

SOIL PHYSICAL CHARACTERISTICS REPORT FOR LAND ON THE PROPOSED
QUARRY AT BARFORD SHEDS, WARWICK

1 INTRODUCTION

The site of approximately 35 ha was surveyed in June 1991 when soils were augered to 100 cm on 100 m grid intersections, to provide a density of 1 boring per hectare. Additional profiles were described as necessary to determine land quality and soil unit boundaries.

The site is underlain by river terrace deposits on Mercia Mudstones and the resulting soils are light textured and slightly stoney over most of the sites. A susceptibility to drought has limited the Agricultural Land Classification Grading of most of the site to Subgrade 3a. Two major and two minor soil units have been identified which will require separate handling if the site is worked.

2 CLIMATIC LIMITATIONS

The land lies between 60 and 65 cm and has an accumulated temperature (January to June) of 1421°C and an average annual rainfall of 632 mm. Climate per se does not impose a limitation to the agricultural use of the land.

The rain falls fairly evenly throughout the year with rainfall peaks in Augusts and November and a relatively dry spell between February and April. The mean date of the last frost is late April.

3 SITE LIMITATIONS

The site lies to the south of Warwick between the River Avon in the north west and the B4462 in the south east. It

includes shelterbelt woodland adjacent to the road and a larger area of woodland in the north east.

The land is only very gently sloping with gradients of 2-4° and nowhere does gradient limit the agricultural use of the land. Altitude varies from 60-65 m over most of the site and as high as 67m in the west. The land is on terraced deposits above the flood plain of the River Avon and does not appear to flood.

4 GEOLOGY AND SOIL LIMITATIONS

The area is underlain by Mercia Mudstone on which River Terrace gravels have been deposited. The resulting soils are light textured and gravelly.

Typically 40 cm of slightly stoney sandy loam overlies stoney loamy sand. Loamy sand and gravel or sand and gravel occur below 60 or 70 cm in many profiles. The stone content reduces the available water capacity of the soils making them prone to drought.

Occasionally fine sandy loam overlies loamy sand and in these areas the soils are less prone to drought.

The soils are freely drained over most of the site and fall into wetness class I. On the low lying land adjacent to the wood slightly stoney sandy clay loam or clay loam soils overlie gleyed clay loams and sandy clay loams. These soils fall into wetness class IV.

5 INTERACTIVE LIMITATIONS

The physical limitations which result from interactions between climate, site and soil are soil wetness, droughtiness and erosion. Soil wetness expresses the extent

to which excess water imposes restrictions on crop growth and cultivations, whilst droughtiness indicates the degree to which a shortage of soil water influences the range of crops which may be grown and the level of yield which may be achieved.

Soil droughtiness is the major limiting factor in the classification of this land. The susceptibility to drought is determined by the difference between the amount of water the soils can hold (available water capacity (AWC)) and the median moisture deficit (MD) which has developed by the end of the critical part of the growing season. The moisture balance (MB), that is the difference between these two figures, indicates the susceptibility to drought of soils in a given area. In this area the median MD for wheat is 106 mm and for potatoes is 98 mm.

6 LAND USE

The agricultural land supports linseed. Mixed woodland occurs adjacent to the B4462 and in the north.

7 AGRICULTURAL LAND CLASSIFICATION

The land is mapped as Grade 3 and non agricultural.

7.1 Sub grade 3a

The subgrade accounts for 15.4 ha and 44.4% of the site. It is mapped over most of the agricultural land to include slightly stoney sandy loam soils which overlie loamy sand or sand and gravel. The sandy textures and high (25-40%) subsoil stone contents make the soils prone to drought in dry years and moisture balances are in the range +5 to -20 for wheat and -10 to -30 for potatoes. Iron cementing in

isolated profiles prevents root penetration below 60 cm. These soils are too droughty for a higher grade.

Deep, very slightly stoney fine sandy loam and sandy loam soils occur scattered across the site and where these are located the land is eligible for Grade 2. A very detailed survey would be required to map these areas separately.

7.2 Sub grade 3b

This sub grade accounts 1.5 ha and 4.3% of the site. It is mapped to include medium to heavy textured soils. Typically sandy clay loam or medium clay loam overlies gleyed sandy clay loam or clay loam. Red clay occurs within a 100 cm in some areas. These soils fall into wetness class IV and with sandy clay loam topsoils into Subgrade 3b.

7.3 Non agricultural and urban

This classification has been placed over mature woodland in the south and north east and includes grassy mounds adjacent to the track which leads to Barford Sheds. 17.8 ha and 51.3% of the site is placed in these grades.

7.4 Summary of Agricultural Land Classification Grades

Grade	Area (ha)	%
3a	15.4	44.4
3b	1.5	4.3
Non agricultural and urban	17.8	51.3
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TOTAL	34.7	100.0

8 SOIL RESOURCES

Two distinct soil types occur on site, which would require separate handling if the site is worked. In addition to the two main units two other units have been mapped to show the location of soil mounds and roads. Unit 1 has been subdivided into 1 and 1a to differentiate the soils with an organic litter layer at the surface.

8.1 Unit 1

This unit is mapped over the majority of the site to include sandy soils which overlies sand and gravel.

Typically 28 cm of dark brown (7.5 YR 3/4) sandy loam overlies brown (7.5 YR 4/4) sandy loam to 40 or 50 cm. Strong brown (7.5 YR 4/6) loamy sand occurs below these depths and sand occurs in many profiles at depths below 60 cm. The structure is weakly formed medium and coarse subangular blocky to coarse granular in the topsoil and upper subsoil but becomes more weak fine granular in the loamy sand or sand lower subsoils. In zones of iron cementing soils structures are massive and extremely firm and prevent root penetration. The soils show no signs of a slowly permeable layer and as a rule are not gleyed.

The total stone content is 5-10% of the topsoil of which 2-5% are greater than 2 cm. The soils become more stoney with depth and in the gravel layer total stones account for 20-40% of the horizon. The stones are typically rounded and angular hard pebbles.

A red clay marl was located below 60 cm in isolated profiles in the west (marked with an * on the soil resource map) if practicable this clay should be stripped and stored separately.

8.2 Unit 1a

The soils in this unit are the same as those in unit 1 but have a thin discontinuous organic layer at the surface, consisting of decomposing litter. This area is under woodland and when cleared some mixing of topsoil and upper subsoil will occur.

8.3 Unit 2

This unit is mapped in the centre of the site to include medium textured soils over clay. Typically 28 cm of dark brown (10 YR 4/3) sandy clay loam overlies grey brown sandy clay loam to 45 cm. Brown (7.5 YR 5/4) heavy sandy clay loam occurs below this depth. Below 60 cm reddish brown subsoils range from clay to sand.

The soils have a porous moderate coarse granular to moderate medium subangular blocky structure in the topsoil and a weak very coarse subangular blocky structure in the upper subsoil. As the soils become heavier so the structures become coarse prismatic. The soils are gleyed below 28 cm and slowly permeable at a similar depth.

The soils are slightly stoney (less than 5% total stones) in the topsoil. The stone content of the upper subsoil ranges from 5-25% but the heavy clay loam and clay horizons are virtually stoneless.

The pit was wet below 60 cm.

8.4 Unit 3

This unit is mapped over 2 mounds of soil which lie parallel to and either side of the track to Barford Sheds. If the site is worked for sand and gravel, exploratory pits should

be dug in these mounds to determine the nature of the material. Very occasional bricks and concrete blocks were seen at the surface and the mounds were too dry and hard to auger.

8.5 Unit 4

This unit delimits areas which have no soil at the surface.

8.6 Summary of soil units

Unit	Depth (cm)	Texture	Stones (%)
1	0-28	sandy loam	2-10
	28-40/50	sandy loam	10
	40/50-60	loamy sand	10
	60-100	loamy sand/sand	20-40
1a	5-0	litter layer	0
	as unit 1	as unit 1	as unit 1
2	0-28	sandy clay loam	5
	28-60	sandy clay loam	25
	60-100	sand to clay	0-25
3		Spoil heap	
4		No soil	

ROSEMARY PEEL

Resource Planning Group

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