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AGRICULTURAL LAND CLASSIFICATION
PROPOSED B2015 HALE STREET BY-PASS

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AGRICULTURAL LAND CLASSIFICATION

B 2015 HALE STREET BY-PASS, KENT

1 SUMMARY

1 1 A detailed Agricultural Land Classification (ALC) survey of approximately 15 ha of land along the route of the proposed B2015 Hale Street By-Pass was undertaken during August 1991 on behalf of Kent County Council, Highways and Transportation Department

1 2 The results of this survey are presented in the form of a coloured plan illustrating the distribution of the ALC grades along the line of the proposed by-pass Within the survey 'corridor the extent and percentage of the ALC grades is as follows

	Ha	%
Grade 2	3 3	21 9
3a	2 6	17 2
3b	2 8	18 5
Non-Agricultural	0 6	4 0
Not Surveyed	1 5	9 9
Urban	4 3	28 5
Total	15 1	100

1 3 The main factors influencing the ALC grades found within the survey area are the result of interactions between soil and climatic factors, namely soil droughtiness and/or wetness

2 BACKGROUND

2 1 The Agricultural Land Classification provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long term limitations on agricultural use The limitations can operate in one or more of four principal ways they may affect the range of crops which can be grown the level of yield, the consistency of yield and the cost of obtaining it The classification system gives considerable weight to flexibility of cropping, whether actual or potential, but the ability of some land to produce consistently high yields of a somewhat narrower range of crops is also taken into account

2 2 The principal physical factors influencing agricultural production are climate site and soil These factors together with interactions between them form the basis for classifying land into one of five grades Grade 1 land being of excellent quality and Grade 5 land of very poor quality Grade 3 which constitutes about half of the agricultural land in England and Wales is now divided into two subgrades designated 3a and 3b General descriptions of the grades and subgrades are given in Appendix 1

2 3 Further details of the Agricultural Land Classification System are contained in the MAFF publication Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land' (MAFF, 1988)

2 4 In connection with the detailed ALC survey work at Hale Street a corridor of land, approximately 50 m wide, was surveyed with the line of the proposed road route lying at the centre of the corridor The corridor, widens to accommodate the additional works required for junctions 27 soil auger boring examinations were made using a 1 2 m Dutch soil auger together with a small number of hand dug soil inspection pits

2 5 At the time of the survey (August 1991) the land was mainly in arable production (cereals), with smaller areas of grass and orchards An area of land adjoining the existing gravel pit operated by J Clubb Ltd was being used for the storage of stripped soils

3 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

3 1 Climatic data was obtained by interpolation from a 5 km grid point dataset adjusted for the height and location of the survey area (Met Office, 1989) The data interpolated for the survey area is as follows

Grid Reference	TQ673497	TQ674472
Altitude	15 m A O D	13 m A O D
Average Annual Rainfall (mm)	665	673
Accumulated Temperature (day °c)	1495	1498
Moisture Deficit (wheat - mm)	123	123
Moisture Deficit (potatoes - mm)	120	121
Field Capacity Days	138	139

3 2 The above figures indicate that climatic factors per se place no limitation on agricultural land quality at this location However they do affect interactions between climate and soil, namely soil wetness and droughtiness The site has a relatively low average annual rainfall with high moisture deficits This increases the risk and degree of droughtiness on soils which lack good reserves of available moisture Conversely the relatively dry climate (139 field capacity days) reduces the likelihood of soil wetness problems and increases the opportunities for land work in favourable conditions

Relief

3 3 The survey area around Hale Street lies in an area of flat and very gently sloping land known as the "Low Weald" The proposed by-pass route is bisected by the River Medway which occupies a wide and nearly flat flood plain The terraces which border the flood plain are only slightly higher than the flood plain itself Altitudes within the survey area vary from about 13-15 m A O D Some localised flooding may occur in the Branbridges area

Geology and Soils

3 4 The published geological map sheet covering the Hale Street area (Sheet 287) (IGS, 1971) indicates that the proposed road route passes through areas of alluvium adjoining the River Medway with spreads of Brickearth on the slightly elevated terrace formations Trial boreholes at East Peckham and Hale Street have proved up to 13 feet of stony loams, silty and sandy clay, with beds of gravel overlying Weald Clay (Dines et al 1969)

3 5 A semi-detailed soil map at a scale of 1 25000 is published for the Paddock Wood area (Soil Survey Record No 99-SSEW, 1986) This maps the soils of the proposed by-pass route as the Hamble, Hook and Park Gate soil series developed in stoneless drift (brickearth) with the Fladbury series in clayey river alluvium and the Breamore series associated with non-calcareous gravels

3 6 Detailed survey along the line of the proposed by-pass confirms the general occurrence of these soil types Topsoils are typically non-calcareous medium sandy silt loams and medium clay loams over similar textured subsoils which may extend to depths in excess of 1 m or, more commonly pass to coarse loamy, sandy and gravelly lower horizons Occasional profiles have subsoil horizons with a higher clay content which may reduce soil permeability Droughtiness is the main factor influencing ALC grading especially where coarse textures and/or gravel occurs at shallow depth Many soils are affected by groundwater but only occasional soil profiles have overriding wetness/workability limitations, particularly within the Medway floodplain

4 AGRICULTURAL LAND CLASSIFICATION

4 1 The results of this survey are presented in the form of a coloured plan illustrating the distribution of the ALC grades along the line of the proposed by-pass Within the survey corridor" the extent and percentage of the ALC grades is as follows

	Ha	%
Grade 2	3 3	37 9
3a	2 6	29 9
3b	2 8	32 2
Total agricultural land	8 7	100 0
Non-Agricultural	0 6	
Not Surveyed	1 5	
Urban	4 3	
Total Area	15 1	

4 2 Land quality ranges from grade 2 to grade 3b Land of a higher quality (grades 2 and 3a) is mainly so graded because of droughtiness limitations, whilst 3b land is associated with disturbed or restored land, and heavier slowly permeable or shallow soil types within the Medway floodplain Land not surveyed represents an area used for soil storage heaps by J Clubb Ltd who operate a sand and gravel quarry immediately adjoining Non-agricultural land includes small areas of woodland, scrub or domestic gardens Urban land represents existing roads and houses

Grade 2

4 3 Land of this quality occurs northeast of Borough's Oak Farm, northeast of Hale Street east of East Peckham and immediately north of the Bell Inn The associated soils are similar in type at all locations having stoneless to very slightly stony non-calcareous medium sandy silt loam or medium clay loam topsoils over similar textured subsoils derived from brickearth drift Some heavy clay loam and sandy clay loam subsoil horizons were also noted Below about 75 cm many of the profiles pass to medium sandy loam horizons, occasionally with coarse sand or sand and gravel at depth These soils are all well drained (wetness Class I) but may show some evidence of fluctuating groundwater at depths generally below 60-70 cm

4 4 Moisture balance calculations indicate that the main agricultural limitation causing land to be graded 2 is a slight risk of drought However such land is versatile and capable of a wide range of agricultural and horticultural cropping

Grade 3a

4 5 Land graded 3a can be broadly divided into two groupings, namely land lying north of the River Medway and that to the south

4 6 Areas to the north of the River Medway included in this grade (ie in the vicinity of the existing junction of the B2016 and B2015 roads) comprises soils very similar to those graded 2 but with sand and gravel occurring higher in the soil profile, between about 60 and 90 cm Moisture balance calculations indicate a reduction in the available water capacity of the soil which increases the risk of drought The soils are, however permeable and well drained (wetness Class I) but show some evidence (gleying) of fluctuating groundwater at depth which can be controlled by appropriate drainage measures if necessary

4 7 South of the River Medway the land graded 3a (ie immediately south of the Tudeley Brook with a further area east of the Whitbread Hop Farms) comprises non-calcareous stoneless to slightly stony topsoils of heavy clay loam sandy clay loam or occasionally medium clay loam or sandy silt loam These typically overlie gritty heavy clay loam subsoils which may become slowly permeable Coarse sandy or gravelly horizons frequently occur below about 70 cm Such soils usually exhibit gleying due to current or past waterlogging within 40 cm Since they are variably permeable, wetness is due either to high groundwater or slowly permeable subsoil horizons Consequently the soils are allocated to wetness Classes II or III limiting some of the heavier soil variants to grade 3a on the basis of wetness limitations In addition moisture balance calculations indicate that many soil profiles are also limited to grade 3a due to droughtiness as a result of their relatively shallow depth over gravelly or coarse sandy horizons

4 8 In common with land graded 2 most of these soils are flexible in use, although some of the heavy variants may have workability limitations The increased risk of drought in this dry climate area may, however reduce consistency of yield

Grade 3b

4 9 Grade 3b land is found in two situations Firstly immediately south of the River Medway within the flood plain and secondly in disturbed/restored land areas, these occur adjoining the gravel workings at East Peckham and south of Beltring Road

4 10 South of the River Medway the associated soils have non-calcareous heavy clay loam topsoils overlying similar subsoils which are usually gleyed within 25-50 cm These either pass to a heavy alluvial silty clay, or gravel at 50-60 cm Drainage status is variable ranging from wetness class II where gravel is present to wetness III or IV where silty clay subsoils occur

4 11 Moisture balance calculations indicate that the shallow soils over gravel cannot be graded higher than Grade 3b, whilst soils in wetness class III or IV with non-calcareous heavy clay loam topsoils cannot be graded above 3b due to wetness and workability restrictions Sporadic flooding may also occur in this area Consequently this land has moderately severe limitations affecting its flexibility of cultivations, cropping and performance being primarily suited to cereal and grass production

4 12 As mentioned in paragraph 4 10, areas of restored/disturbed land are also included in this grade Restored land associated with the gravel pit at East Peckham was worked for gravel and reinstated about 1-2 years ago using inert fill and the original soil materials In the second area South of Beltring Road the level of the land was raised using imported fill some years ago Both areas currently have subsoil structural problems coupled with a limited amount of topsoil at some locations These areas are currently limited to grass production

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SOURCES OF REFERENCE

DINES et al, (1969) Geology of the Country around Sevenoaks Explanation of one-inch Geological Sheet 287 Institute of Geological Sciences

INSTITUTE OF GEOLOGICAL SCIENCES (1971) Geological Map Sheet no 287 (solid and drift) 1 63360 Scale Sevenoaks

MAFF (1988) Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land

METEOROLOGICAL OFFICE (1989) Climatological datasets for Agricultural Land Classification

SOIL SURVEY OF ENGLAND AND WALES (SSEW) (1986) Soil Survey Record no 99 Soils in Kent IV Sheet TQ 64 (Paddock Wood) 1 25,000 scale

APPENDIX I

DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield In practice the grades are defined by reference to physical characteristics and the grading guidance and cut offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions The most productive and flexible land falls into Grades 1 and 2 and Subgrade 3a and collectively comprises about one third of the agricultural land in England and Wales About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4 Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates The remainder is very poor quality land in Grade 5 which mostly occurs in the uplands

Descriptions are also given of other land categories which may be used on ALC maps

Grade 1 – excellent quality agricultural land

Land with no or very minor limitations to agricultural use A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit soft fruit, salad crops and winter harvested vegetables Yields are high and less variable than on land of lower quality

Grade 2 – very good quality agricultural land

Land with minor limitations which affect crop yield cultivations or harvesting A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops The level of yield is generally high but may be lower or more variable than Grade 1

Grade 3 – good to moderate quality agricultural land

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

Subgrade 3a – good quality agricultural land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops especially cereals or moderate yields of a wide range of crops including cereals grass oilseed rape potatoes sugar beet and the less demanding horticultural crops

Subgrade 3b – moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year

Grade 4 – poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or level of yields It is mainly suited to grass with occasional arable crops (eg 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 very severe limitations which restrict use to permanent pasture or rough grazing except for occasional pioneer forage crops

Descriptions of other land categories used on ALC maps

Urban

Built up or 'hard uses with relatively little potential for a return to agriculture including housing industry commerce education transport religious buildings cemeteries 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 golf courses private parkland public open spaces sports fields allotments and soft surfaced areas on airports/airfields 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 land cover types eg buildings in large grounds and where map scale permits the cover types may be shown separately Otherwise, the most extensive cover type will usually be shown

APPENDIX II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile Six revised soil wetness classes (Hodgson in preparation) are identified and are defined in Table 11

Table 11 Definition of Soil Wetness Classes

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 not wet within 40 cm depth for more than 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 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 and 90 days in most years
IV	The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years *or*, if there is no slowly permeable layer 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

[1] The number of days specified is not necessarily a continuous period

[2] In most years is defined as more than 10 out of 20 years

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics site and climatic factors Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field The method adopted here is common to ADAS and the SSLRC