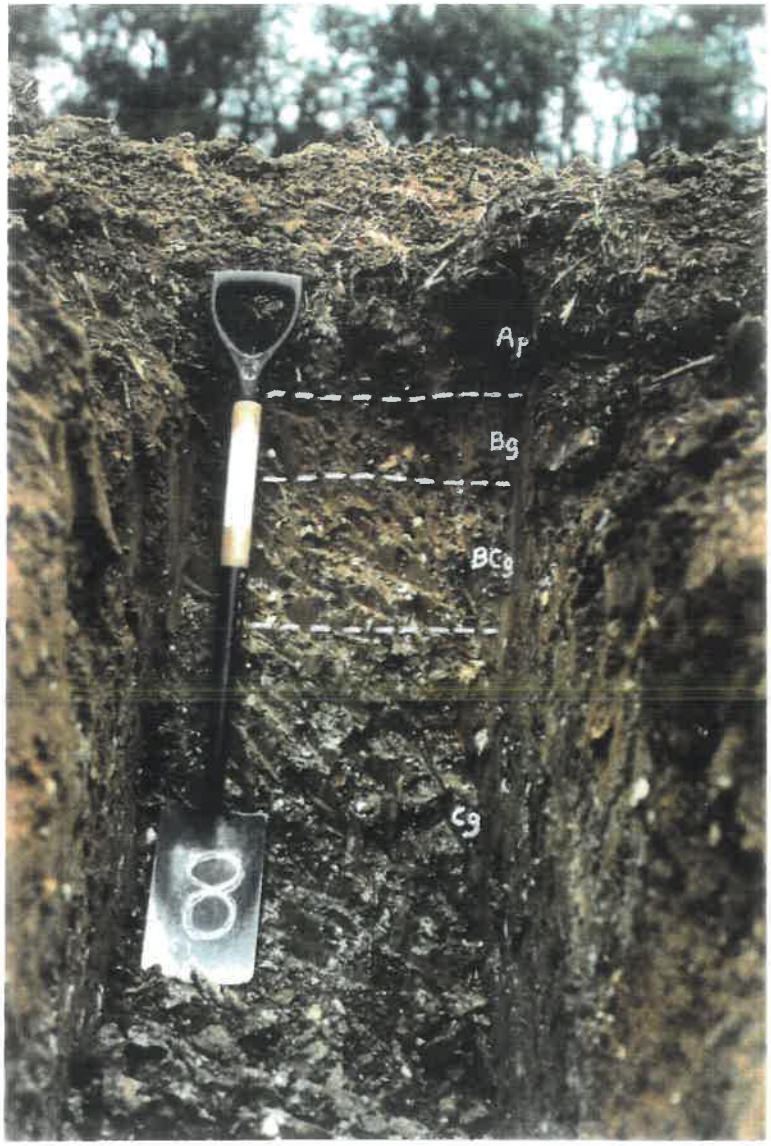
40-65cm BCg horizon. 2.5Y6/3-7/4 very calcareous clay with many 2.5Y6/1 and common 10&7.5YR5/6 mottles. Common to many small chalk stones Moderate to strong coarse prismatic structure. Slightly moist. Extremely firm consistence. c0.2% macropores of fine and larger size. Few Fe/Mn concs. Few roots. Slowly permeable.

65-110cm Cg horizon. 2.5Y6/1 very calcareous clay with many 10YR5/8 mottles and 10YR-2.5Y5/3 ped matrix colours. Many small chalk stones. Moderate coarse prismatic structure. Slightly moist. Extremely firm consistence. c0.2% macropores of fine and larger size; but becoming 0.5% and more in places at depth. Slowly permeable becoming permeable.

Notes: Along one face of the pit the top two horizons overlie not common Chalky Boulder Clay, but a gravelly lens some 50cm thickness made up of clay and sand lenses with abundant small hard flints and other stones, including chalk. The described and sampled face represents the 'normal' soil for the area. The gravel lens was unexpected.

Profile available water.

Horizon	For Winter Wheat	For Potatoes.
1	510.0	510.0
2	130.0	130.0
3	124.0	310.0
	105.0	
4	385.0	61.3
	1254	1011
Divided by 10	125	101
Balance v. MD	+12	-6



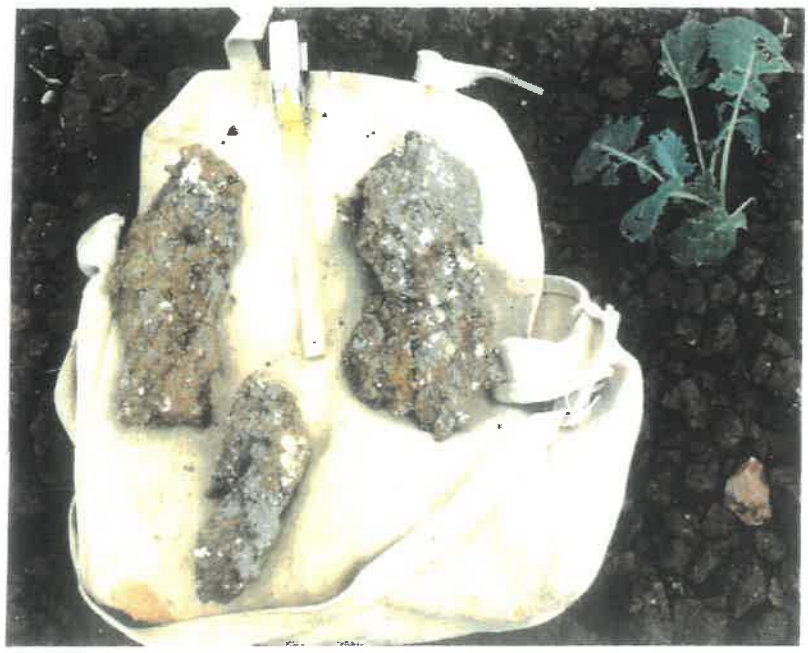
PIT 8 Grade 3b

Slowly Permeable in BCg
Wetness Class III
Non-calcareous in Ap
and top of Bg.

PIT 8 Soil Structure

30-40cm. Bg Horizon
Moderate coarse prismatic
to very coarse
angular blocky

40-65cm. BCg Horizon
Moderate to strong
coarse prismatic



65-110cm. Cg Horizon
Moderate coarse prismatic

ANALYTICAL RESULTS

BBI 6.1.9 - Calcium Carbonate Content

Augerhole /Pit	CaCO3 Content	Augerhole	CaCO3 Content
Pit 4 Topsoil	<0.2%	79 Topsoil	<0.2%
Pit 4 Subsoil	0.3%	82 Topsoil	<0.2%
Pit 5 Topsoil	<0.2%	87 Topsoil	<0.2%
Pit 5 Subsoil	<0.2%	87 Subsoil	0.2%
Pit 8 Topsoil	<0.2%	106 Topsoil	1.0%
Pit 8 Subsoil	<0.2%	162 Topsoil	<0.2%
14 Topsoil	<0.2%	168 Topsoil	<0.2%
15 Topsoil	<0.2%	168 Subsoil	<0.2%
16 Topsoil	<0.2%	174 Topsoil	<0.2%
16 Subsoil	<0.2%	174 Subsoil	1.4%
27 Topsoil	<0.2%	175 Topsoil	<0.2%
27 Subsoil	<0.2%	188 Topsoil	0.3%
41 Topsoil	<0.2%	191 Topsoil	1.0%
41 Subsoil	0.8%	200 Topsoil	2.0%
42 Topsoil	0.5%	202 Topsoil	2.5%
62 Topsoil	<0.2%	206 Topsoil	0.8%
68 Topsoil	<0.2%	210 Topsoil	1.6%
68 Subsoil	<0.2%	211 Topsoil	3.9%
73 Topsoil	<0.2%	215 Topsoil	1.3%

Notes: Samples <1% CaCO3 are classed as non-calcareous.

Laboratory: Sherwood Research Laboratories, Edwinstowe, Nottinghamshire.

ANALYTICAL RESULTS

BBI 6.1.10 - Clay Content (Topsoils)

Augerhole /Pit	Sand	Silt	Clay	Nomenclature
14	23.6	36.6	39.8	Clay
42	24.5	33.5	42.0	Clay
62	32.2	33.9	33.9	Heavy Clay Loam
73	28.1	34.5	37.4	Clay
79	25.2	33.5	41.3	Clay
122	19.8	35.3	44.9	Clay
133	26.0	37.5	39.5	Clay
159	23.3	38.3	38.4	Clay
162	24.9	35.6	39.5	Clay
175	25.5	37.3	37.2	Clay
Pit 4	27.6	36.3	36.1	Clay
Pit 5	24.3	32.4	43.3	Clay
Pit 8	26.4	35.3	38.3	Clay

Laboratory: Newton Technology Ltd, Maiden Newton, Dorset.

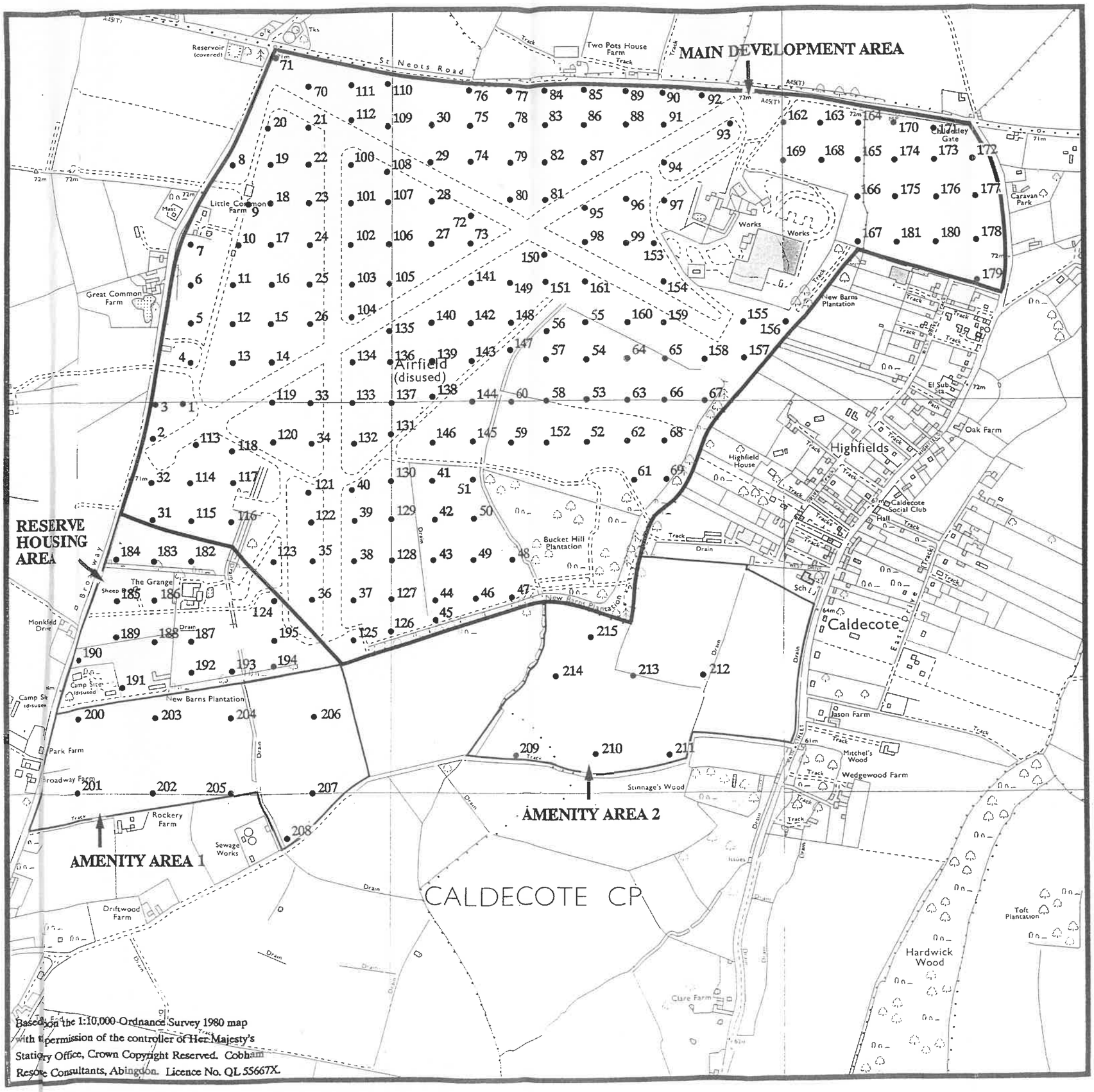
ANALYTICAL RESULTS

BBI 6.1.11 - Organic Matter Content (Topsoils)

X^1 2.72, 3.21, 2.41, 2.60, 2.93

X^2 3.88, 3.39, 3.10, 2.87, 3.34

Laboratory: Sherwood Research Laboratories, Edwinstowe, Nottinghamshire



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- Augerholes 1 - 195 and 200 - 215

Note: Land in Reserve Housing Area and the two Amenity Areas has been surveyed and the findings presented on Map V (Land Grades). However these areas are not included in my discussion or statistics presented in the Report.

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Project **Bourn Airfield**

Client **Monsell Youell Homes Limited**
Bovis Homes Limited
Ideal Homes (Thames) Limited

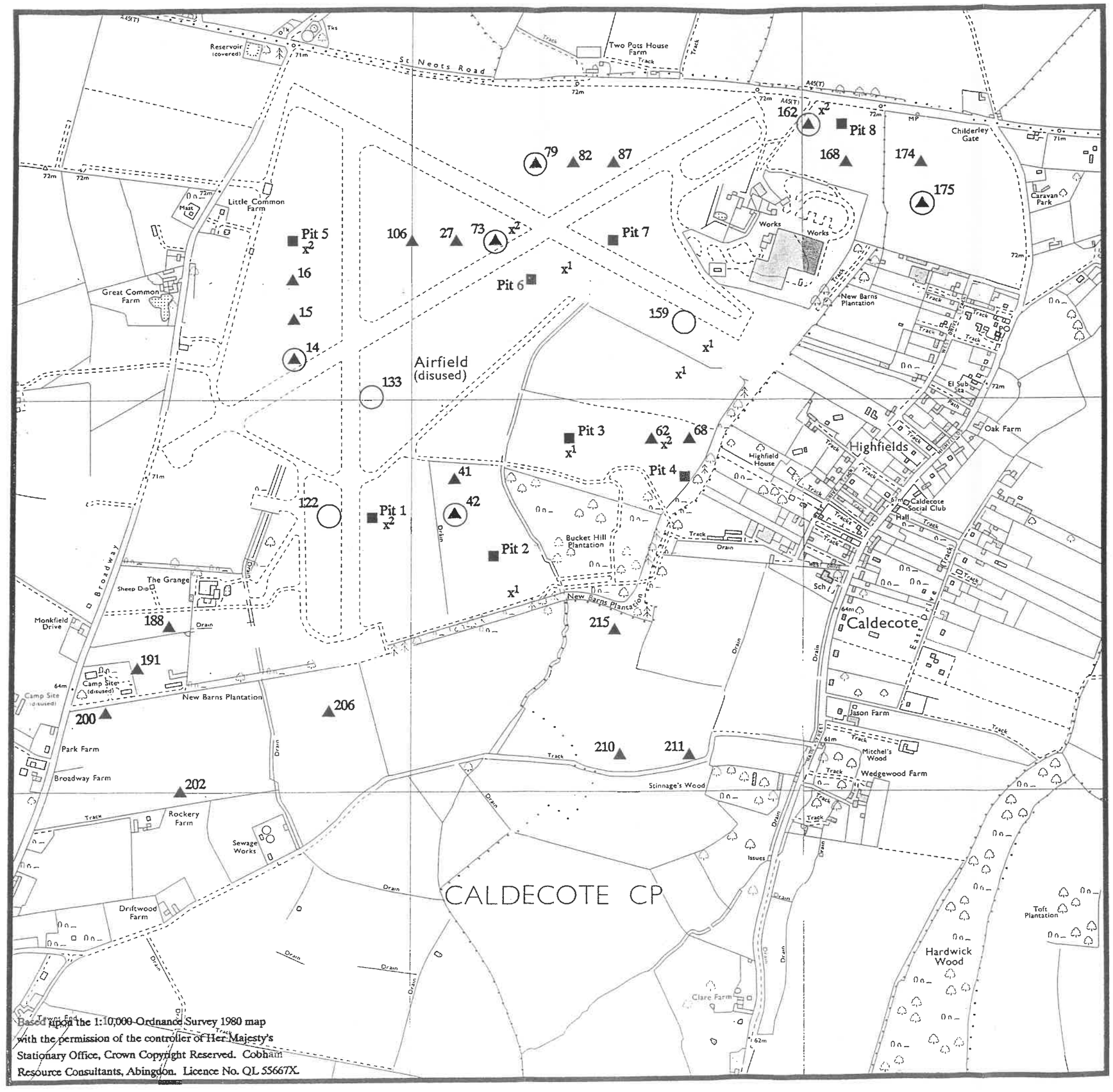
Drawing Title

BBI. 6.1.12
AUGERHOLE SAMPLE POINTS

Scale	LA	LM	Checked by
1:10,000			

Drawing no. Revision Date

CTR12014



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■ Pits 1-8 Some pits sampled as triangle and circle below

▲ Sample for Calcium Carbonate content Topsoil and some subsoils

◯ Sample for Clay content

x Sample for Organic Matter content

x^1 Poor topsoil

x^2 Undisturbed topsoil

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Project **Bourn Airfield**

Client **Monsell Youell Homes Limited**
Bovis Homes Limited
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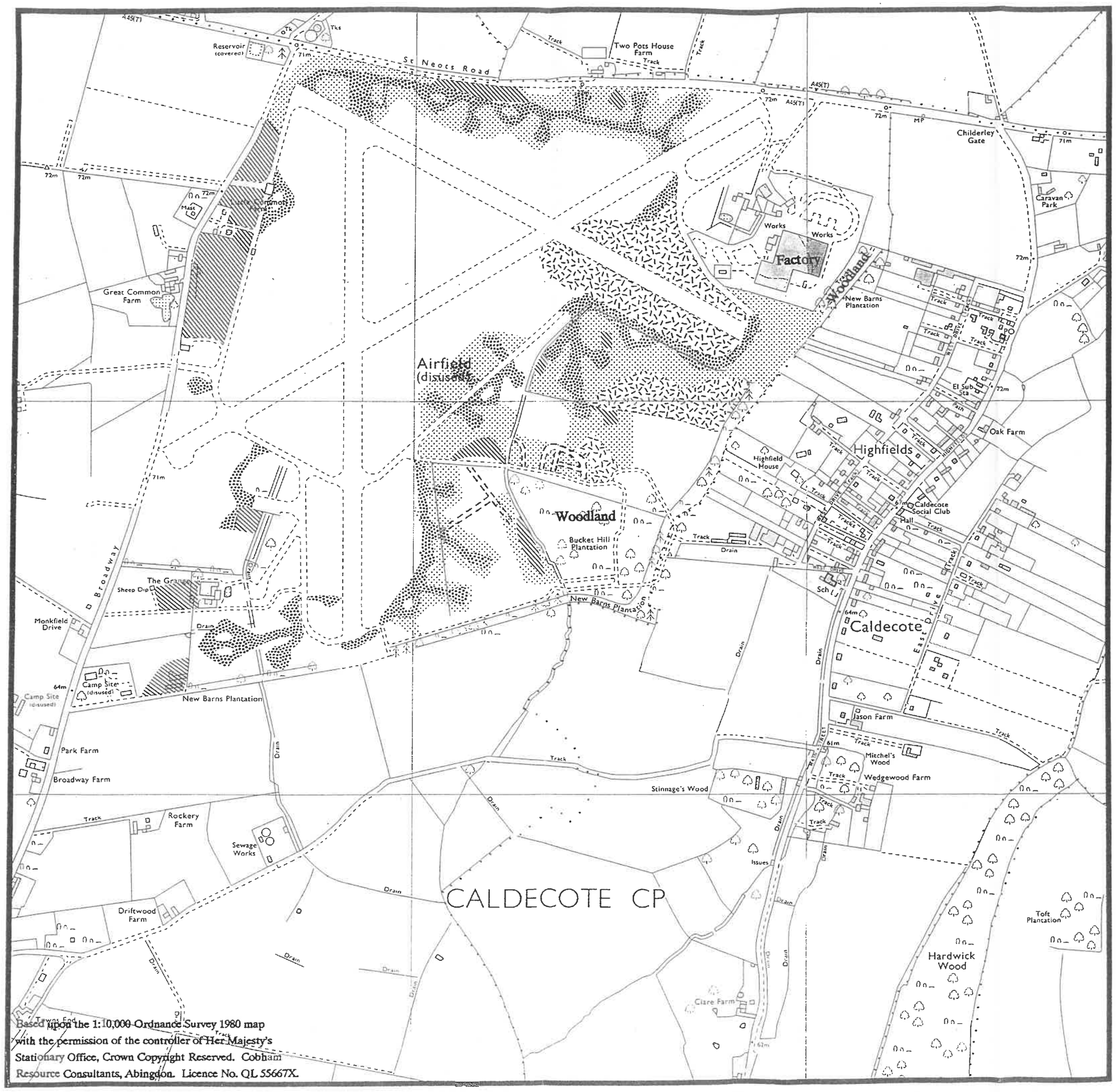
Drawing Title

BBI. 6.1.13
PITS AND SAMPLING LOCATIONS

Scale	LA	LM	Checked by
1:10,000			

Drawing no. | Revision | Date

CTR12014



Former runway

Former buildings

Former concrete tracks

Major land disturbance

Moderate land disturbance
(includes all 'former' categories above)

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Project **Bourn Airfield**

Client **Monsell Youell Homes Limited**
Bovis Homes Limited
Ideal Homes (Thames) Limited

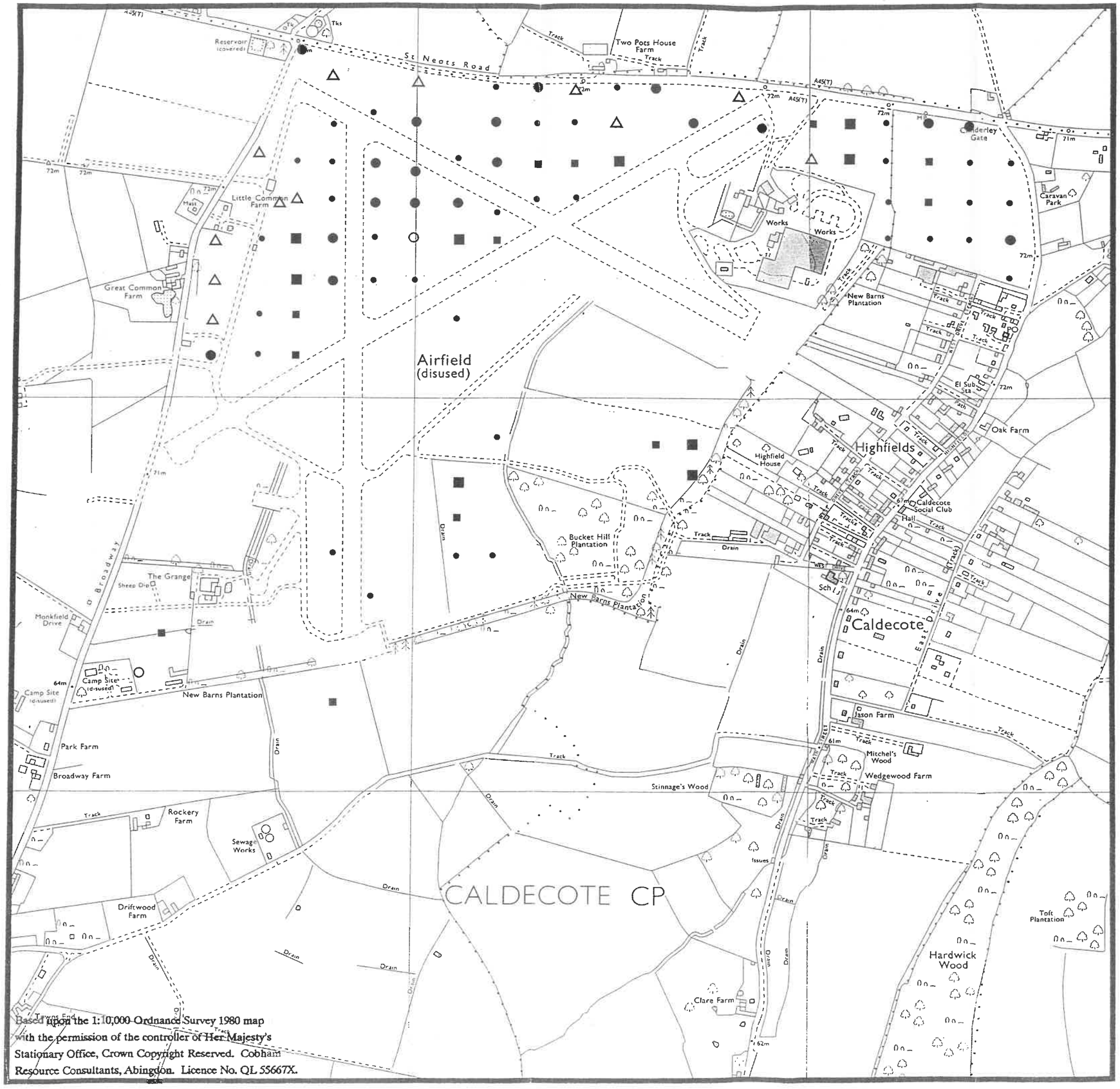
Drawing Title

BBI. 6.1.14
AREAS OF DISTURBANCE

Scale	LA	LM	Checked by
1:10,000			

Drawing no. | Revision | Date

CTR12014



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- ■ Topsoil and Immediate Subsoil non-calcareous by analysis
- ■ Topsoil non-calcareous by analysis
- ● Topsoil and Immediate Subsoil non-calcareous by field test
- • Topsoil non-calcareous by field test
- △ Calcareous due to disturbance (for northern areas only)
- ○ Borderline calcareousness by analysis

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Project **Bourn Airfield**

Client **Monsell Youell Homes Limited**
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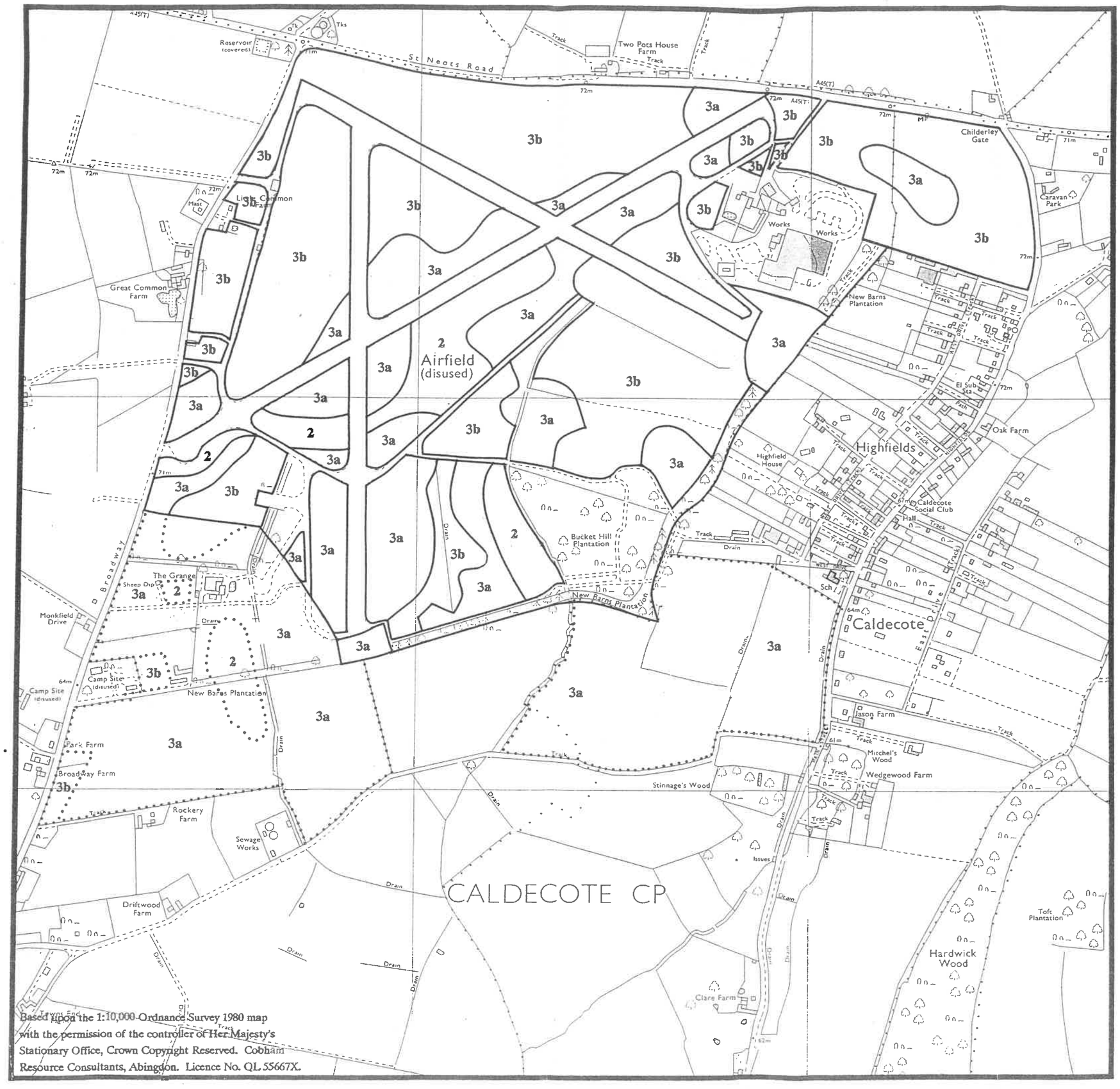
Drawing Title

BBI. 6.1.15
NON-CALCAREOUS TOPSOIL AREAS

Scale	LA	LM	Checked by
1:10,000			

Drawing no. | Revision | Date

CTR12014



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Grade 2	6.8%
Grade 3a	23.2%
Grade 3b	44.5%
Non-Agricultural	20.0%
Urban	5.5%

Percentages only relate to the main development area contained in the solid line. Other information is for guidance only.

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[X]

Project Bourn Airfield

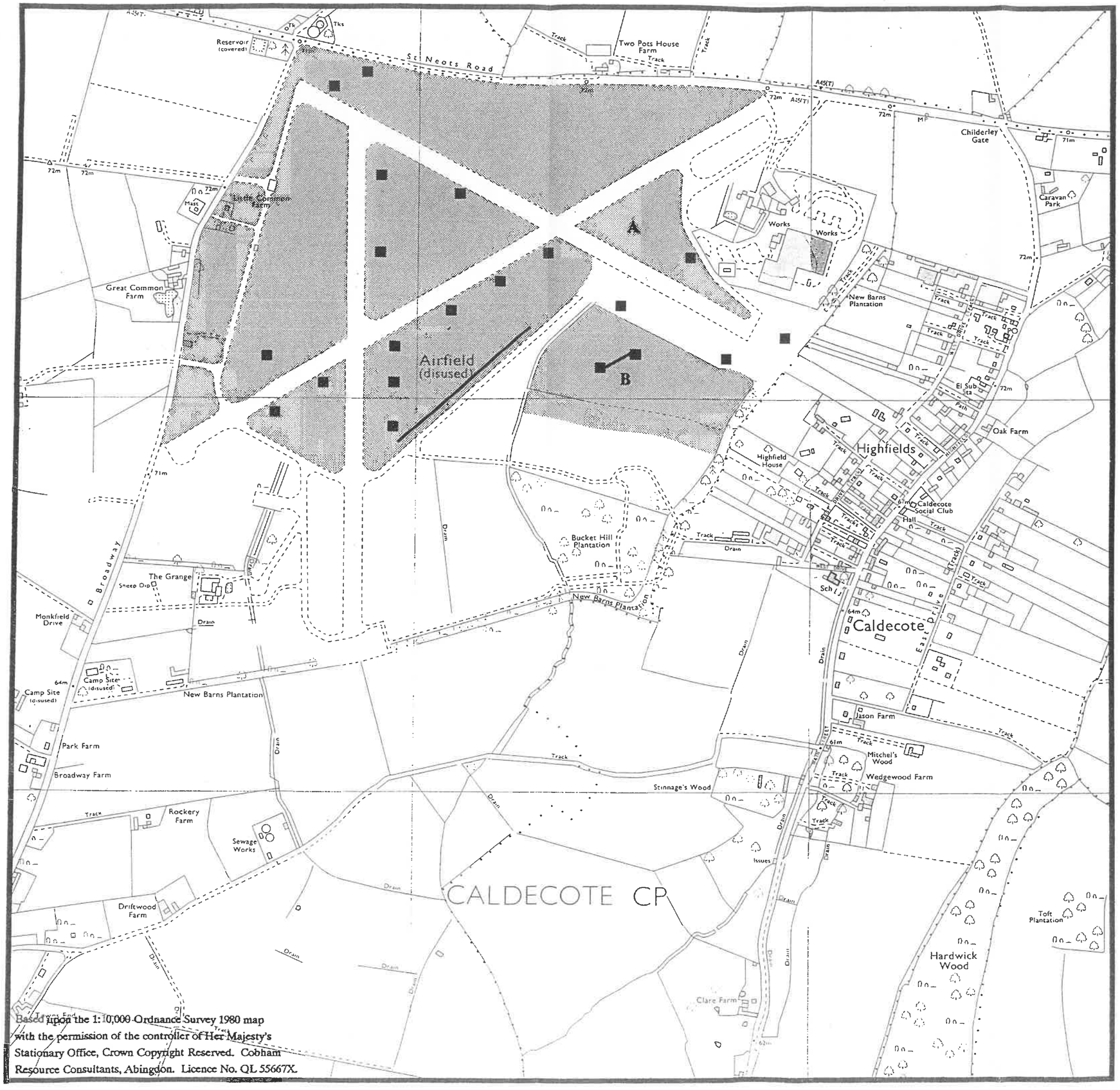
Client Monsell Youell Homes Limited
Bovis Homes Limited
Ideal Homes (Thames) Limited

Drawing Title
BBI. 6.1.16
LAND GRADE

Scale	LA	LM	Checked by
1:10,000			

Drawing no. Revision Date

CTR12014



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■ Manhole inspection chambers either for drains or cables

— Known underground drains or cable ducts close to surface

▨ Areas neither mole drained nor drained by a primary underdrainage system; except for areas A and B which are underdrained

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Project **Bourn Airfield**

Client **Monsell Youell Homes Limited**
Bovis Homes Limited
Ideal Homes (Thames) Limited

Drawing Title

BBI. 6.1.17
DRAINAGE

Scale	I.A	I.M	Checked by
1:10,000			

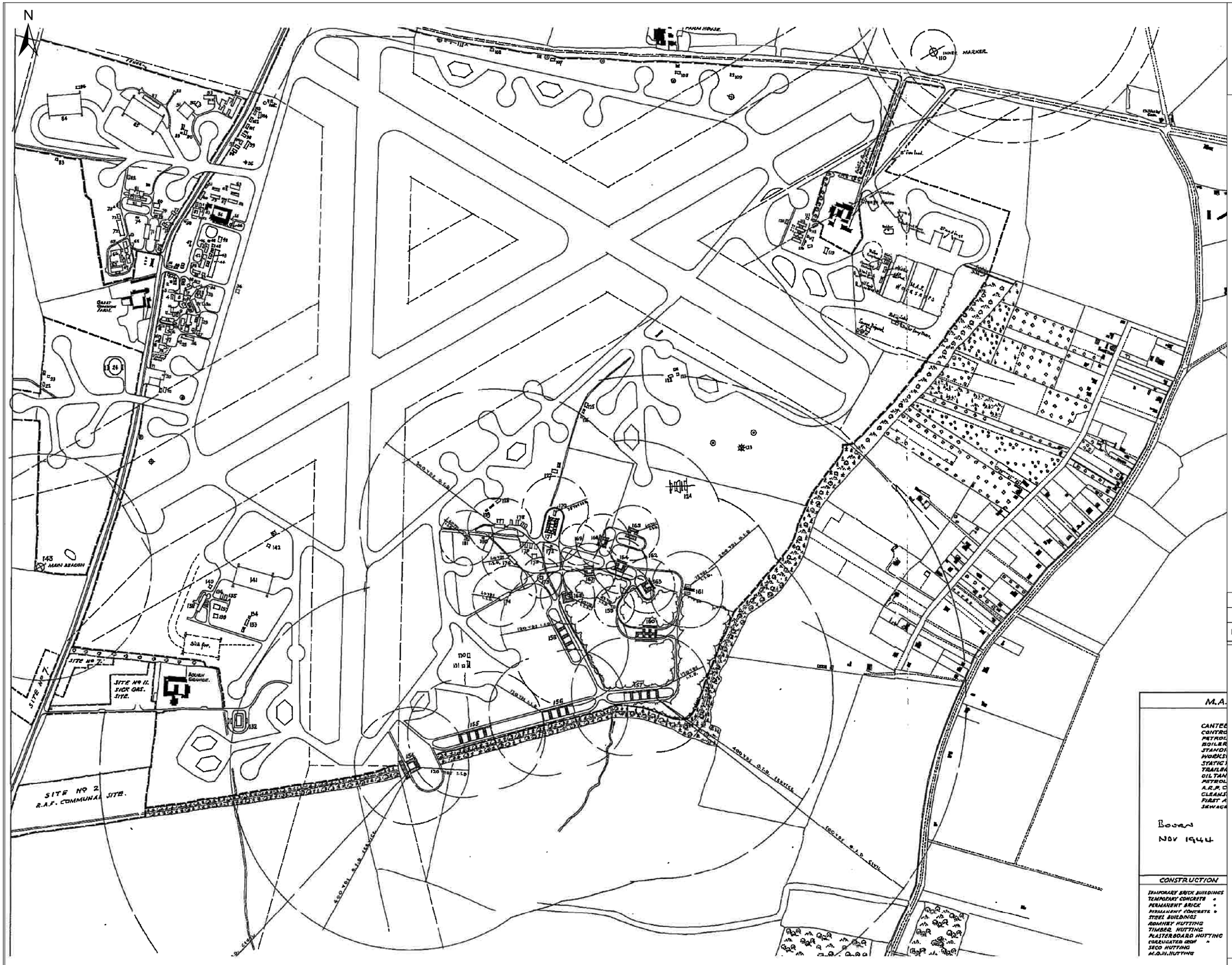
Drawing no. Revision Date

CTR12014

FIGURES

FIGURE 1

ALC OF BOURN AIRFIELD AND SURROUNDING AREA



0 0.2 0.4 km

Notes
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Client

Project Bourn Airfield

Title Bourn Airfield - Extent of Airfield in 1944

Status	Drawn By	PM/Checked By
FINAL	MS	JT
Job Ref	**Scale @ A3**	**Date Created**
OXF101813	1:13,393	FEB 17

Figure Number **1** Rev **-**

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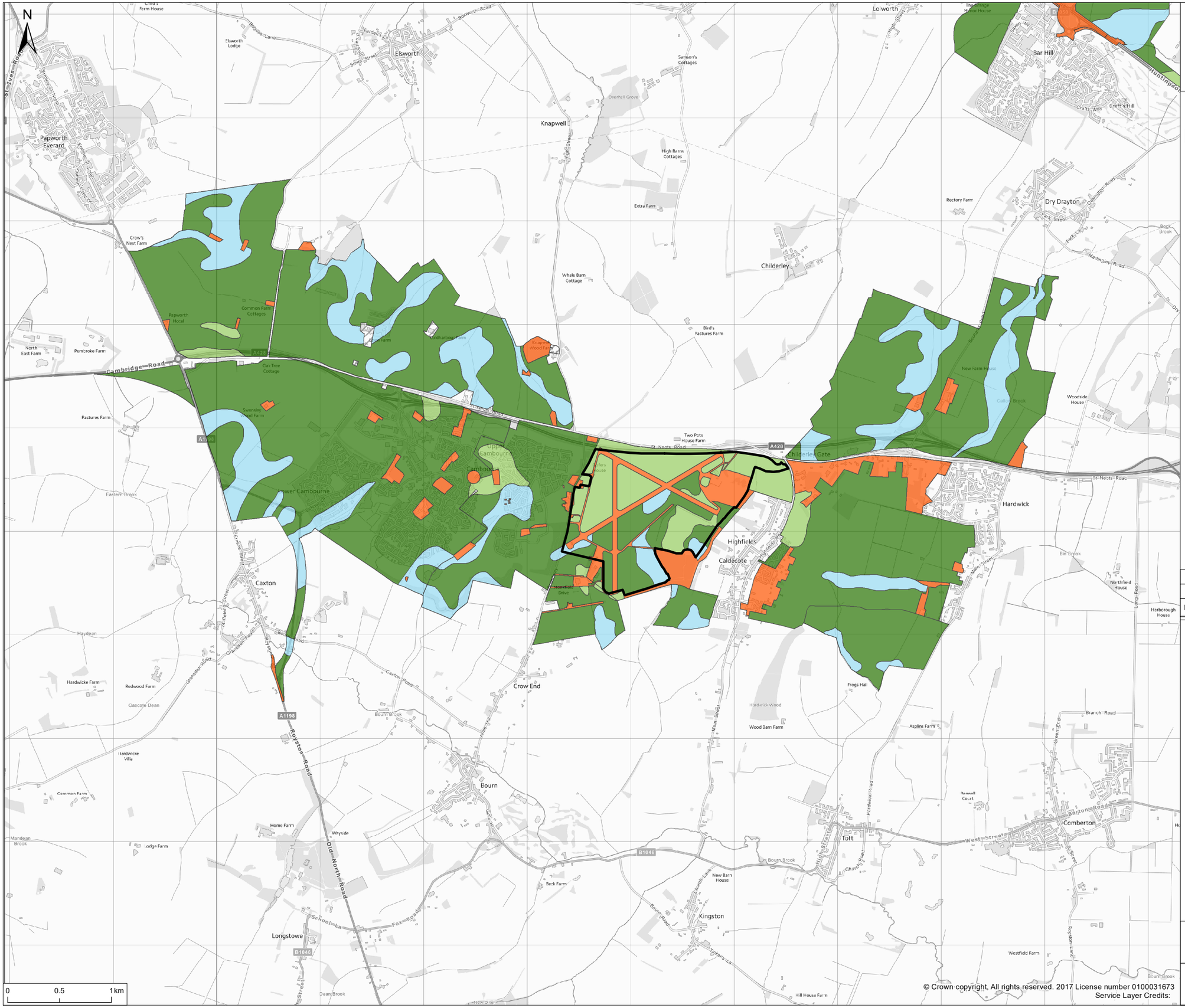

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Legend

- Site location

ALC Grade

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Not Surveyed
- Other

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Figure Number	Rev
2	-

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