

**SOILS AND AGRICULTURAL  
QUALITY OF LAND OFF DODDS LANE  
GWERSYLLT**

Report 1367/1b

6<sup>th</sup> November, 2017

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**SOILS AND AGRICULTURAL QUALITY  
OF LAND OFF DODDS LANE, GWERSYLLT**

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Report 1367/1b  
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6<sup>th</sup> November, 2017

## **SUMMARY**

This report provides information on the soils and agricultural quality of 1.75 ha of land off Dodds Lane, Gwersyllt.

The soils are mainly fine loamy over slowly permeable clay at depth. The site is mainly of subgrade 3a agricultural quality limited by wetness or stoniness. An area in the north of the site is limited by slope to subgrade 3b.

Were the site to be developed, the medium and sandy clay loam topsoils in the south would provide a high quality resource for reuse in landscaping; the heavy clay loam soil resources in the north of the site are of moderate quality for reuse.

## 1.0 Introduction

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- 1.1 This report provides information on the soils and agricultural quality of 1.75 ha of land off Dodds Lane, Gwersyllt. The report is based on a survey of the land in November 2017.

### **SITE ENVIRONMENT**

- 1.2 The survey area comprises two grassland fields and the site of a demolished farmstead. The site is bordered to the south by Dodds Lane, to the west by Pen-Y-Llyn and on other sides by adjoining agricultural land.
- 1.3 The land is mostly gently sloping with an average elevation of approximately 80 m AOD. An area in the north slopes moderately steeply at a gradient of 8°.

### **AGRICULTURAL USE**

- 1.4 The land was in rough grassland at the time of survey.

### **PUBLISHED INFORMATION**

- 1.5 1:50,000 scale BGS information records the site to be underlain by Pennine Lower Coal Measures Formation (mudstone, siltstone and sandstone). Superficial deposits of glaciofluvial sand and gravel are recorded in the west, with glacial till in the east.
- 1.6 The National Soil Map (published at 1:250,000 scale) shows the soils at the site to be within the Salop Association, mainly slowly permeable fine loamy and clayey soils<sup>1</sup>.
- 1.7 No Agricultural Land Classification (ALC) mapping of the site is available to current guidelines.

<sup>1</sup>Rudeforth, R., et al., (1984). *Soils and their use in Wales*, Soil Survey of England and Wales. Bulletin No 11, Harpenden.

## 2.0 Soils

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- 2.1 A detailed soil resource and agricultural quality survey was carried out in November 2017. It was based on observations at intersects of a 50 m grid, giving a sampling density of two observations per hectare. During the survey soils were examined by a combination of pits and augerings to a maximum depth of 1.0 m. A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report.
- 2.2 The soils were found to comprise medium or heavy clay loam topsoils with a permeable upper subsoil of the same texture, which overlies a slowly permeable clay subsoil. In the north and south of the site the soils do not have a slowly permeable layer within 1.0 m.
- 2.3 An example profile is described below from a pit at observation 2 (Map 1):
- |            |  |
|------------|--|
| 0-22 cm    | Dark brown (7.5YR 3/2) heavy silty clay loam; slightly stony with small subangular hard stones; well developed fine subangular blocky structure; very friable; smooth clear boundary to:                             |
| 22-70 cm   | Strong brown (7.5YR 5/8) heavy clay loam with yellow (10YR 8/8) sand inclusions and reddish yellow (5YR 5/8) mottles; moderately well developed fine subangular blocky structure; friable; smooth clear boundary to: |
| 70-100 cm+ | Red (2.5YR 4/6) clay with weak red (2.5YR 4/2) ped faces and few reddish brown (5YR 4/4) mottles; stoneless; weak coarse prismatic structure; very firm.   |
- 2.4 These soils are freely to imperfectly-draining (Soil Wetness Class I-III) and have a moderate capacity to absorb excess winter rainfall.

### 3.0 Agricultural land quality

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3.1 To assist in assessing land quality, the former Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF 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 in the 1960s and revised in 1988.

3.2 The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification<sup>2</sup>. The relevant site data for an average elevation of 80 m is given below.

- Average annual rainfall: 821 mm
- January-June accumulated temperature >0°C 1385 day°
- Field capacity period (when the soils are fully replete with water) 189 days mid Oct-late Apr
- Summer moisture deficits for: wheat: 92 mm potatoes: 80 mm

3.3 The survey described in the previous section was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for Agricultural Land Classification issued in 1988 by the Ministry of Agriculture, Fisheries and Food<sup>3</sup>. There are no climatic limitations at this locality.

#### **SURVEY RESULTS**

3.4 The agricultural quality of the land is determined either by wetness, slope or stoniness. Land of grade 3 has been identified.

#### **Subgrade 3a**

3.5 This grade makes up the majority of the site: loamy topsoils and permeable upper subsoils overlie a slowly permeable clay subsoil. This land is limited by wetness as the high clay content of the topsoil and dense lower subsoil will

<sup>2</sup>Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

<sup>3</sup>MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

restrict access with farm machinery during wet periods and therefore limit land use flexibility.

- 3.6 An area in the south of the site is limited to this subgrade as a result of the high stone content of topsoils. This acts as an impediment to cultivation, harvesting and crop growth by impairing crop establishment in precision-drilled crops, reducing nutrient capacity of topsoil, and distorting crop roots.

#### **Subgrade 3b**

- 3.7 This land grade is made up of an area in the north of the site limited by slope (gradient of 8°). This limits the agricultural quality of land as it restricts the safe and efficient use of farm machinery, thereby effecting cultivation opportunities and land use.

#### **Non agricultural land**

- 3.8 This land includes a demolished farmstead and outbuildings and a track.

#### **Grade areas**

- 3.9 The boundaries between the different grades of land are shown on Map 2 and the areas occupied by each are shown below.

**Table 1. Areas occupied by the different land grades**

<i><b>Grade/subgrade</b></i>	<i><b>Area (ha)</b></i>	<i><b>% of the agricultural land</b></i>
<b>Subgrade 3a</b>	1.13	79
<b>Subgrade 3b</b>	0.3	21
<b>Non agricultural</b>	0.32	-
<b>Total</b>	1.75	100

## **4.0 Soil resources and their use**

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### **Topsoil**

- 4.1. The topsoils are a moderate quality resource for reuse in landscaping and gardens, being loamy and naturally fertile, but difficult to handle with machinery when wet due to their moderately high clay content.
- 4.2. Handling of the all soil resources is best undertaken between May and September and avoided during or just after periods of heavy rainfall.

### **Subsoil**

- 4.3. The subsoils are susceptible to compaction during construction activities which could result in restricted rooting depth, increased droughtiness and risk of localised flooding. If compacted during construction, subsoils should be loosened before any topsoil is spread on them.

### **Soil Handling**

- 4.4. Areas not being built over (e.g. environmental buffers and landscape areas) should not be trafficked by construction vehicles as this will render the soils impermeable, preventing percolation of rainfall beyond the base of the topsoil, which will quickly become saturated.
- 4.5. Stripped topsoil should be stored in separate resource bunds no more than 3 m high and kept grassed and free from construction traffic until required for re-use. The Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Defra, 2009) provides guidance on good practice in soil handling.

**APPENDIX**  
**MAPS AND DETAILS OF OBSERVATIONS**

**Land off Dodds Lane: ALC and soil resources survey – Details of observations at each sampling point**

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
1	0-28	HZCL	5	28-92	HZCL	x(x)	91-100+	SZL	o	8	I	3b	Sl
2	0-22	HZCL	10	22-70	HCL	xx	<u>70</u> -100+	Cr	x	1	II/III	3a/b	W
3	0-25	SCL	10-15	25-65	SCLr mod st (dist. Bricks etc)	o	65+	Stopped on stone		2	I	3a	St
4	0-32	MCL	5	32-60	HCL	xxx	<u>60</u> -100+	C	xxx	0	III	3a	W

**Key to table**

*Mottle intensity:*

- o unmottled
- x few to common rusty root mottles (topsoils) or a few ochreous mottles (subsoils)
- xx common to many ochreous mottles and/or dull structure faces
- xxx common to many greyish or pale mottles (gleyed horizon)
- xxxx dominantly grey, often with some ochreous mottles (gleyed horizon)

a depth underlined (e.g. 50) indicates the top of a slowly permeable layer  
 (a wavy underline indicates the top of a layer borderline to slowly permeable)

*Texture:*

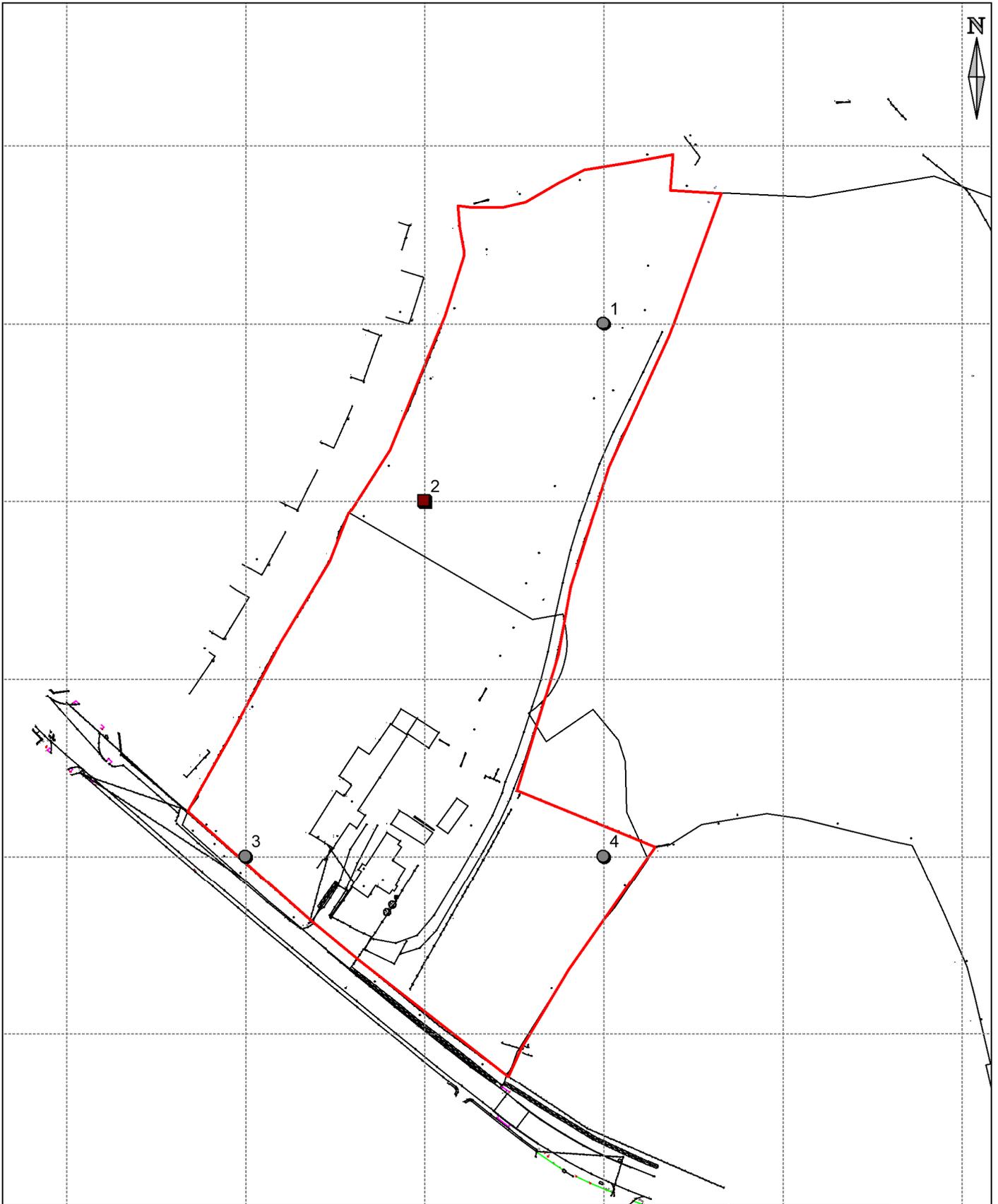
- C - clay
- ZC - silty clay
- SC - sandy clay
- CL - clay loam (H-heavy, M-medium)
- ZCL - silty clay loam (H-heavy, M-medium)
- SCL - sandy clay loam
- SZL - sandy silt loam (F-fine, M-medium, C-coarse)
- SL - sandy loam (F-fine, M-medium, C-coarse)
- LS - loamy sand (F-fine, M-medium, C-coarse)
- S - sand (F-fine, M-medium, C-coarse)
- P - peat (H-humified, SF-semi-fibrous, F-fibrous)
- LP - loamy peat; PL - peaty loam
- R - bedrock

*Limitations:*

- W - wetness/workability
- D - droughtiness
- De - depth
- St - stoniness
- Sl - slope
- F - flooding
- T - topography/microrelief

*Texture suffixes & prefixes:*

- ca – calcareous: x-extremely, v-very, sl-slightly
- (ca) marginally calcareous
- mn - ferrimanganiferous concentrations
- gn – greenish, yb – yellowish brown, rb – reddish brown
- r – reddish; (v)st – (very) stony; sdst–sandstone;lst - limestone
- dist - disturbed soil layer; mdst - mudstone



Client:



Project:

Land off Dodds Lane,  
Gwersyllt

Map title:

Map 1  
Survey observations

**KEY**

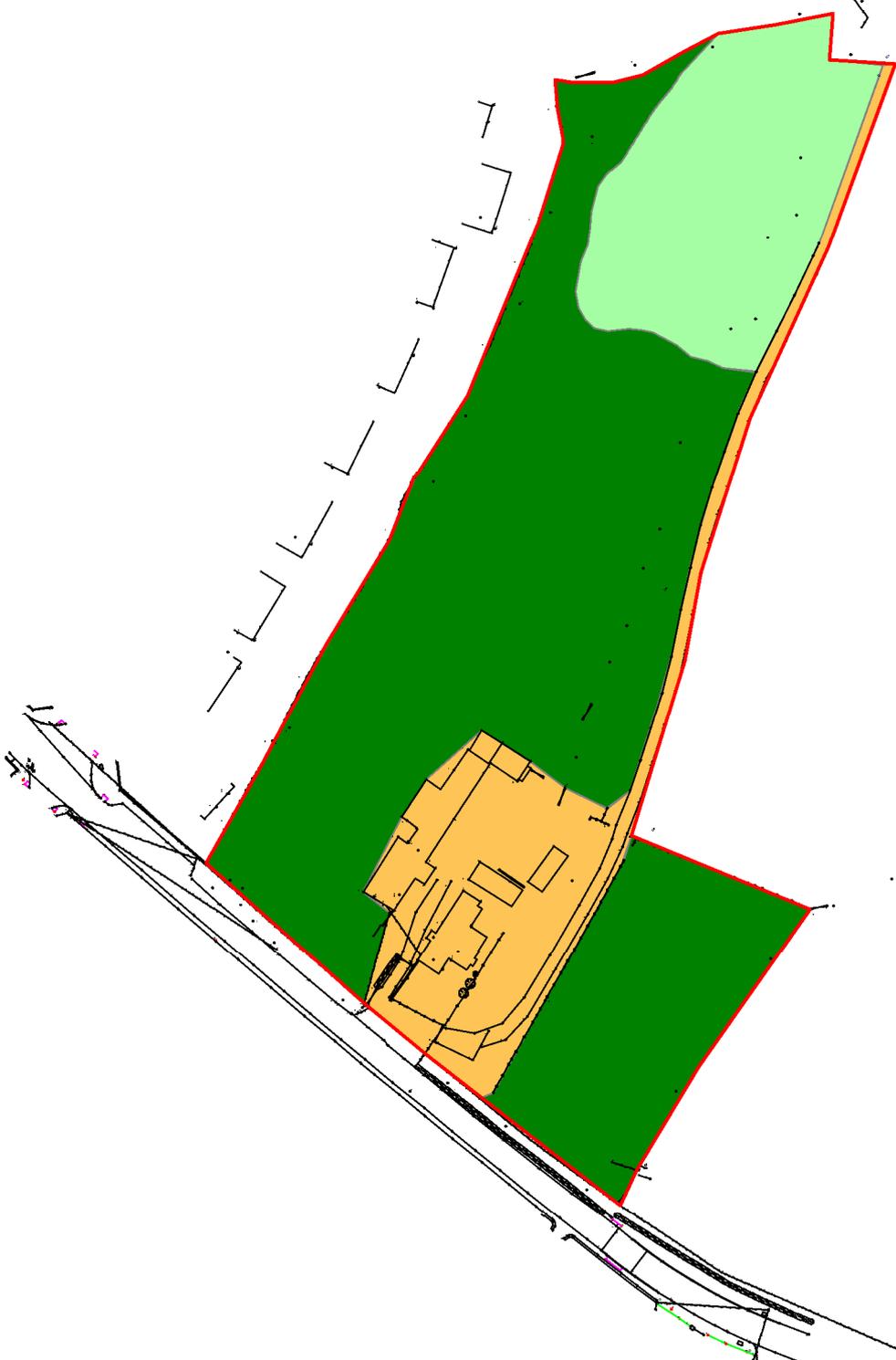
- Survey observation
- Soil/land grade description pit
- ▭ Survey area

Scale: 1:1,500 at A4

Date: 6/11/2017



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Client:



Project:

Land off Dodds Lane,  
Gwersyllt

Map title:

Map 2  
Agricultural Land Classification

KEY

-  Subgrade 3a
-  Subgrade 3b
-  Non agricultural
-  Survey area

Scale: 1:1,500 at A4

Date: 6/11/2017



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