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Land at Ebbsfleet,
Near Gravesend, Kent
Agricultural Land Classification
September 1995

Resource Planning Team
Guildford Statutory Group
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AGRICULTURAL LAND CLASSIFICATION REPORT

LAND AT EBBSFLEET, NR GRAVESEND, KENT.

INTRODUCTION

1. This summary report presents the findings of a detailed Agricultural Land Classification (ALC) survey on approximately 34 ha of land between the A2 and the Sewage Works at Ebbsfleet, near Gravesend, in Kent. The survey was carried out in September 1995.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF), Land Use Planning Unit (Reading), in connection with an ad-hoc planning application for residential and business development. The survey supersedes any previous survey on this land.

3. The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.

4. At the time of survey all of the land on this site was in a brassica crop.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000; it is accurate at this scale but any enlargement would be misleading.

6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area
1	8.1	23.7
2	11.4	33.3
3a	9.2	26.9
3b	3.7	10.8
4	1.8	5.3
Total survey area	34.2	100
Total site area	34.2	N/A

7. The fieldwork was conducted at an average density of approximately 1 boring per hectare. A total of 29 borings and 4 soil inspection pits were described during this survey.

8. The majority of the land on this site has been classified as 'best and most versatile' quality (Grades 1, 2 and Subgrade 3a) with some poorer quality land (Subgrade 3b and Grade 4) along the western edge.

9. All of the land on this site is currently irrigated and an adequate water supply is available for agricultural use. Irrigation can significantly enhance the potential of agricultural land, especially in drier areas, and is taken account of in the grading where it is current or recent practice.

10. Two areas of Grade 1, excellent quality, land have been mapped towards the east. One lies to the south of Springhead Enterprise Park and the other occurs as a narrow tongue through the centre of the site. These profiles are deep and relatively free draining comprising fine sandy loams over similar or slightly heavier subsoils. These profiles are irrigated so despite the dry climate they receive adequate water for crop growth. As a result this land has no or very minor limitations to agricultural use and is suitable for a very wide range of agricultural or horticultural crops.

11. Grade 2, very good quality, land has been mapped across much of the higher ground. These profiles are variable in texture, structure and stone content with a drainage status ranging from Wetness class I to II. A combination of stone contents, light soil textures and locally dry climatic regime reduce the amount of profile available water for crops. However, irrigation offsets these effects to give a slight soil droughtiness limitation. At some locations the amount of large stones (5-10% volume >2cm) in the topsoil also cause a minor topsoil stoniness limitation as they can affect crop growth and quality as well as damage farm equipment and cause wear to tyres. Minor soil wetness limitations occur where deep slowly permeable subsoils slightly impede water movement however the light topsoil textures aid workability.

12. A small pocket of Subgrade 3a, good quality, land lies towards the south of the site. The soil profiles comprise fine sandy loam topsoils over variable subsoils. The volume of larger (>2cm) flints in the topsoil is moderately high, though stone content in general decreases with depth. The key limitation here is topsoil stoniness as larger stones can affect crop growth and quality as well as damage agricultural machinery and cause increased wear to tyres. The north west of the site has also been classified as Subgrade 3a where medium and heavy clay loams overlie the Upper Chalk at relatively shallow depths. With the benefit of irrigation land in this area has been classified as Subgrade 3a on the basis of a slight to moderate soil droughtiness limitation.

13. The south western edge of the site comprises a steep bank which has been classified as Subgrade 3b and Grade 4 on the basis of gradient restrictions. Steeply sloping land such as this can limit the safe and efficient use of agricultural machinery as well as initiate water induced soil erosion where the topsoil textures have a high content of fine sand.

FACTORS INFLUENCING ALC GRADE

Climate

14. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

15. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values	
		TQ 620 727	TQ 617 734
Grid reference	N/A		
Altitude	m, AOD	30	5
Accumulated Temperature	day°C	1468	1496
Average Annual Rainfall	mm	584	564
Field Capacity Days	days	110	106
Moisture Deficit, Wheat	mm	122	126
Moisture Deficit, Potatoes	mm	119	124

16. The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

17. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (ATO, January to June), as a measure of the relative warmth of a locality.

18. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation (Climate Grade 1). However, climatic factors do interact with soil properties to influence soil wetness and droughtiness limitations. At this locality the high crop adjusted soil moisture deficits may increase the likelihood of soil droughtiness while the correspondingly low average annual rainfall may reduce the likelihood of soil wetness.

19. Local climatic factors such as exposure or frost risk are not believed to affect the site.

Site

20. The majority of the site is relatively flat and is situated between 20-30cm AOD. Land along the western edge of the site, however, drops to between 5-10m AOD forming a steep bank. Gradients in this area range from 7.5° to 18° thus restricting the safe and effective use of agricultural machinery. This area has therefore been classified as Subgrade 3b and Grade 4 quality land on the basis of a gradient limitation.

21. Flooding does not appear to adversely affect this site.

Geology and soils

22. The relevant geological sheet (BGS, 1977) maps the majority of the site as the Thanet Beds which occupy the higher ground to the south east of the site. The underlying Upper Chalk outcrops to the north and west on the lower ground. Drift Head deposits are shown to occur in the north over the chalk while a very small area of plateau gravel is situated on the Thanet Beds, at the highest point of the site. Some alluvium may also occur next to the River Ebbsfleet.

23. The most recently published soil information for the site (SSEW, 1983) shows the entire site to be Urban though the Fyfield 4 and Frilsham soil associations are both mapped near by. The former are described as 'Deep well drained often stoneless coarse loamy and sandy soils. Some fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging and some slowly permeable seasonally waterlogged fine loamy over clayey soils. Risk of water erosion.' (SSEW, 1983). The latter are said to be 'Well drained mainly fine loamy soils over chalk, some calcareous. Shallow calcareous fine loamy and fine silty soils in places.' (SSEW, 1983). Detailed field survey shows that the Fyfield 4 soils broadly relate to the Thanet Beds while the Frilsham soils correspond more closely to the chalk.

AGRICULTURAL LAND CLASSIFICATION

24. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.

25. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix III.

Grade 1

26. Grade 1, excellent quality land, occurs in two pockets across the site. These profiles generally comprise very slightly to slightly flinty (2-8% by volume) fine sandy loam topsoils over slightly stony (10% by volume) loamy fine sand, fine sandy loam and medium clay loam upper subsoils. The stone content generally diminishes in the lower subsoils (0-3% by volume), though occasional stonier subsoils were noted (25% by volume). The soil textures vary in the lower subsoil from fine sandy loams and loamy fine sands to sandy clay loams and clay loams. Most profiles are deep and free draining though some become slowly permeable at depth. These have been classified as Wetness Class II, Grade 1, as the combination of the dry climate and light soil textures counteract the effects of soil wetness, otherwise Wetness Class I is assigned. The combination of soil factors (particularly textures and stone content) and the dry climate means this land is, infact, slightly droughty. However, irrigation is practiced across the site and adequate water is readily available for most agricultural and horticultural crops. As a result there are little or no limiting factors affecting the agricultural land use of these parts of the site.

Grade 2

27. The majority of this site has been classified as Grade 2, very good quality land, principally due to slight soil wetness and soil droughtiness restrictions. To the south west of the Springhead Enterprise Park the soil profiles comprise medium clay loam topsoils over moderately structured heavy clay loam upper subsoils. At approximately 45cm depth the heavy clay loam becomes slowly permeable thus impeding drainage through the profile. In this locally dry climatic regime the resultant soil wetness is consistent with Wetness Class II, Grade 2, as slight structural damage may arise through trafficking by agricultural machinery or grazing livestock. Wet soils can also inhibit crop germination and growth.

28. The remainder of the Grade 2 mapping unit is limited by soil droughtiness and occasionally topsoil stoniness. Here the profiles comprise very slightly to moderately flinty (5-15% total stone by volume) fine sandy loam topsoils over moderately flinty (10-25% by volume) loamy fine sand, sandy clay loam or, less frequently, slightly heavier upper subsoils. The stone content decreases in the lower subsoil (2-5% by volume) where the soil textures generally range from fine sandy loams to fine sands. Occasional borings contained slowly permeable subsoils but these are too deep to affect the overall grade. In this locally dry climatic regime the combination of light soil textures and stone content reduce the amount of profile available water for plants. This would normally restrict the level and range of crop yields to the extent Subgrade 3a is appropriate. However, this land is irrigated which has the effect of partially alleviating drought risk in this area thus allowing Grade 2 to be mapped.

29. Topsoil stones also limit parts of this land to Grade 2 where the amount of large flints (> 2cm diameter) in the topsoils measure 6%. This limits land to Grade 2 as a result of the increased damage caused to tyres and farm equipment and the effects upon seed germination.

Subgrade 3a

30. In the north west corner of the site the land has been classified as Subgrade 3a, the key limitation being soil droughtiness. The profiles generally comprise very slightly to slightly flinty (3-10% by volume) medium and heavy clay loam topsoils over very chalky (40-50% by volume) medium clay loam or silty clay loam upper subsoils. In general the Upper Chalk is encountered between 22-60cm depth. In this locally dry climatic regime the shallow soil depth over chalk and total stone content act to reduce profile available water for crops. Normally this would result in severe drought stress such that Subgrade 3b would be mapped. However, irrigation helps to offset these factors. This land has therefore been classified as good quality, Subgrade 3a.

31. Towards the centre of the site a small parcel of land has also been classified as Subgrade 3a. Here the profiles comprise moderately flinty (20-25% by volume) fine sandy loam topsoils over variably stony (5-30% flint by volume) medium clay loam, fine sandy silt loam and fine sandy loam upper subsoils. A poorly structured, very slightly stony(2% by volume), clay occurs towards the bottom of the profile but this does not significantly restrict drainage. The limiting factor in this area is the high percentage of large flint in the topsoil (11-13% >2cm by volume) as they can adversely affect crop establishment and growth. Large flints can also cause wear to tyres and damage farm machinery.

Subgrade 3b

32. Along the south western edge of the site an area of land has been classified as Subgrade 3b, moderate quality, on the basis of a gradient restriction. A combination of the steep slope (7.5°-11°), limited turning space and light topsoils textures significantly restrict the range of agricultural machinery that can be safely and efficiently used in this area. The light topsoil textures also result in some soil erosion (by water) evidence of which was noted at the time of survey.

Grade 4

33. A small strip of land within the Subgrade 3b unit has been classified as Grade 4, poor quality, on the basis of a more severe gradient restriction. The angle of slope in this area measures between 11.5°-18°. Therefore the safe and effective use of most agricultural equipment will be greatly reduced. Soil erosion (by water) resulting from a combination of light topsoil textures and steep slopes was also more marked in this area.

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SOURCES OF REFERENCE

British Geological Survey (1977) *Sheet No. 271*, Dartford. 1:50,000 scale (Drift Edition). BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.* MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification.* Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet 6, Soils of South East England.* SSEW: Harpenden.

Soil Survey of England and Wales (1983) *Soils and their Use in South East England* SSEW: Harpenden

DESCRIPTIONS OF THE GRADES AND SUBGRADES

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 or horticultural crops can usually be grown but on some land of this 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 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the 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 the 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 Agricultural Land

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

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religous buildings, cemetries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: private parkland, public open spaces, sports fields, allotments and soft-surfaced areas on airports. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

Agricultural Buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (eg. polythene tunnels erected for lambing) may be ignored.

Open Water

Includes lakes, ponds and rivers as map scale permits.

Land Not Surveyed

Agricultural land which has not been surveyed.

Where the land use includes more than one of the above, eg. buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will be shown.

APPENDIX II

SOIL WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Wetness Class	Duration of waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years.[2]
II	The soil profile is wet within 70 cm depth for 31-90 days in most years **or**, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but only wet within 40 cm depth for 30 days in most years.
III	The soil profile is wet within 70 cm depth for 91-180 days in most years **or**, if there is no slowly permeable layer present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years **or**, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

[1] The number of days is not necessarily a continuous period.
[2] 'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL DATA

Contents:

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database. This uses notations and abbreviations as set out below.

Boring Header Information

1. **GRID REF**: national 100 km grid square and 8 figure grid reference.

2. **USE**: Land use at the time of survey. The following abbreviations are used.

ARA:	Arable	**WHT:**	Wheat	**BAR**:	Barley
CER:	Cereals	**OAT**:	Oats	**MZE**:	Maize
OSR:	Oilseed rape	**BEN**:	Field Beans	**BRA**:	Brassicae
POT:	Potatoes	**SBT**:	Sugar Beet	**FCD**:	Fodder Crops
LIN:	Linseed	**FRT:**	Soft and Top Fruit	**FLW**:	Fallow
PGR:	Permanent Pasture	**LEY**:	Ley Grass	**RGR**:	Rough Grazing
SCR:	Scrub	**CFW**:	Coniferous Woodland	**DCW**:	Deciduous Wood
HTH:	Heathland	**BOG**:	Bog or Marsh	**FLW**:	Fallow
PLO:	Ploughed	**SAS**:	Set aside	**OTH**:	Other
HRT:	Horticultural Crops				

3. **GRDNT**: Gradient as estimated or measured by a hand-held optical clinometer.

4. **GLEY/SPL**: Depth in centimetres (cm) to gleying and/or slowly permeable layers.

5. **AP (WHEAT/POTS)**: Crop-adjusted available water capacity.

6. **MB (WHEAT/POTS)**: Moisture Balance. (Crop adjusted AP - crop adjusted MD)

7. **DRT**: Best grade according to soil droughtiness.

8. If any of the following factors are considered significant, 'Y' will be entered in the relevant column.

MREL:	Microrelief limitation	**FLOOD:**	Flood risk	**EROSN**:	Soil erosion risk
EXP:	Exposure limitation	**FROST**:	Frost prone	**DIST**:	Disturbed land
CHEM:	Chemical limitation				

9. **LIMIT**: The main limitation to land quality. The following abbreviations are used.

OC:	Overall Climate	**AE**:	Aspect	**EX**:	Exposure
FR:	Frost Risk	**GR**:	Gradient	**MR**:	Microrelief
FL:	Flood Risk	**TX**:	Topsoil Texture	**DP**:	Soil Depth
CH:	Chemical	**WE**:	Wetness	**WK**:	Workability
DR:	Drought	**ER**:	Erosion Risk	**WD**:	Soil Wetness/Droughtiness
ST:	Topsoil Stoniness				

Soil Pits and Auger Borings

1. **TEXTURE**: soil texture classes are denoted by the following abbreviations.

S:	Sand	**LS**:	Loamy Sand	**SL**:	Sandy Loam
SZL:	Sandy Silt Loam	**CL**:	Clay Loam	**ZCL**:	Silty Clay Loam
ZL:	Silt Loam	**SCL**:	Sandy Clay Loam	**C**:	Clay
SC:	Sandy Clay	**ZC**:	Silty Clay	**OL**:	Organic Loam
P:	Peat	**SP**:	Sandy Peat	**LP**:	Loamy Peat
PL:	Peaty Loam	**PS**:	Peaty Sand	**MZ**:	Marine Light Silts

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

F: Fine (more than 66% of the sand less than 0.2mm)
M: Medium (less than 66% fine sand and less than 33% coarse sand)
C: Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content: **M:** Medium (<27% clay) **H**: Heavy (27-35% clay)

2. **MOTTLE COL**: Mottle colour using Munsell notation.

3. **MOTTLE ABUN**: Mottle abundance, expressed as a percentage of the matrix or surface described.

F: few <2% **C:** common 2-20% **M**: many 20-40% **VM**: very many 40% +

4. **MOTTLE CONT:** Mottle contrast

F: faint - indistinct mottles, evident only on close inspection
D: distinct - mottles are readily seen
P: prominent - mottling is conspicuous and one of the outstanding features of the horizon

5. **PED. COL**: Ped face colour using Munsell notation.

6. **GLEY:** If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

7. **STONE LITH**: Stone Lithology - One of the following is used.

HR:	all hard rocks and stones	**SLST**:	soft oolitic or dolimitic limestone
CH:	chalk	**FSST**:	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	**GH**:	gravel with non-porous (hard) stones
MSST:	soft, medium grained sandstone	**GS**:	gravel with porous (soft) stones
SI:	soft weathered igneous/metamorphic rock		

Stone contents (>2cm, >6cm and total) are given in percentages (by volume).

8. **STRUCT**: the degree of development, size and shape of soil peds are described using the following notation:

degree of development	**WK**: weakly developed **ST**: strongly developed	**MD**: moderately developed
ped size	**F**: fine **C**: coarse	**M**: medium **VC**: very coarse
ped shape	**S** : single grain **GR**: granular **SAB**: sub-angular blocky **PL**: platy	**M**: massive **AB**: angular blocky **PR**: prismatic

9. **CONSIST**: Soil consistence is described using the following notation:

L: loose **VF**: very friable **FR**: friable **FM**: firm **VM**: very firm
EM: extremely firm **EH**: extremely hard

10. **SUBS STR**: Subsoil structural condition recorded for the purpose of calculating profile droughtiness: **G**: good **M**: moderate **P**: poor

11. **POR**: Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.

12. **IMP**: If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropiate horizon.

13. **SPL**: Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.

14. **CALC**: If the soil horizon is calcareous, a 'Y' will appear in this column.

15. Other notations
    APW: available water capacity (in mm) adjusted for wheat
    APP: available water capacity (in mm) adjusted for potatoes
    MBW: moisture balance, wheat
    MBP: moisture balance, potatoes

SOIL PIT DESCRIPTION

Site Name : EBBSFLEET, GRAVESEND Pit Number : 1P

Grid Reference: TQ61707330 Average Annual Rainfall : 564 mm
Accumulated Temperature : 1496 degree days
Field Capacity Level : 106 days
Land Use :
Slope and Aspect : 03 degrees W

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 28	MCL	10YR42 00	0	3	HR					Y
28- 46	MCL	10YR53 00	0	5	CH		MDCSAB	FR	M	Y
46- 52	MZCL	10YR63 00	0	45	CH		WKCSAB	FR	M	Y
52- 74	CH	10YR81 00	0	5	HR				P	Y

Wetness Grade : 1 Wetness Class : I
Gleying : cm
SPL : No SPL

Drought Grade : 3B APW : 99 mm MBW : -27 mm
APP : 103mm MBP : -21 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : EBBSFLEET, GRAVESEND Pit Number : 2P

Grid Reference: TQ61907320 Average Annual Rainfall : 564 mm
Accumulated Temperature : 1496 degree days
Field Capacity Level : 106 days
Land Use :
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	MCL	10YR32 00	1	2	HR					
30- 45	HCL	10YR43 00	0	0		F	MDCSAB	FR	M	
45- 58	HCL	25Y 53 00	0	0		M	MDCPR	FR	M	
58-120	HCL	25Y 62 00	0	0		M	MDCAB	FM	P	

Wetness Grade : 2 Wetness Class : II
Gleying :045 cm
SPL :045 cm

Drought Grade : 3A APW : 136mm MBW : 10 mm
APP : 112mm MBP : -12 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : EBBSFLEET, GRAVESEND Pit Number : 3P

Grid Reference: TQ61907300 Average Annual Rainfall : 564 mm
Accumulated Temperature : 1496 degree days
Field Capacity Level : 106 days
Land Use :
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 32	FSL	10YR32 00	1	5	HR					
32- 54	FSL	10YR54 00	0	10	HR		MDCSAB	FR	M	
54-120	FSL	10YR53 00	0	2	HR		MDCSAB	FR	M	

Wetness Grade : 1 Wetness Class : I
Gleying : cm
SPL : No SPL

Drought Grade : 2 APW : 173mm MBW : 47 mm
APP : 119mm MBP : -5 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : EBBSFLEET, GRAVESEND Pit Number : 4P

Grid Reference: TQ61907270 Average Annual Rainfall : 564 mm
Accumulated Temperature : 1496 degree days
Field Capacity Level : 106 days
Land Use :
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	FSL	10YR32 00	6	15	HR					
25- 40	FSL	10YR54 00	0	25	HR				M	
40- 80	FSL	10YR53 00	0	0					M	
80-120	LFS	25Y 63 00	0	0					M	

Wetness Grade : 1 Wetness Class : I
Gleying : cm
SPL : No SPL

Drought Grade : 3A APW : 168mm MBW : 42 mm
APP : 113mm MBP : -11 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC		COMMENTS
1	TQ61807350	PLO	W	02			1	1	84	-42	89	-35	3B				DR	3B	3A	Irrigation
1P	TQ61707330	BRA	W	03			1	1	99	-27	103	-21	3B				DR	3B	3A	Irrigation
2	TQ61707340	PLO	W	02			1	1	140	14	116	-8	2				DR	2	1	Irrigation
2P	TQ61907320	BRA			045	045	2	2	136	10	112	-12	3A				DR	3A	2	Irrigation
3	TQ61807340	PLO	NW	02			1	1	76	-50	80	-44	3B				DR	3B	3A	Irrigation
3P	TQ61907300	BRA					1	1	173	47	119	-5	2				DR	2	1	Irrigation
4	TQ61707330	BRA	W	03			1	1	96	-30	100	-24	3B				DR	3B	3A	Irrigation
4P	TQ61907270	BRA					1	1	168	42	113	-11	3A				DR	3A	2	Irrigation
5	TQ61807330	PLO	W	04			1	2	76	-50	80	-44	3B				DR	3B	3A	Irrigation
6	TQ61707320	BRA	W	05			1	1	113	-13	115	-9	3A				DR	3A	2	Irrigation
7	TQ61807320	BRA	W	03	030	030	3	3A	132	6	105	-19	3A				WE	3A		
8	TQ61907320	BRA	N	01	045	045	2	2	137	11	113	-11	3A				DR	3A	2	Irrigation
10	TQ61807310	BRA	NW	02	030		1	1	179	53	123	-1	2				DR	2	1	Irrigation
11	TQ61907310	BRA	NW	01	032	032	3	2	172	46	118	-6	2				WD	2		
12	TQ62007310	BRA	N	01	075	075	2	1	152	26	115	-9	2				DR	2	1	Irrigation
13	TQ62107310	BRA	N	01			1	1	156	30	118	-6	2				DR	2	1	Irrigation
14	TQ62207310	BRA					1	1	135	9	114	-10	2				DR	2	1	Irrigation
16	TQ61807300	BRA					1	1	133	7	91	-33	3B				DR	3B	3A	Irrigation
17	TQ61907300	BRA					1	1	170	44	115	-9	2				DR	2	1	Irrigation
18	TQ62007300	BRA	W	02			1	1	160	34	102	-22	3A				DR	3A	2	Irrigation
19	TQ62107300	BRA			100		1	1	149	23	104	-20	3A				DR	3A	2	Irrigation
21	TQ61807290	BRA			085	085	1	1	157	31	113	-11	3A				DR	3A	2	Irrigation
22	TQ61907290	BRA			100	100	1	1	163	37	120	-4	2				DR	2	1	Irrigation
23	TQ62007290	BRA			060	060	2	1	152	26	117	-7	2				DR	2	1	Irrigation
24	TQ62107290	BRA					1	1	168	42	115	-9	2				DR	2	1	Irrigation
25	TQ62207290	BRA			070	070	2	1	134	8	102	-22	3A				DR	3A	2	Irrigation
26	TQ61807280	BRA	W	03			1	1	176	50	115	-9	2				DR	2	1	Irrigation
27	TQ61907280	BRA	E	02	100	100	1	1	136	10	95	-29	3A				ST	3A		
28	TQ62007280	BRA	E	02			1	1	74	-52	74	-50	4				ST	3A		
29	TQ62107280	BRA	SE	01	060	060	2	1	163	37	118	-6	2				DR	2	1	Irrigation
30	TQ62207280	BRA	SE	01			1	1	164	38	117	-7	2				DR	2	1	Irrigation
32	TQ61907270	BRA					1	1	168	42	113	-11	3A				DR	3A	2	Irrigation
33	TQ62007270	BRA	E	01	100		1	1	145	19	104	-20	3A				DR	3A	2	Irrigation

				MOTTLES			PED		STONES				STRUCT/	SUBS				
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
1	0-25	mcl	10YR43 00						1	0	HR	8					Y	
	25-60	mcl	10YR64 00						0	0	CH	40		M			Y	I60 See 1P
1P	0-28	mcl	10YR42 00						0	0	HR	3					Y	
	28-46	mcl	10YR53 00						0	0	CH	5	MDCSAB	FR M			Y	
	46-52	mzcl	10YR63 00						0	0	CH	45	WKCSAB	FR M			Y	
	52-74	ch	10YR81 00						0	0	HR	5		P			Y	Roots to 74
2	0-25	mcl	10YR53 43						0	0	HR	5					Y	
	25-38	mcl	10YR54 64						0	0	HR	5		M			Y	
	38-60	mzcl	10YR64 00						0	0	CH	5		M			Y	
	60-90	hzcl	75YR68 00						0	0	CH	2		M			Y	
	90-110	mzcl	10YR73 63						0	0	CH	40		M			Y	Imp 110
2P	0-30	mcl	10YR32 00						1	0	HR	2						
	30-45	hcl	10YR43 00	10YR58 00	F				0	0		0	MDCSAB	FR M				FS
	45-58	hcl	25Y 53 00	75YR58 00	M			Y	0	0		0	MDCPR	FR M	Y		Y	FS
	58-120	hcl	25Y 62 00	75YR58 00	M		10YR53 00	Y	0	0		0	MDCAB	FM P	Y		Y	FS
3	0-25	mcl	10YR53 00						1	0	HR	10					Y	
	25-65	ch	10YR81 00						0	0	HR	1		P			Y	See 1P
3P	0-32	fsl	10YR32 00						1	0	HR	5						
	32-54	fsl	10YR54 00						0	0	HR	10	MDCSAB	FR M				
	54-120	fsl	10YR53 00						0	0	HR	2	MDCSAB	FR M				
4	0-27	mcl	10YR43 00						0	0	HR	5					Y	
	27-35	mcl	10YR54 00						0	0	CH	5		M			Y	
	35-55	mcl	10YR54 00						0	0	CH	50		M			Y	
	55-75	ch	10YR81 00						0	0	HR	1		P			Y	See 1P
4P	0-25	fsl	10YR32 00						6	0	HR	15						
	25-40	fsl	10YR54 00						0	0	HR	25		M				
	40-80	fsl	10YR53 00						0	0		0		M				
	80-120	lfs	25Y 63 00						0	0		0		M				
5	0-22	hcl	10YR53 00						0	0	CH	10					Y	
	22-65	ch	10YR81 00						0	0	HR	1		P			Y	See 1P
6	0-30	mcl	10YR32 00						0	0	HR	1					Y	
	30-65	mcl	10YR44 00						0	0	HR	4		M			Y	
	65-80	hcl	10YR54 00						0	0	HR	5		M			Y	I80 flints
7	0-30	mcl	10YR32 00						0	0	HR	2						
	30-58	c	25Y 63 00	10YR58 00	M			Y	0	0		0		P	Y		Y	
	58-80	c	10YR53 00	75YR58 00	M			Y	0	0		0		P	Y		Y	
	80-120	scl	25Y 62 00	75YR58 00	C			Y	0	0		0		P	Y		Y	

				----MOTTLES-----			PED		----STONES----				STRUCT/	SUBS				
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC	
8	0-35	mcl	10YR32 00						1	0	HR	3							
	35-45	hcl	10YR43 00	10YR58 00	F				0	0		0		M					FS
	45-60	hcl	25Y 53 00	10YR58 00	C			Y	0	0		0		M	Y		Y		FS
	60-120	hcl	25Y 63 00	75YR58 00	M			Y	0	0		0		P	Y		Y		FS
10	0-30	fsl	25Y 42 00						1	0	HR	2							
	30-65	fsl	25Y 53 63	10YR58 00	C			Y	0	0	HR	1		M					
	65-120	lfs	05Y 63 00	10YR68 00	C			Y	0	0	HR	1		M					
11	0-32	fsl	10YR42 00						1	0	HR	2							
	32-60	hcl	10YR53 00	10YR58 00	C			Y	0	0	HR	2		M			Y		FS
	60-120	fsl	25Y 53 72	10YR58 00	C			Y	0	0	HR	1		M					
12	0-30	fsl	10YR42 00						1	0	HR	3							
	30-40	scl	10YR43 00						0	0	HR	2		M					FS
	40-75	hcl	10YR43 00						0	0	HR	1		M					FS
	75-120	hcl	25Y 52 63	10YR58 00	C			Y	0	0	HR	1		M			Y		FS
13	0-35	fsl	10YR42 00						1	0	HR	5							
	35-55	fsl	10YR54 00						0	0	HR	5		M					
	55-90	hcl	10YR54 00						0	0	HR	2		M					FS
	90-120	scl	10YR54 00						0	0	HR	2		M					
14	0-32	fsl	10YR42 00						1	0	HR	5							
	32-60	fsl	10YR43 00						0	0	HR	10		M					
	60-100	fsl	10YR54 00						0	0	HR	25		M					Imp flints
16	0-25	fsl	10YR32 00						2	0	HR	10							
	25-60	lfs	10YR44 00						0	0	HR	35		M					
	60-120	scl	10YR56 00	10YR68 00	C			S	0	0	HR	2		M					C Lens 70
17	0-28	fsl	10YR32 00						1	0	HR	8							
	28-50	fsl	10YR44 00						0	0	HR	10		M					
	50-70	fsl	10YR44 00						0	0	HR	10		M					
	70-90	lfs	10YR54 00						0	0	HR	2		M					
	90-120	lfs	25Y 63 00						0	0	HR	2		M					See 3P
18	0-25	fsl	10YR32 00						0	0	HR	5							
	25-50	lfs	10YR54 00						0	0	HR	20		M					
	50-80	lfs	10YR54 00						0	0	HR	5		M					
	80-120	fsl	10YR64 00	10YR62 00	C				0	0	HR	5		M					
19	0-30	fsl	10YR32 00						0	0	HR	5							
	30-50	scl	10YR44 00						0	0	HR	10		M					
	50-70	scl	10YR44 00						0	0	HR	15		M					
	70-100	scl	10YR54 00						0	0	HR	5		M					
	100-120	fsl	10YR53 00	75YR68 00	M			Y	0	0	HR	5		M					

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
21	0-30	fsl	10YR32 00						2	0	HR	8							
	30-55	fsl	10YR44 00						0	0	HR	15		M					
	55-70	fszl	10YR54 00						0	0	HR	25		M					
	70-85	lfs	10YR64 00						0	0	HR	5		M					
	85-120	scl	10YR53 00	10YR68 00	C			Y	0	0		0		M	Y		Y		
22	0-30	fsl	10YR32 00						1	0	HR	5							Moist Profile
	30-50	mcl	10YR44 00						0	0	HR	10		M					FS
	50-80	fszl	10YR54 00						0	0	HR	5		M					
	80-100	hcl	10YR54 00						0	0		0		M					FS
	100-120	hcl	25Y 53 00	10YR58 00	C			Y	0	0		0		M	Y		Y		FS
23	0-35	fsl	10YR32 00						1	0	HR	5							
	35-45	fsl	10YR44 00						0	0	HR	10		M					
	45-60	fsl	10YR54 00						0	0	HR	10		M					
	60-100	hcl	25Y 53 00	7.5YR58 00	C			Y	0	0		0		M	Y		Y		
	100-120	scl	25Y 63 00	7.5YR58 00	C			Y	0	0		0		P	Y		Y		
24	0-30	fsl	10YR32 00						0	0	HR	5							
	30-50	fsl	10YR44 00						0	0	HR	10		M					
	50-70	fsl	10YR44 00						0	0	HR	15		M					
	70-120	fsl	10YR54 00						0	0	HR	5		M					
25	0-30	fsl	10YR32 00						0	0	HR	5							
	30-50	mcl	10YR44 00						0	0	HR	20		M					
	50-70	c	10YR54 00	10YR58 00	C			S	0	0	HR	25		M					FS
	70-100	hcl	25YR53 00	7.5YR58 00	C			Y	0	0	HR	5		M	Y		Y		FS
	100-120	scl	25Y 63 00	10YR58 00	C			Y	0	0		0		P	Y		Y		
26	0-35	fsl	10YR53 00						0	0	HR	1							
	35-70	lfs	10YR64 00						0	0		0		M					
	70-120	lfs	10YR74 00						0	0		0		M					
27	0-30	fsl	10YR31 00						13	1	HR	25							
	30-65	mcl	10YR43 00						0	0	HR	20		M					
	65-100	fsl	10YR54 00						0	0	HR	5		M					
	100-120	c	10YR63 62	10YR58 00	M			Y	0	0	HR	2		P			Y		
28	0-30	fsl	10YR31 00						11	0	HR	20							
	30-50	fszl	10YR43 00						0	0	HR	30		M					I50 See 4P
29	0-30	fsl	10YR42 00						2	0	HR	5							High FS Content
	30-60	fsl	10YR43 00						0	0	HR	5		M					
	60-100	scl	25Y 53 00	7.5YR58 00	C			Y	0	0	HR	2		M			Y		
	100-120	fsl	25Y 64 00	10YR58 00	C				0	0	HR	2		M					
30	0-28	fsl	25Y 42 00						2	0	HR	5							High FS Content
	28-57	fsl	10YR43 00						0	0	HR	5		M					
	57-95	scl	10YR54 00						0	0	HR	2		M					
	95-120	lfs	25Y 64 54						0	0		0		M					

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
32	0-25	fsl	10YR32 00						6	0	HR	15						
	25-40	fsl	10YR54 00						0	0	HR	25		M				
	40-80	fsl	10YR53 00						0	0		0		M				
	80-120	lfs	25Y 63 00						0	0		0		M				
33	0-30	fsl	10YR42 00						6	1	HR	15						
	30-100	hcl	10YR54 00						0	0	HR	10		M				
	100-120	fs	25Y 56 64	10YR58 00	C			Y	0	0		0		M				